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Foreword

It is with great pleasure that we present the second volume of Innovation Academy: Innovation Management in Health & Social Care. Building on the foundations established in the inaugural edition, this publication continues to showcase high-quality research outputs and practice-informed projects from postgraduate learners on the *MSc Advanced Health & Care Management (Innovation & Transformation)*. The work collected here reflects the programme's core mission: to equip current and future leaders with the capabilities required to drive meaningful, evidence-informed innovation across health and social care systems.

The contributions in this volume demonstrate the powerful intersection of scholarly inquiry and applied practice. Each project engages with contemporary challenges within health and social care—ranging from service redesign and innovation capability-building to transformational change and system integration. Collectively, these works advance theoretical understanding while offering practical, context-ready solutions. They exemplify the academic rigour of our learners and their commitment to achieving measurable impact within their respective professional fields.

These projects also align strongly with national strategic priorities. They reflect the ambitions outlined in *A Healthier Wales* (Welsh Government, 2018), which emphasises whole-system, person-centred, and sustainable models of care. They also resonate with the *Innovation Strategy for Wales* (Welsh Government, 2023), which promotes mission-driven innovation, strengthened translational pathways, and research that delivers societal and economic benefit. In doing so, this volume contributes to Wales's broader vision for a resilient, equitable, and innovation-led health and social care ecosystem.

The interdisciplinary composition of the cohort, spanning health, social care, the third sector, public services, and the wider life sciences and industry landscape, has enriched the depth and breadth of insights presented. This diversity strengthens the analyses, fosters rich knowledge exchange, and reinforces the collaborative ethos that defines the Innovation & Transformation programme.

This publication offers clear value across multiple audiences. For academics and researchers, the practitioner-led studies provide empirical evidence and conceptual reflections that deepen understanding of innovation methodologies in complex care environments. For policymakers, the volume presents real-world findings and emerging innovation capabilities that can inform system-level strategy, policy development, and service planning. For students and early-career professionals, the projects offer accessible, inquiry-driven exemplars of innovation in action, illustrating how theory can be translated into high-impact practice and showcasing pathways for developing their own innovation and leadership competencies.

The *Innovation Academy Research Series* reaffirms the shared commitment of Swansea University and the All-Wales Intensive Learning Academy for Innovation in Health and Social Care to advancing innovation scholarship, promoting open access, and contributing to knowledge that shapes policy, informs practice, and strengthens health and social care systems for the future.

Warm regards,

Editorial team

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Implementation of the Flying Start programme in Swansea and its alignment with Local Authority strategy

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Abstract:

This research project is an analytic study into the implementation of the Flying Start programme by Swansea Council. The study seeks to understand how Welsh Government policy and guidance is interpreted and executed by Local Authorities. Its primary objective is to enhance the understanding of the effectiveness of Swansea Council's implementation of Flying Start in accordance with Local Authority strategy, thereby contributing to the advancement of future practices.

This project reviews and evaluates relevant literature, outlining the importance of policies and legislation aimed at early intervention within Wales. Utilising a pragmatic, mixed method approach, the project conducts two questionnaires to increase understanding of:

- Swansea Council's implementation of Flying Start, and particularly its Childcare element.
- How Local Authorities across Wales interpret and apply Welsh Government policies and guidance.
- Welsh Government's view on the implementation by Local Authorities (LAs).

The primary and secondary research are synthesised and analysed, ultimately leading to the identification of 12 key recommendations therefore encouraging improved delivery within Swansea Council.

Keywords: Early Intervention, Prevention, Collaboration, Childcare, Social Services, Local Authority Strategy.

Acronyms, Tables, and Figures

List of acronyms used

Acronym	Definition
CCG	Children and Communities Grant
CSA	Childcare Sufficiency Assessment
CWLWM	Childcare Wales Learning & Working Mutually (A consortium of five childcare and play partners, supporting childcare providers throughout Wales)
ECEC	Early Childhood Education and Care
EY	Early Years
EYEH	Early Years Early Help
FS	Flying Start
GIS	Geographic Information Systems
HV	Health Visiting
LA	Local Authority
LSOA	Lower Super Output Area
NHS	National Health Service
PSB	Public Services Board
SALT	Speech and Language Therapy
SBUHB	Swansea Bay University Health Board
VBHC	Value-based Healthcare
WG	Welsh Government

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Introduction

Context And Influence

The Flying Start Programme (FS) is a Welsh Government Early Years initiative, launched in 2006/7, and targeted at families with children under four years of age in some of the most disadvantaged areas across Wales (Welsh Government, 2024a). FS consists of four fully funded key elements (see *Figure 1*).



Figure 1. FS core elements (Welsh Government, 2019).

There has recently been an expansion of the childcare element of the programme, in line with the "protect, re-build and develop services for vulnerable people" commitment within the *Programme for Government* where it was announced that there would be a phased expansion of EY childcare provision to include all two-year-olds. The *Programme for Government* also outlined the desire to achieve this via the flagship FS programme, with a specific emphasis on Welsh medium provision (WG, 2021b, p. 3).

This research project will take account and analyse the presence of key strategies and legislation both at national and local levels, some of which are listed in *Table 1* and *Table 2*.

Table 1. Key strategies guiding implementation of FS in Swansea.

Title	Publisher	Year	Overview/Purpose
Prevention Strategy	Swansea Council	2022	A strategy about "delivering more sustainable services that meet people's needs and deliver better outcomes" (Swansea Council, 2022b, p.3).
Tackling Poverty Strategy	Swansea Council	2021	The strategy aims to address income poverty; service poverty; participation; maximising the income of residents; minimise the "poverty premium"; remove barriers to employment; and reduce inequalities (Swansea Council, 2021, p.5).
Partnership and Commissioning Hub Service Plan 2023/24	Swansea Council	2024	The key service priority is to work in partnership to meet the needs of communities by fully utilising the commissioning cycle principles of Analyse, Plan, Do and Review (Swansea Council, 2024b).

Table 2. Key policies, document and legislation guiding implementation of FS at a national level.

Title	Publisher	Year	Overview/Purpose
Children and Young People: Rights to Action	Welsh Government	2004	The Welsh Government has Seven Core Aims for Children and Young People, derived from the United Nations Convention on the Rights of the Child (UNCRC). The first of the aims is that of *A Flying Start in Life*.
Social Services and	National	2014	Social Care Wales (2024) outlines the
Well-being (Wales) Act 2014	Assembly for Wales		fundamental principles of the Act as: voice and control; prevention and early intervention; well-being; and co-production.

A Healthier Wales	Welsh Government	2021	WG outline the importance of good health and healthy behaviours "in the first few years of life, with pre-birth and the first 1,000 days as the most critical time to influence healthy outcomes" (WG, 2021a, p.10). Statistics releases from WG also cite *A Healthier Wales* as relevant in the context of Flying Start (WG, 2024a).
Programme for Government	Welsh Government	2021	A detailed list of well-being priorities and objectives that WG wish to focus on during its tenure, including a significant focus on health and social care provision.
Phased expansion of Early Years Provision	Welsh Government	2024	Welsh Government guidance on the expansion of early years childcare provision via the Flying Start Programme. An estimated timeline is described, detailing that the third and final phase of FS expansion is due to take place from April 2025 (WG, 2024b).
Well-being of Future Generations (Wales) Act 2015	Welsh Government	2015	Designed to ensure public sector organisations in Wales work towards the long-term sustainability and well-being of current and future generations. The Act requires public organisations to consider the social, economic, environmental, and cultural well-being of Wales in their decision-making. It includes seven wellbeing goals, including a prosperous, resilient, and healthier Wales (Future Generations Commissioner for Wales, 2024).

Research Motivation

The researcher primarily works in data analysis and compliance, responsible for supporting the project management, data reporting and implementation of FS and its subsequent childcare expansion. Her experience within social care and EY have fuelled her interest in exploring and emphasising the key themes surrounding the challenges and opportunities of expanding childcare to all two-year-olds in Wales. The researcher aims to develop a set of general and widely applicable recommendations for future practice, to enable Welsh LAs to share good practice.

Research Objectives

The central research question of this study is:

"What are the best ways to implement Flying Start in Swansea?"

To highlight recommendations surrounding the future expansion and implementation of the Flying Start programme, and particularly FS Childcare within Swansea.

Subsequent research aims are:

- Gain insight from other LAs in how they implement FS.
- Evaluate how Swansea and other LAs align the implementation of FS with local strategies.

Conclusions and the Structure of the Research Project

This chapter has outlined the evolution of FS implementation. Whilst the implementation strategies differ across Welsh LAs, this research primarily focuses on Swansea Council as the central case study for analysis. Chapter 2 will provide a review of the existing literature around FS and EY; Chapter 3 will outline the research design and methodology; Chapter 4 will present the findings from the interviews and surveys undertaken; Chapter 5 will discuss the synthesis between the research and the literature review; Chapter 6 will discuss the concluding remarks; finally, Chapter 6 will outline a list of recommendations to improve the effectiveness and outcomes of FS implementation.

Literature Review

Introduction

The purpose of this literature review is to critically examine existing research and policy documents related to the implementation of FS in Wales, with a specific focus on how the programme aligns with local authority strategies. Much of the literature around FS overlaps heavily with other EY research on topics such as the *Childcare Offer for Wales*. As the programme was introduced by WG to improve the life chances of children aged 0-4 in disadvantaged areas, the provision of comprehensive support services seeks to mitigate these inequalities. Similarly, the expansion of the childcare only element of FS seeks to also improve the quality of life for families in Wales.

Understanding how FS and its recent childcare expansion aligns with and is integrated into LA strategies is crucial to assess the effectiveness and sustainability of the programme, especially within the context of legislation such as the Social Services and Well-being (Wales) Act 2014 and the Well-being of Future Generations (Wales) Act 2015. Swansea Council, as one of the 22 Welsh LAs that coordinate and commission FS services, offers a pertinent case study to explore the interplay between national policy objectives and local priorities. This literature review will analyse the extent to which FS complements Swansea Council's overarching goals for EY development and poverty reduction, identify challenges and best practices at a local level, and highlight gaps in the current literature that require further examination. Through this analysis, the review aims to provide a comprehensive foundation for evaluating the programme's impact and informing future practice and policy in FS and EY throughout Wales as a whole.

Local Authority Strategy and Policy

Strategy plays a pivotal part in LA implementation of FS across Wales. Local government structures and functions are similar across all 22 LAs, and this section of the literature review will focus on Swansea as a primary case study.

It is essential to define strategy. Mintzberg (1987) defines a deliberate strategy as one that is planned and intentional. It is a strategy where an organisation clearly defines goals, and the steps needed to achieve them. Senior leadership makes conscious decisions about the direction of the organisation and aligns resources and actions to fulfil these plans. In contrast, Mintzberg (1987) also discusses emergent strategy, where a strategy arises when an organisation does not follow specific or pre-determined plans; it instead allows patterns of behaviour to emerge over time. Emergent strategies take a more adaptive approach, where the organisation responds to challenges and opportunities that arise unexpectedly (see *Figure 2*).

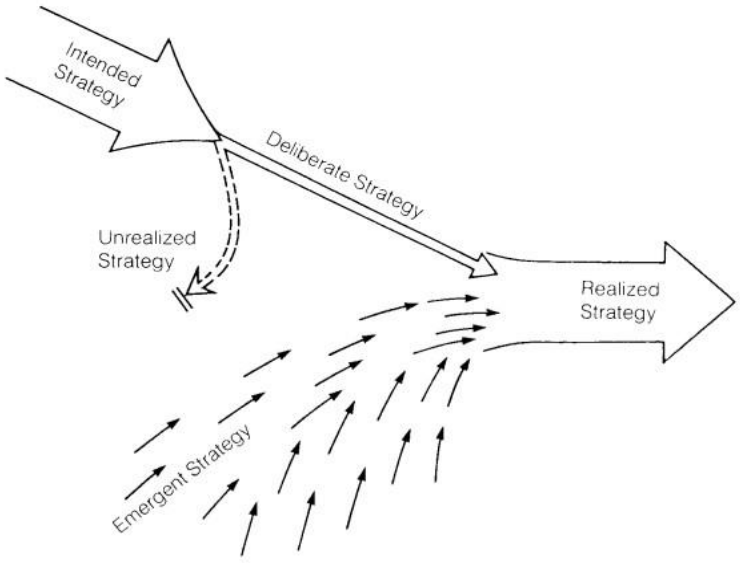


Figure 2. Deliberate and Emergent Strategies (Mintzberg, 1987, p.14).

When examining how Swansea Council implements FS through the lens of Mintzberg's strategic framework, it is essential to consider the LA's strategies for Poverty and Prevention, as well as financial plans. The LA

combines both deliberate and emergent strategies to effectively manage and deliver FS services, adapting to the changing needs of the community whilst maintaining a clear focus on high-level strategic objectives.

Swansea Council's *Tackling Poverty* and *Prevention* strategies outline clear objectives aimed at reducing child poverty, improving early childhood outcomes, and promoting social inclusion (Swansea Council, 2021, 2022). These goals align closely with the objectives of the FS programme, which focus on providing targeted support to children in the most disadvantaged areas (Welsh Government, 2024a).

The Council's Medium Term Financial Plan (Swansea Council, 2024a) reflects a deliberate strategy by allocating specific resources to Social Services (within which FS and EY sits). This deliberate allocation ensures that the programme receives the WG funding ringfenced under the Children and Communities Grant (CCG). The financial plan also outlines the pressures surrounding budget constraints and the increasing costs of services.

Swansea Council has adopted several budget principles that underpin its strategy (see *Table 3*). These principles allow for prioritisation of essential services, within which social services sit. The principles also ensure that FS services are delivered in a sustainable and collaborative manner.

Table 3. Swansea Council's Budget Principles (Swansea Council, 2024a).

Everything is included	Increased income
Engagement	Different models of delivery
We will have less money	Supporting those at risk
Demonstrating efficiency	Evidence base
Cutting red tape	Sustainable outcomes/prevention
Full cost recovery	Personal responsibility
All services must apply and be consistent with these Budget Principles	
All services are also required to address these principles as part of their business planning and developing savings proposals.	

Swansea Council's Prevention Strategy is a key driver in how social care and education are delivered throughout the authority. The strategy emphasises the importance of early intervention to reduce longterm dependency on social services and to promote positive outcomes in education, health and social care (Swansea Council, 2022b). The literature on prevention strategies in public services suggests that proactive approaches to service delivery, such as those employed by Swansea Council, are crucial in reducing the need for costly reactive interventions in following years (Allen, 2011). The strategy aligns with this by prioritising support for vulnerable families, providing them with services (such as the four FS elements or childcare as a standalone expanded provision) that help prevent problems from escalating into more complex situations. This approach is supported by evidence from broader research, such as Munro (2011), who argues that "preventative services can do more to reduce abuse and neglect than reactive services" (p.7).

The strategy also reflects broader trends in LA planning, where preventative measures are increasingly seen as essential to sustainable service delivery within the remit of the Well-being of Future Generations (Wales) Act 2015 (Welsh Government, 2023). The literature on the effectiveness of LA prevention strategies highlights the importance of collaboration between sectors, something which Swansea Council actively pursues through its partnership with SBUHB, schools, and community organisations (Local Government Association, 2008). These partnerships not only enhance service delivery but also create a more resilient system capable of adapting to changing needs in the community (Local Government Association, 2008).

Similarly, the Tackling Poverty Strategy in Swansea emphasises the importance of early intervention to prevent the long-term effects of poverty on children and families (Swansea Council, 2021). As noted by Allen (2011), free or low-cost quality childcare also allows parents to go to work, which in turn increases household income; this also has an impact on a family's well-being and experience. The strategy is a key component of the LA's broader efforts to tackle deprivation and social inequality. The strategy aligns with national priorities set by WG and is underpinned by local implementation of initiatives such as FS and the *Childcare Offer for Wales*. Swansea Council's approach is both strategically and operationally integrated, with EY programmes playing a crucial role in achieving the overarching goal of breaking the cycle of poverty (Swansea Council, 2021).

The FS programme is a central pillar of the Council's early intervention efforts, and its Tackling Poverty Strategy directly links to this evidence by prioritising FS as a key mechanism for mitigating the effects of poverty, by providing funded part-time childcare, enhanced health visiting and SALT intervention, and parenting support. The strategy also highlights the need for collaborative working across all sectors, to address the multifaceted nature of poverty (Swansea Council, 2021). The encouragement of joint working and pooling of resources to deliver effective integrated services throughout the strategy is exemplified through the implementation of FS. The literature on public service integration supports this approach, suggesting that multi-agency collaboration improves service delivery and outcomes for vulnerable families (Local Government Association, 2008; Jones et al., 2021). Through FS, Swansea Council can leverage its partnership with SBUHB to provide holistic support to families, addressing not only childcare and health needs, but also offering wider family support services. Archambault et al. (2020) found that tackling multiple aspects of disadvantage simultaneously is more effective than addressing them in isolation (see *Figure 3*).

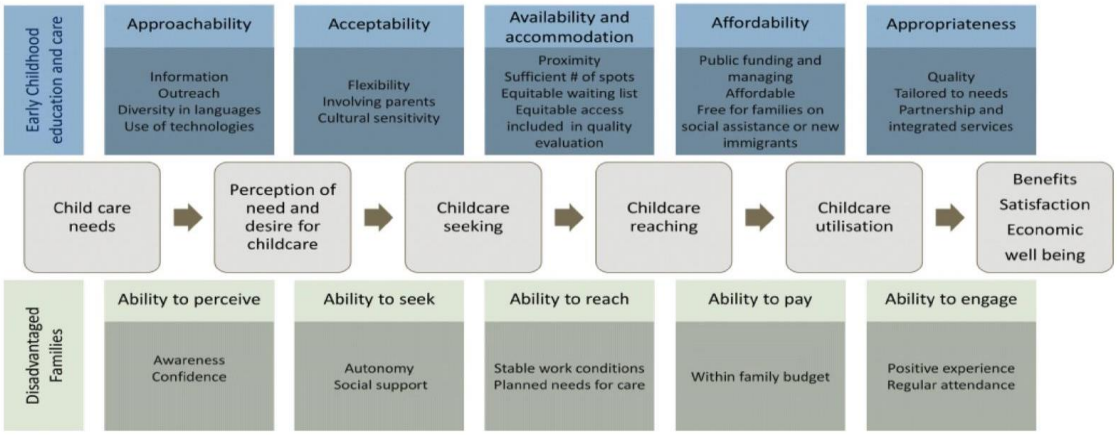


Figure 3. A conceptual framework of access to quality ECECs for children from disadvantaged backgrounds (Archambault et al., 2019, p.347).

Further exploration into local literature highlights Swansea's 2022 Childcare Sufficiency Assessment (CSA) as a key driver and indicator of childcare provision in the local area. It highlights the availability, accessibility, and quality of childcare across the city. It focuses on ensuring that local provision meets the needs of families, particularly within disadvantaged areas. The CSA emphasises the importance of aligning childcare services with FS and similar initiatives, which target EY support in deprived communities. The CSA underscores a gap in childcare provision for children with ALN and families with flexible work arrangements, recommending strategies to bridge these gaps (Swansea Council, 2022a). This aligns with broader literature advocating for targeted, multi-agency approaches to EY services, emphasising the role of integrated care and education to enhance children's developmental outcomes (Mason et al., 2023). The 2022 CSA analysed responses from 94 respondents in a WG parental survey, with 4 respondents stating that they were accessing FS childcare (see *Figure 4*). The CSA also discusses the need to support those in need outside of the existing FS catchment, which could be targeted via the extension and further development of an outreach programme (Swansea Council, 2022a).

Is your age 2 or 3 year old child(ren) accessing Flying Start childcare?

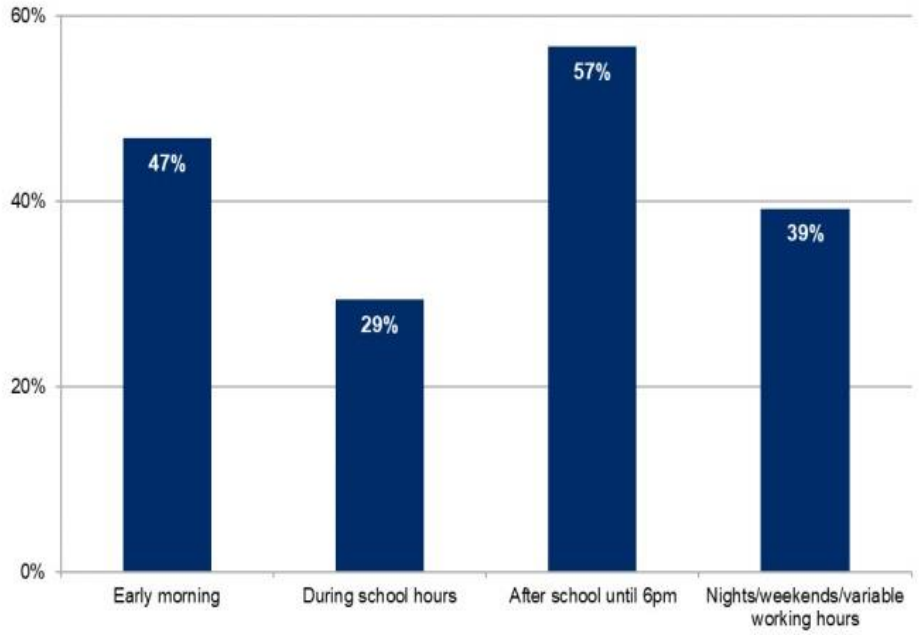
		Response Percent	Response Total
1	Yes	4.26%	4
2	No	82.98%	78
3	Not sure	5.32%	5
4	Not Applicable	23.40%	22

Statistics								
	Minimum	1	Mean	2.41	Std. Deviation	0.85	answered	94
	Maximum	4	Variance	0.72	Std. Error	0.08	skipped	93

Figure 4. Findings from the 2022 CSA (Swansea Council, 2022a).

The 2022 CSA also highlighted that the time of day that childcare is provided needs improving, where "most respondents referred to after school care" as their priority (see *Figure 5*).

Chart 4: Time of day childcare needs improving, 2018-19 (a)

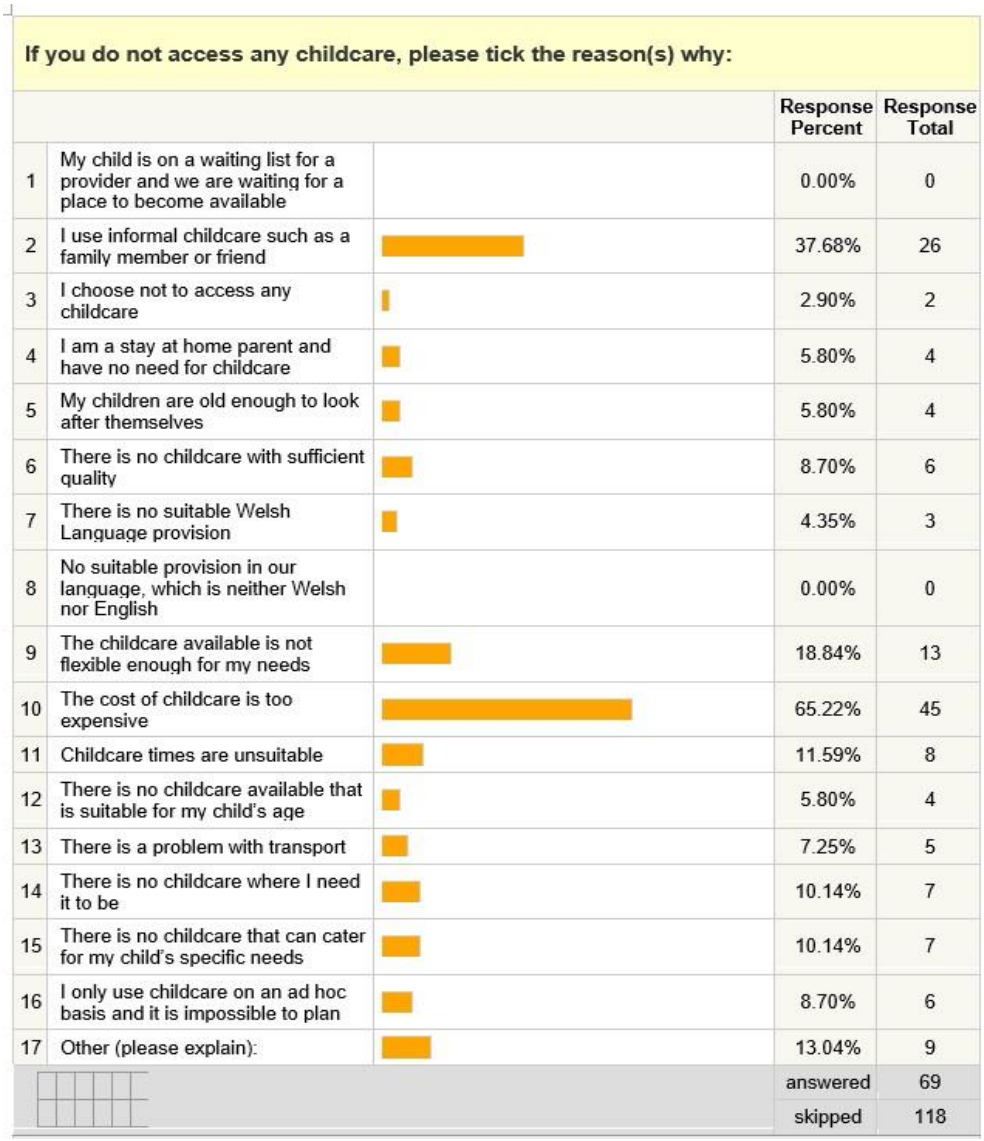


(a) Parents could give more than one response so percentages may sum to over 100%.

Over half of the parents who found accessing suitable childcare difficult said they would like improved childcare from 3pm to 6pm. Parents also had difficulty arranging childcare early in the morning, at night, at weekends and to cater for variable work patterns.

Figure 5. Time of day childcare needs improving (Swansea Council, 2022a).

A WG Parental Survey conducted in 2021 and referenced in the 2022 CSA shows that the largest barrier to families accessing childcare is due to it being too expensive (Swansea Council, 2022a) (see *Figure 6*). Once again, this statistic shows the importance of FS in Swansea, and Wales as a whole, particularly for low-income families. FS offers free childcare as a core component of the original programme delivery, which in turn directly alleviates cost burdens for eligible families. This aligns with Swansea Council's strategies to reduce child poverty by improving access to affordable childcare, which is outlined as a priority throughout the Tackling Poverty and Prevention strategies. It is essential, however, to take geographical barriers into consideration, as FS eligibility is primarily based on Welsh Index of Multiple Deprivation (WIMD) Data from 2016/17: "The number and percentage of children aged under four years living in income deprivation with the total and cumulative number of children aged under four years, for each LSOA in Wales listed by LA area in 2016/17" (Swansea Council, 2024d). There are currently 150 LSOAs in Swansea (Swansea Council, 2023b), with Geographic Information Systems (GIS) used internally within the EY Team to assess the feasibility of including LSOAs and postcodes in both the original FS programme, and the roll-out of childcare expansion.



If you do not access any childcare, please tick the reason(s) why:

		Response Percent	Response Total
1	My child is on a waiting list for a provider and we are waiting for a place to become available	0.00%	0
2	I use informal childcare such as a family member or friend	37.68%	26
3	I choose not to access any childcare	2.90%	2
4	I am a stay at home parent and have no need for childcare	5.80%	4
5	My children are old enough to look after themselves	5.80%	4
6	There is no childcare with sufficient quality	8.70%	6
7	There is no suitable Welsh Language provision	4.35%	3
8	No suitable provision in our language, which is neither Welsh nor English	0.00%	0
9	The childcare available is not flexible enough for my needs	18.84%	13
10	The cost of childcare is too expensive	65.22%	45
11	Childcare times are unsuitable	11.59%	8
12	There is no childcare available that is suitable for my child's age	5.80%	4
13	There is a problem with transport	7.25%	5
14	There is no childcare where I need it to be	10.14%	7
15	There is no childcare that can cater for my child's specific needs	10.14%	7
16	I only use childcare on an ad hoc basis and it is impossible to plan	8.70%	6
17	Other (please explain):	13.04%	9
		answered	69
		skipped	118

Figure 6. Welsh Government Parental Survey 2021 (Swansea Council, 2022a).

National Strategy and Policy

The Social Services and Well-being (Wales) Act 2014 is central to the delivery of FS throughout Wales, as it emphasises the person-centred, preventative nature of services which enhance the well-being of vulnerable populations, specifically children aged 0-4. The Act promotes collaboration between the health, social care, and education sectors, aligning with the multi-agency approach of the original FS programme. It is the EY Team's, within Swansea Council, responsibility as the commissioning authority within the local delivery of FS, to provide

The Well-being of Future Generations (Wales) Act 2015 is referenced generously throughout Swansea Council's Tackling Poverty Strategy and plays a crucial role in shaping the implementation of FS throughout Welsh LAs, aligning with both local and national strategies focused on EY intervention and prevention. The Act emphasises sustainable development and long-term well-being, which directly supports FS goals of improving outcomes for children in deprived areas through its four core elements (Welsh Government, 2024c). By promoting collaborative, preventative approaches, the Act ensures that programmes such as FS are aligned with the LA's broader aims to tackle poverty, social inequality, and improve the well-being of future generations. This legislative framework not only enhances multi-agency working but also promotes integrated service delivery, ensuring that EY interventions are both impactful and sustainable (Welsh Government, 2024c).

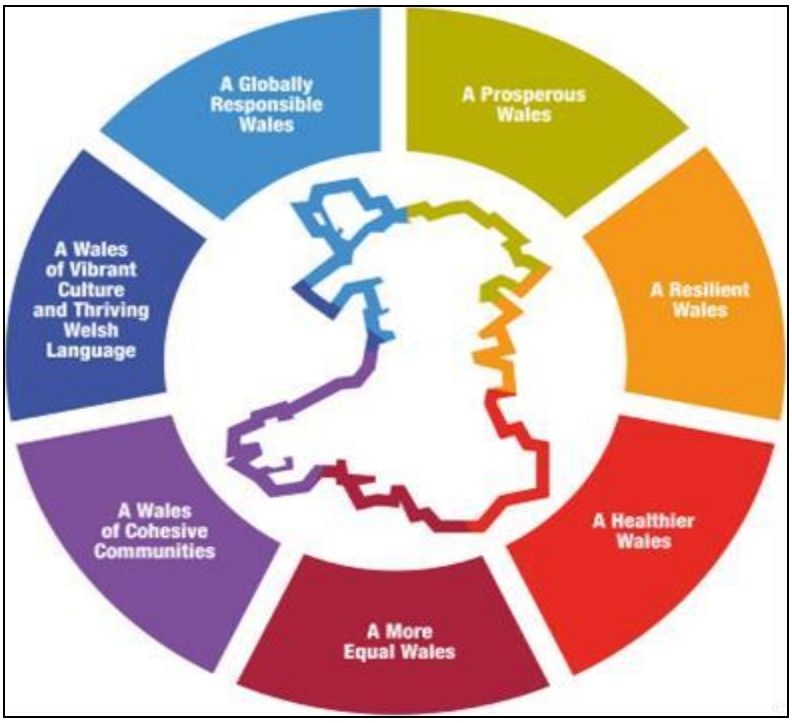


Figure 7. The Well-being goals for Wales within the Well-being of Future Generations (Wales) Act 2015 (Welsh Government, 2024c).

Implementation Statistics

Reynolds et al. (2003) found that EY participation was associated with "significantly higher levels of school readiness, achievement, and educational attainment" (p.633). Feinstein (2015) found that in a case study in Cheshire West and Chester LA, where an Integrated Early Support service was introduced (consisting of over 20 agencies), that data showed positive trends such as:

- 13% reduction in Children in Need;
- 23% reduction in inappropriate referrals to Children's Services;
- Increase in the proportion of family support cases managed below the statutory level;
- 54% reduction in violent offences among domestic violence perpetrators;
- Estimated 20% reduction in demand on police services for a sample of people whose cases were managed through the integrated service (EIF (2015) quoted in Feinstein (2015).

The effectiveness of FS HV can be seen in significantly lower caseloads compared to the generic counterpart (1:110 vs up to 1:400). There were also on average 4.6 more home visits to FS families than non-FS families, which is indicative of the enhanced intervention principles in addition to the Healthy Child Wales Programme GSR (2014). GSR (2014) also found that 12.5% more FS than non-FS children accessed parenting programmes.

Stakeholder Influence

"Stakeholders depend on an organisation to fulfil their own goals and on whom, in turn, the organisation depends" (Whittington et al., 2020, p.130).

In line with this quote, stakeholders are vital to FS implementation across Wales. *Figure 8* displays the categories of stakeholders within the public sector environment. It is also important to note that a stakeholder may fit in with more than one category.

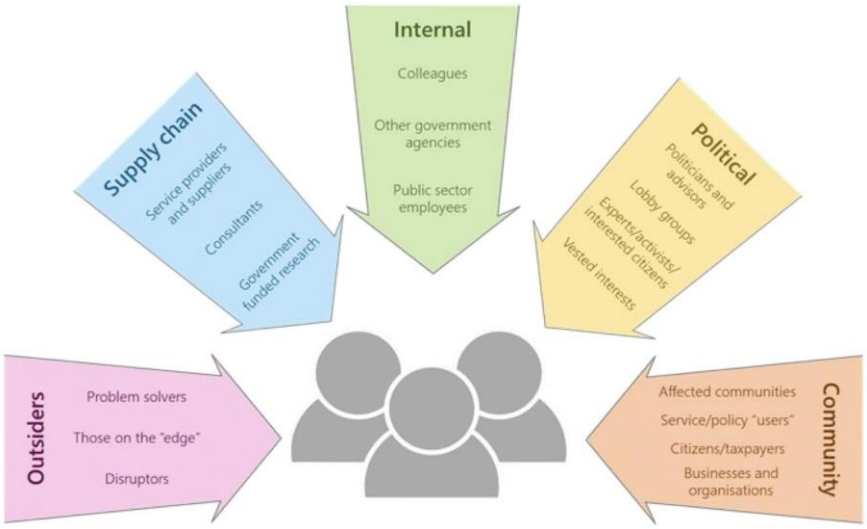


Figure 8. Display of stakeholders in public sector organisations (OECD, 2020).

Whilst all stakeholders are essential, understanding relationships and dynamics helps develop organisational purpose, and in turn, strategy. The main stakeholders that Flying Start teams within LAs regularly deal with are listed below and are broken down into four main types of stakeholders: economic; social and political; technological; and community (see *Figure 9*).

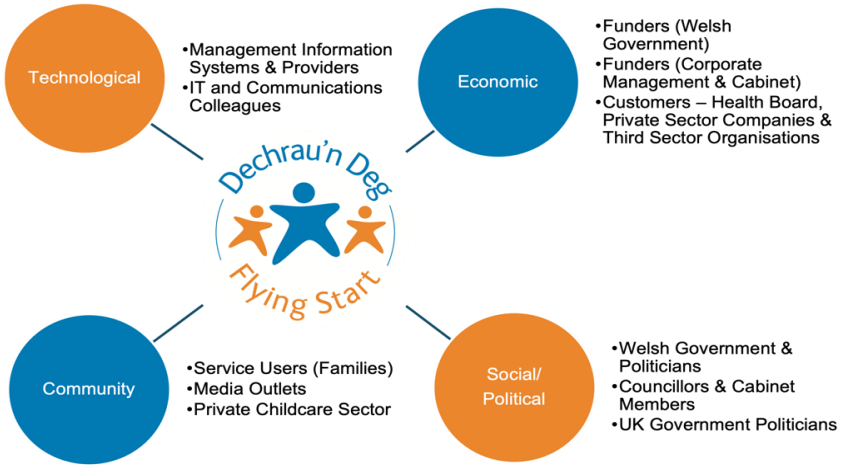


Figure 9. Stakeholder map created by the researcher based on literature research.

SBUHB are a vital stakeholder and collaborative partner within Swansea's implementation of FS. FS Health Visitors in Wales have reported several suggestions regarding service improvement, in the context of boosting immunisation rates within FS areas, as displayed in *Figure 10*.



Figure 10. Public Health Wales (n.d.).

In terms of health board strategy, and within the context of SBUHB delivery of FS, VBHC and Prudent Healthcare are critical frameworks guiding healthcare delivery to ensure effective use of resources and better outcomes for patients and communities. *Table 4* is based on the researcher's interpretation of works by Porter and Lee (2013) and the Welsh Value in Health Centre (2024).

Table 4. Value-Based Healthcare (VBHC) in FS delivery.

Aspect	Description
Focus	Maximise health outcomes relative to the cost of care, with person-centred care being at the heart of NHS Wales goals.
Application in FS	Early interventions aimed at preventing long-term issues in children from disadvantaged backgrounds.
Outcome Measurement	Track child development and health outcomes to assess the effectiveness of interventions.
Resource Allocation	Allocate resources to interventions that provide the most value in long-term child development outcomes.
Long-term impact	Align with FS goals of achieving lasting developmental improvements whilst optimising costs over time.
Key principle	Deliver care that maximises value to children and families through preventative measures and improved health outcomes.

Similarly, *Table 5* shows how Prudent Healthcare factors into FS delivery, based on literature from Welsh Government (2016) and the Bevan Commission (2024).

Table 5. Prudent Healthcare in FS delivery.

Aspect	Description
Focus	Ensure healthcare is proportionate, necessary, and involves patient empowerment.
Application in FS	Tailor FS services to local needs and avoid unnecessary interventions while empowering parents.
Outcome Measurement	Deliver care that is proportionate to the child's needs, focusing on necessary services and avoiding over-treatment.
Resource Allocation	Ensure FS operates across health and social services to provide integrated and non-duplicative care.
Long-term impact	Engage parents and families in taking an active role in the health and development of their children.
Key principle	Use community resources and existing assets to deliver care in a costeffective manner whilst ensuring quality outcomes.

West Glamorgan Regional Partnership's *Population Needs Assessment* (n.d.) is a requirement under part two of the Social Services and Well-being (Wales) Act (2014), which includes a section focusing on EY and FS. *Figure 11* displays the positive effect that attending FS childcare had on children in 2018-19. The *Population Needs Assessment* also outlines how there is a "need to develop and harness a culture of sharing data more easily" (West Glamorgan Regional Partnership, n.d., p.65). This is something that will be explored throughout the *findings* and *discussion* chapters.

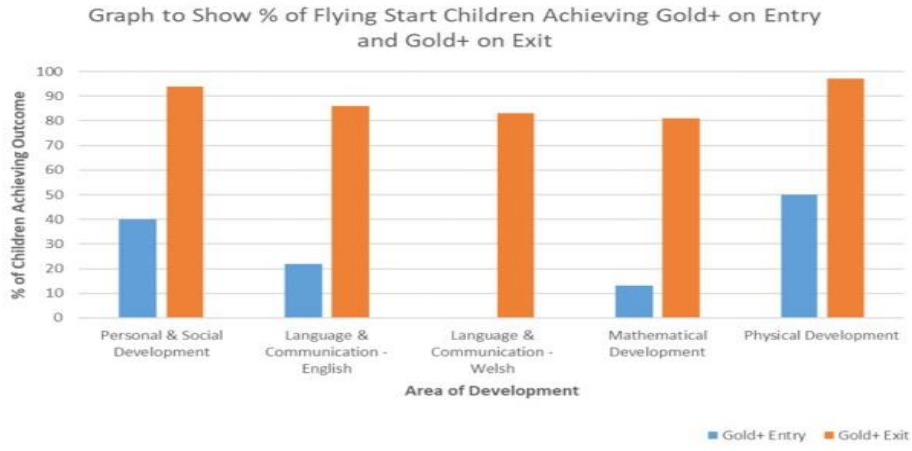


Figure 11. On entry/on exit comparison for children attending FS childcare in Swansea in 2018-19 (West Glamorgan Regional Partnership, n.d., p.30).

The IPC Commissioning Cycle and the P&C Service Plan

The Institute of Public Care (IPC) Commissioning Cycle offers a structured approach to planning, delivering and evaluating public sector organisations. It ensures that resources are aligned with strategic priorities and the needs of service recipients. The four stages of the cycle are outlined in *Figure 12* and is highly relevant to the implementation of Flying Start, as it also forms part of the Commissioning and Resources Service Plan. The Commissioning and Resources Service Plan outlines the key priorities and responsibilities of the service as: strategic commissioning, compliance, and financial management (Swansea Council, 2024b). Effective commissioning ensures that the programme's EY services are targeted effectively, well-coordinated and responsive to the needs of the local population.

In Swansea, aligning the Commissioning Cycle with FS means that LAs can continually assess the needs of disadvantaged families and refine services to maximise impact. For example, by systematically reviewing outcomes and parental feedback (such as affordability concerns outlined in the CSA), LAs can make informed decisions about resource allocation and service improvement (IPC, 2002, 2010). Effective commissioning also supports the integration of multi-agency partnerships, a core component of the FS approach, ensuring collaboration between health, social care, and education sectors (IPC, 2010). The Commissioning Cycle provides a framework for commissioning that highlights the reliance on skilled professionals to deliver the services that FS provides, including childcare, health services and parental support. Effective commissioning in this context ensures that resources are deployed efficiently and effectively, ultimately contributing to the overall success and sustainability of FS. In response to the Covid19 pandemic, IPC also suggest that commissioners need to "review the market" to ensure there are sufficient suppliers to meet need (IPC, n.d.) that this can be achieved by developing useful communication tools to engage with providers. Such tools include commissioning strategies and market position statements to proactively shape the market to re-design services (IPC, n.d.).

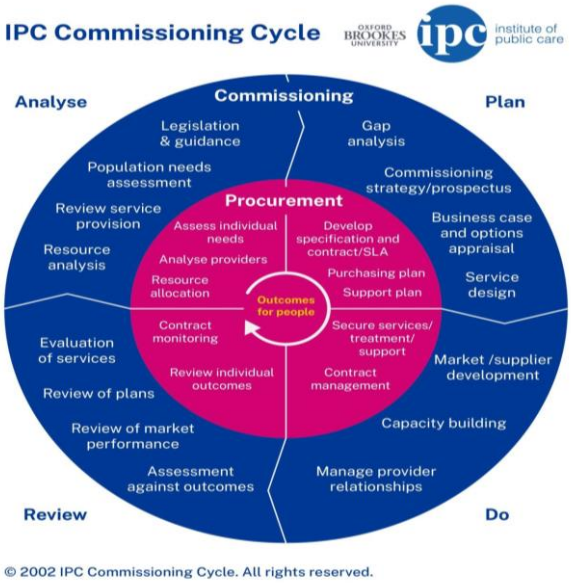


Figure 12. The IPC Commissioning Cycle (Institute of Public Care, 2002).

In Summary

The research during the literature review highlighted the importance of national and local strategies on FS implementation, and the need to utilise tools such as the IPC Commissioning Cycle. It has also highlighted gaps in LA implementation of childcare needs in Swansea. Whilst the 2022 CSA was thorough and emphasised the need for affordable and accessible childcare, this has not necessarily been acted upon in Swansea except for the recent WG supported childcare expansion. Whilst the childcare expansion was wide-reaching (discussed in *Section 5.3*) it was not necessarily targeted as effectively as it could have been. The researcher took this gap in knowledge and implementation and used it as a basis for the subsequent surveys and interviews undertaken as part of the research project.

Table 6. Gaps in the literature.

LA strategy and policy	There is insufficient research on how LAs adapt the FS programme to local needs, and whether these adaptations influence outcomes. The quality of FS implementation is also underdeveloped in research.
National strategy and policy	There is limited exploration of how WG incorporates feedback from public consultations and stakeholder engagement into the development of FS policy. There are few robust studies which evaluate the long-term impacts of FS.
Implementation statistics	Inconsistent evaluation metrics: Limited standardised frameworks to assess FS outcomes across LAs. Secure Anonymised Information Linkage (SAIL) data for FS is currently only collected by Swansea Council, and no other LA.
Stakeholder influence	There is very limited literature surrounding how the stakeholders within FS interact, including the most heavily involved external partner: SBUHB.
IPC Commissioning Cycle & Service Plans	The IPC Commissioning Cycle is not yet fully embraced by Swansea Council's EY Team.

Research Methodology

Ethics

The Swansea University School of Management Research Ethics Board approved the research undertaken for this project in July 2024. Please see *Appendix A*. All research was undertaken in compliance with both the Welsh Government and Swansea University guidelines and policy.

Introduction and Justification

This section will outline the research methodology used to explore the implementation of FS throughout Wales, aiming to answer the research question. Barends and Rousseau (2018) argue that the fundamental premise of evidence-based practice is that critical thinking and the utilisation of the best available evidence should be combined, to lead to quality decision-making, and therefore quality outcomes (p.2).

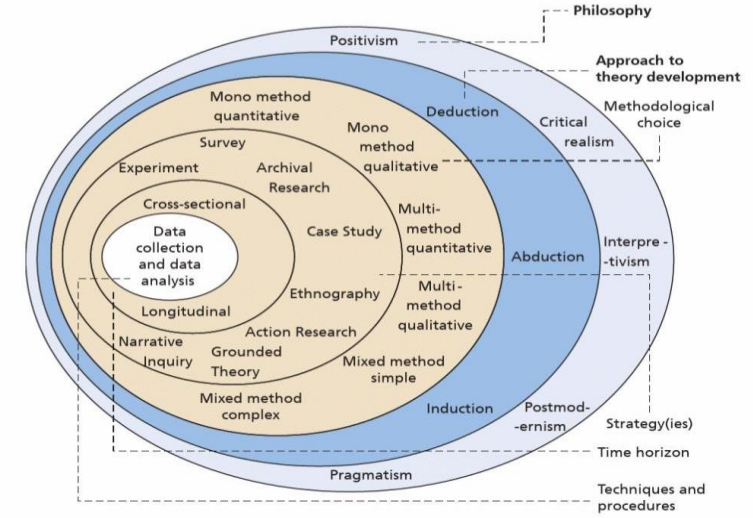


Figure 13. The Research Onion (Saunders et al., 2019, p.174).

The Research Onion (*Figure 13*) was used to guide the approach taken for this research project. The researcher chose the following methods from each layer of the Research Onion, as they were seen as the most relevant and effective options to answer the research question:

- Interpretivism
- Induction
- Multi-method qualitative
- Case study and survey
- Cross-sectional

The research methodology also aligns with IPC Commissioning Cycle (see *Figure 12*) and its adaptation by Swansea Council's Commissioning and Resources Service.

Qualitative research such as the interviews conducted with numerous LAs, and the descriptive questions allowing for in-depth survey responses, are often associated with Interpretivism and higher levels of validity (Collis and Hussey, 2014, p.130). This also aligns well with the methods of action research, where the goal is to improve a situation by taking specific actions, making sure to understand the process and providing explanations to how it was improved (McNiff, 2010) (see *Figure 14*).

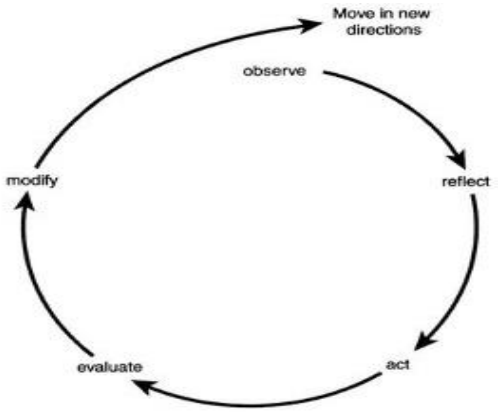


Figure 14. Action Research model (McNiff, 2010).

Online Surveys

To conduct comprehensive research, the researcher decided to ask managers from all 22 Welsh LAs to complete a survey. *Table 7* outlines the survey methods used.

Table 7. Survey methods.

Selecting participants	To conduct comprehensive research, the researcher decided to ask managers from all 22 Welsh LAs to complete the survey.
Administration and circulation	The links to the survey were distributed via email from the Welsh Government's official Flying Start mailbox to all LA managers involved in Flying Start. Colleagues in Welsh Government are interested in collaborating with research and were eager to assist the researcher. The LA questionnaire was circulated to respondents via a gatekeeper (see *Appendix C*). It was essential to seek consent and guidance from Welsh Government as the gatekeeper, due to their position and extensive relationship with all Local Authorities (Cohen et al., 2018, p.124) A follow-up reminder was sent by the gatekeeper (WG) outlining an extension to the submission date due to lack of responses (see *Appendix C*), which significantly increased the individual LA response rate from 36% to 59%.
Design	The researcher chose to ask questions on the recent FS childcare expansion alongside questions of the implementation of the original FS programme. This was due to expansion being implemented recently (and still ongoing in some cases), and so remains a topic of considerable attention within EY discourse. The survey was designed using Microsoft Forms and was created in both Welsh and English. No responses were received in Welsh. 15 responses were received in English (from 13 LAs). To ensure there was also a high level of reliability in line with Collis and Hussey's (2014) perspective, the researcher undertook quantitative primary research by utilising Likert and intensity, frequency and evaluation rating scales (Collis and Hussey, 2014) in numerous survey questions, in order to gather a comprehensive understanding of how other LAs have interpreted and implemented FS. A mid-point was provided in each relevant question, in order to not force the respondent into having to choose whether to agree or disagree with a point, allowing them to take a neutral standpoint if they felt that way. Whilst these quantitative questions allowed for easy interpretation of the data, it also permitted the researcher to capture "underlying attitudes and feelings" (Collis and Hussey, 2014, p.216).

Interviews

Further to the survey, the researcher felt it was appropriate to investigate further by conducting semi structured interviews, which lasted between 20 minutes and one hour. The questions were designed to explore intricacies of FS implementation based on responses seen in the survey results. The interviews provided further context to the initial responses and themes evident in the survey. *Table 8* outlines the interview methods utilised.

Table 8. Interview methods.

Selecting participants	The researcher followed-up with survey respondents who consented to be contacted to be interviewed.
Administration and design	The researcher collected contextual data in line with Saunders et al. (2007), including location of the interview; date and time; interview setting; background information (such as job title); immediate impression of how the interview went. See *Appendix D* for the questions used during the interviews. Similarly to the survey questions, the researcher chose to ask questions on the recent FS childcare expansion alongside the original FS programme, as expansion implementation is the most recent change to the programme. With the consent of each participant, the researcher recorded the interviews and transcribed them afterwards.

Analysing and Evaluating the Data

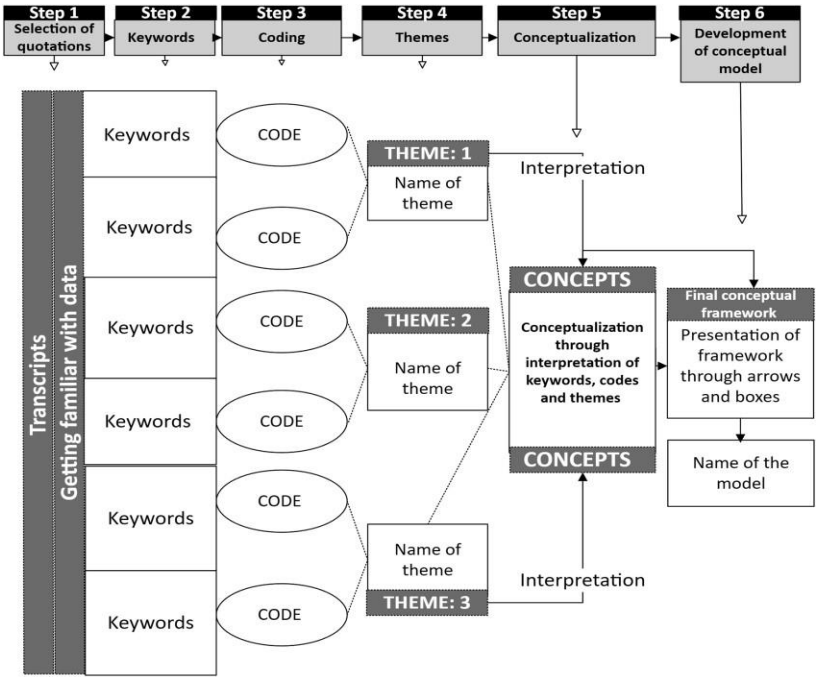


Figure 15. A systematic thematic analysis process: A novel six-step process for conceptual model development in qualitative research (Naeem et al., 2023).

The researcher undertook Thematic Analysis, and particularly Reflexive Thematic Analysis (RTA). RTA is commonly used to identify, analyse and understand themes within datasets, originally developed by Braun and Clarke (Byrne, 2022). The researcher undertook coding of the qualitative data produced from both the interviews and survey responses. Coding was undertaken using software and aligning it with handwritten observations as the researcher was studying the responses. This was done in line with the six-step process outlined by Braun and Clarke (2006) and re-examined by Naeem et al. (2023) (See *Figure 15*).

The *Likert* and *intensity, frequency and evaluation rating* scales utilised in the online survey were subsequently analysed via Microsoft Forms and the graph creator tools within it. Cohen et al. (2018) found that data from online surveys was exported easier and are less likely to include missing or incorrect entries. The researcher, however, was also aware of the notion of satisficing, where respondents may essentially answer a question just to ensure it is not left blank, which could compromise quality, accuracy and reliability (Cohen et al., 2018).

Themes and trends from both qualitative and quantitative data from the surveys and interviews were selected in line with the frequency in which they were mentioned, in line with Braun and Clarke (2006) and Naeem et al. (2023).

The research question surrounding the implementation of Flying Start in Wales was kept at the centre of the thematic analysis and data evaluation, in order to ensure the findings did not stray off topic.

Findings

Introduction

This chapter outlines the key themes and subsequent findings from the research conducted, setting the stage for the next chapter, where these results will be analysed in the context of existing academic literature to directly address the core research question of the study.

Online Survey

The survey was created and circulated using Microsoft Forms (see *Appendix B*). The survey received 15 responses from 13 LAs. All respondents worked at a management level within Welsh LAs, in line with the gatekeeper circulating the survey to a mailing list of FS coordinators and have been categorised in line with their main responsibility (See *Figure 16*).

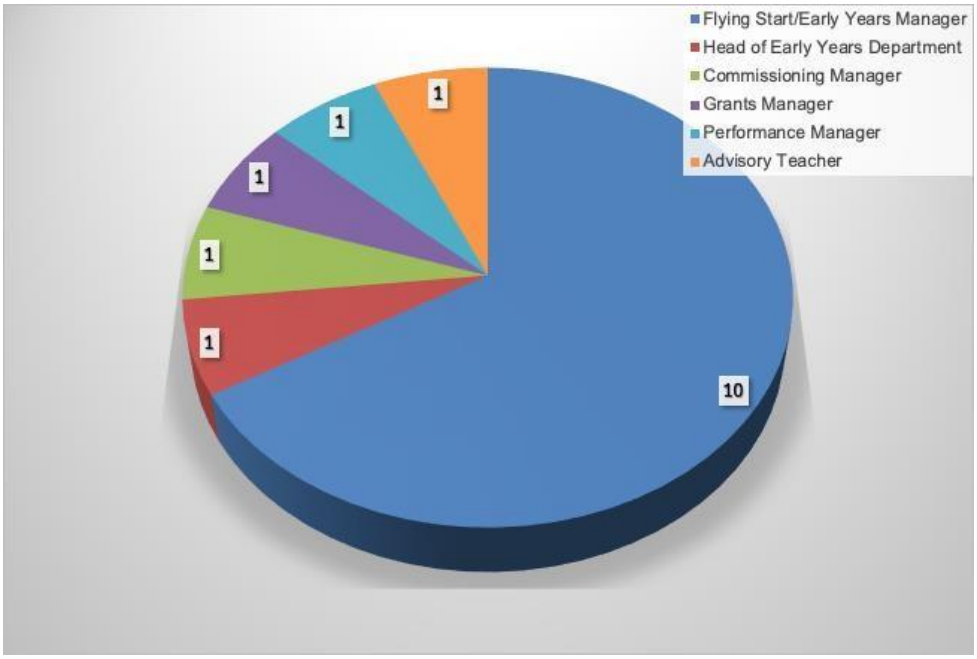


Figure 16. Breakdown of job role of survey respondents.

Programme Rollout and Implementation

Respondents were asked to assess the rollout and implementation of the recent second phase of FS childcare expansion, costing a total of £26 million across Wales, as outlined by the Welsh Government (2024b). Over 56% of respondents responded that the implementation was either “smooth” or “very smooth” (see *Figure 17*).

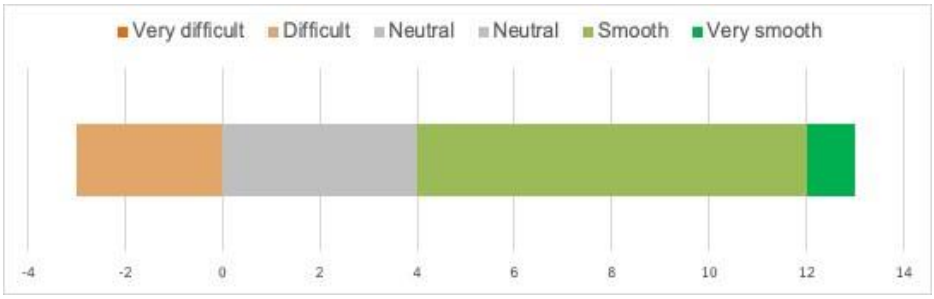


Figure 17. Perceived 'smoothness' of Phase 2 childcare expansion implementation across Welsh LAs.

The date of initial expansion also tended to vary amongst respondents, however the majority of LAs implemented their expansion in 2023. Notably, two LAs responded that they expanded in 2020, before the programme had been announced Wales-wide, something which had possibly been agreed between WG and the LAs regarding expanding their outreach programmes (see *Figure 18*).

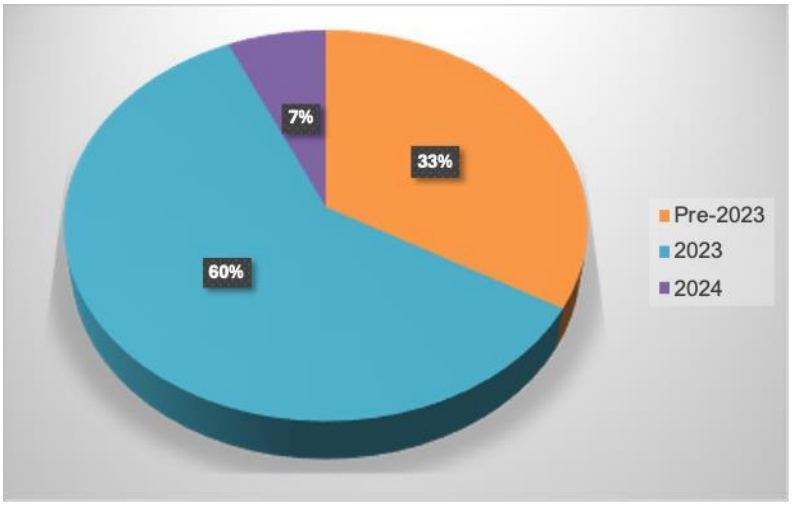


Figure 18. Date of implementation of childcare expansion.

Every LA response felt that the original FS programme reaches those families who need it most at least 50% of the time (see *Figure 19*). The responses suggest that improvements can be made to target families in the original FS programme in a more appropriate way. This notion was explored further during the interviews held with LA managers, as explored in the in *Section 4.3*.

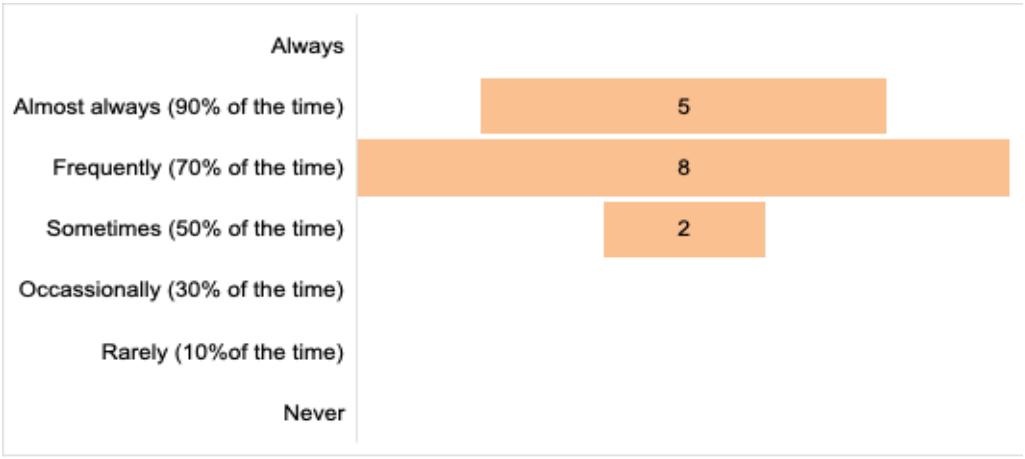


Figure 19. The Flying Start Programme (all four elements) reaches those families who need it the most.

Similarly, each LA response felt that the childcare element (and its recent expansion) reaches those families who need it the most at least 50% of the time (see *Figure 20*). It is notable, however, that in this instance, two fewer LAs felt that childcare reaches the right families 'almost always' versus the original four elements.

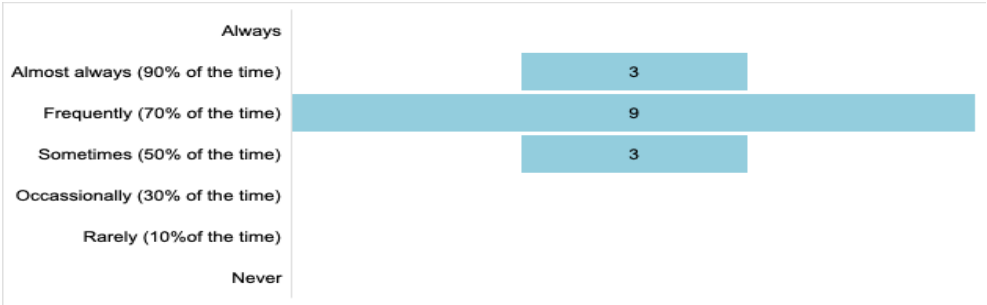


Figure 20. Flying Start childcare (and its recent expansion) reaches those families who need it the most.

Stakeholder Engagement and Co-Production

Each LA responded that they worked alongside at least two stakeholders during the planning and implementation of Flying Start childcare expansion, with five LAs involving parents and families. All LAs worked alongside childcare providers, meaning they were participating and influencing the eligibility expansion, and they would be the stakeholder most directly affected by it, as it would place additional pressure on capacity. Nine LAs worked alongside local councillors and cabinet members, as local political approval is often required to move forward with the expansion (see *Figure 21*).

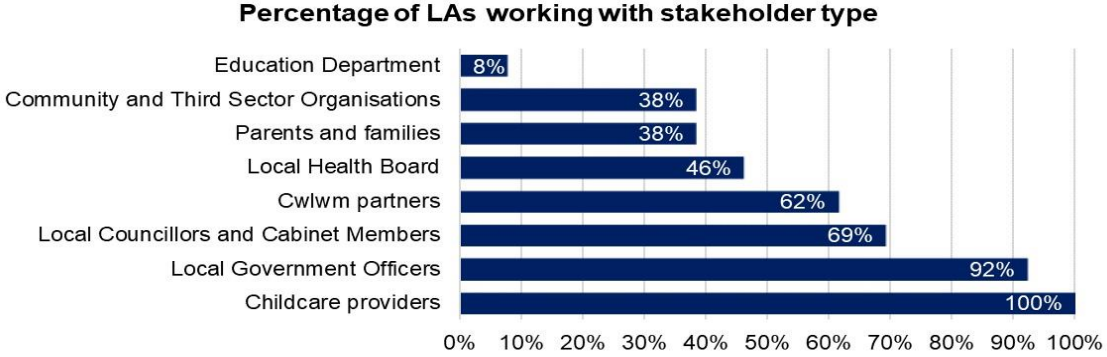


Figure 21. Percentage of LAs working with stakeholder type.

Resource Allocation

Figure 22 demonstrates how adequate the LAs felt the funding for the original FS was. 20% of respondents felt that the funding was inadequate, however over two-thirds felt the funding was at least adequate. Respondents were given the opportunity to provide further comments in response to their choice, with one LA stating:

> *"Funding awarded per child for expansion is nearly double what is awarded per child for original Flying Start (all four elements of the programme)."*

Of the 15 responses, nine mention a general lack of funding within the original FS programme, and six of which state that there are difficulties with paying childcare providers an enhanced or attractive rate:

> *"We do not have enough money for all elements of the programme, which results in us not being able to raise the childcare award to providers."*

And:

> *"The funding allocation is making it extremely difficult to increase the rate paid to childcare providers for FS childcare placements. This is a risk to the programme as existing providers are telling us that they are becoming less viable due to financial pressures. Also, potential providers that are needed for expansion may not see the rate as attractive. Without an increase in the Flying Start rate providers cannot increase the wages of staff; this only adds to the recruitment and retention issue seen across childcare at present as practitioners can earn more working in retail and have less responsibility."*

Furthermore, several LAs also state the difficulty in budget allocations remaining stagnant and not taking into account a general cost increase to service provision, including pay awards to LA staff and rises in the minimum wage:

> *"Recent budget allocations have remained at a standstill level and have therefore failed to reflect the increased expenditure across all resources utilised for service provision by all LAs."*

And:

> *"We had to cut some projects this year. Ongoing staff salary uplifts causing pressures (we fund 50+ staff with this grant)."*

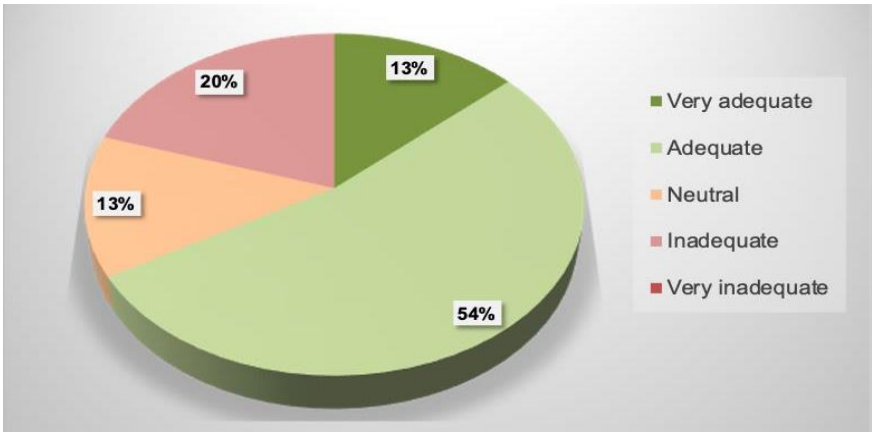


Figure 22. Adequacy of funding received for the implementation of the original FS programme.

In contrast to this, none of the respondents felt funding for the childcare expansion element of FS was inadequate (see *Figure 23*). Whilst 93% of respondents felt that funding for childcare expansion was at least adequate, further comments provided in addition to this question highlighted a different issue: ringfencing of budgets. Three LAs identified budget ringfences as an issue within this question:

> *"Ringfencing of this funding caused issues as we were hugely underspent in Phase 2 (Childcare Expansion) but overspent and could have used more funds in Phase 1."*

And:

> *"It is very frustrating to operate within the ring-fenced budget allocations for childcare expansion only. There are financial pressures within the original programme which are difficult to manage, and we are unable to have the flexibility within the overall budget allocations which could help mitigate this position by being able to [move] available underspends within the expansion programme funding."*

The notion of ringfenced budgets was further explored during the interviews, as outlined in *section 4.3.2*.

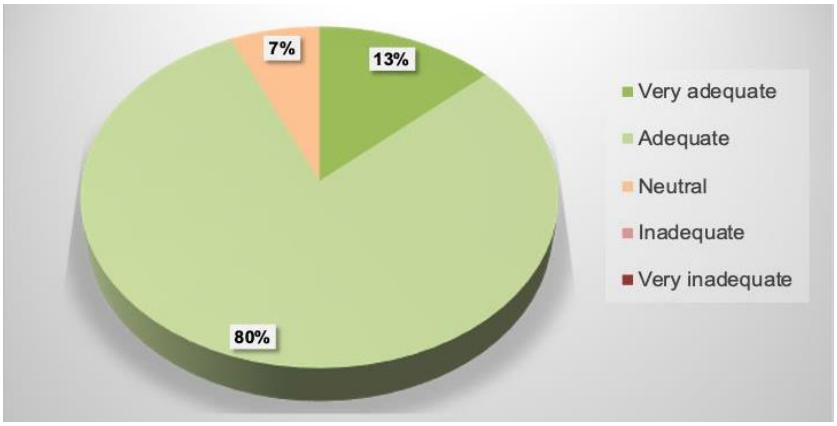


Figure 23. How adequate was the funding received for the implementation of FS childcare expansion?

Figure 24 shows that almost three-quarters of respondents felt that their LA did not have sufficient staff members within their team to meet the needs of the childcare expansion of FS. In further comments provided, 13 of the 15 respondents spoke about the need to restructure their existing staffing provision and even create and recruit to new roles. One LA recruited seven new staff members.

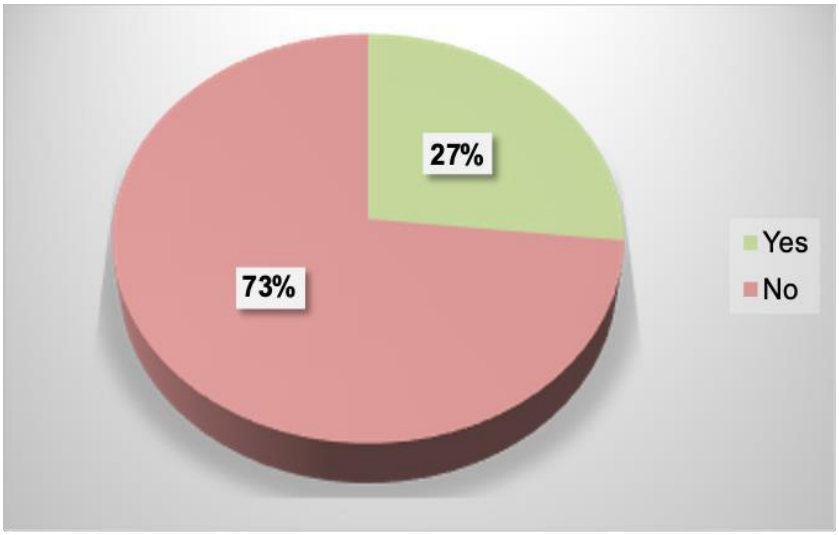


Figure 24. Were there sufficient staff members within your internal team available to meet the needs of expanded services?

Strategic Alignment

Survey respondents were also asked whether their implementation of FS and its recent childcare expansion align with the strategies and policies of their LA, to which 85% responded *yes*. (see *Figure 25*).

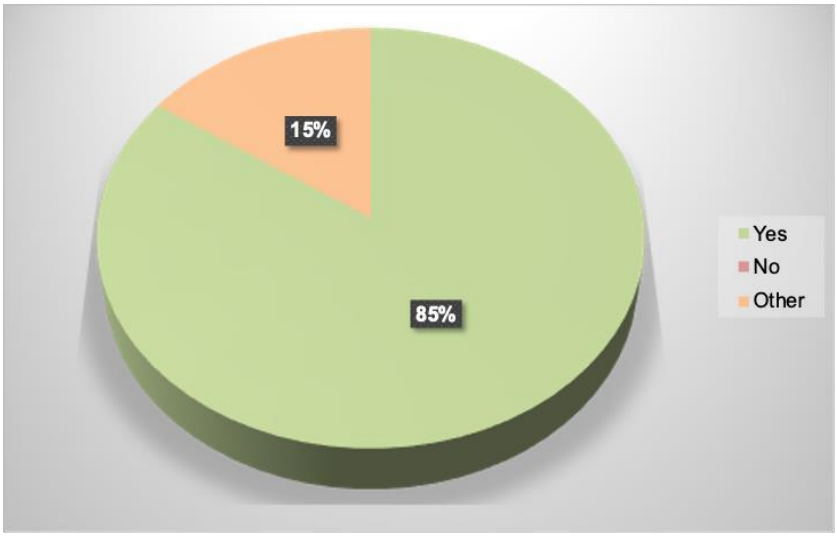


Figure 25. Does the FS programme and its recent childcare expansion align with the strategies and policies of your LA?

To provide context, respondents were asked to provide further comment alongside their answer. The responses are summarised in *Figure 26.*

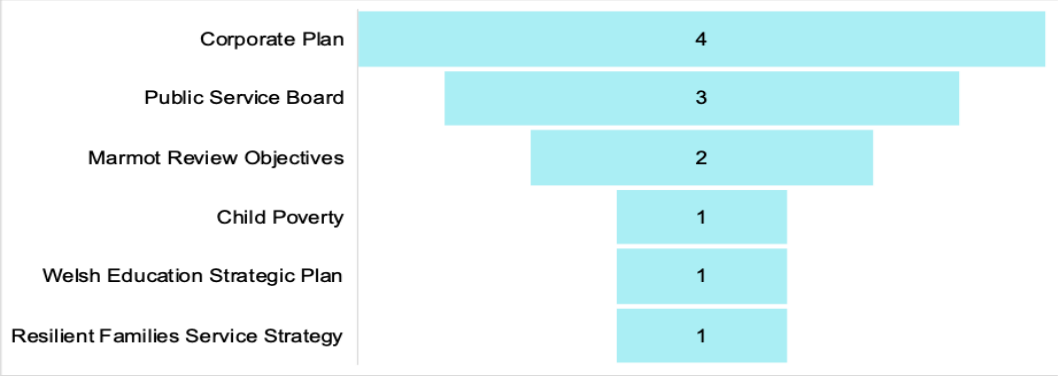


Figure 26. Strategies and policies mentioned by respondents when aligning the implementation of FS to local strategy.

The most frequently mentioned strategy or plan mentioned were corporate plans. Corporate plans are pivotal in LAs for several key reasons (see *Table 9*).

Table 9. The pivotal nature of corporate plans within LAs.

Setting of overarching strategic direction.	For FS to be effective, it needs to be aligned with these strategic priorities to ensure that the programme's goals are supported by the LA's broader vision. If EY development, for example, is a key focus of an LA's corporate plan, this increases the likelihood that FS will receive the dedication necessary for its effective rollout.
Framework for governance and accountability.	Corporate plans provide a framework for governance and accountability, ensuring that FS implementation is subject to monitoring to ensure it is meeting the needs of local families.
Close alignment with high-level national objectives.	For example, Swansea Council's Corporate Plan references the importance of the Well-being of Future Generations (Wales) Act 2015 and how it is important to "give current and future generations a good quality of life" by implementing sustainable and joined-up approaches (Swansea Council, 2023a).

Overcoming Challenges When Expanding Childcare Provision

Political and Social Challenges

Figure 27 highlights that one third of respondents experienced political and/or social barriers when implementing FS childcare expansion.

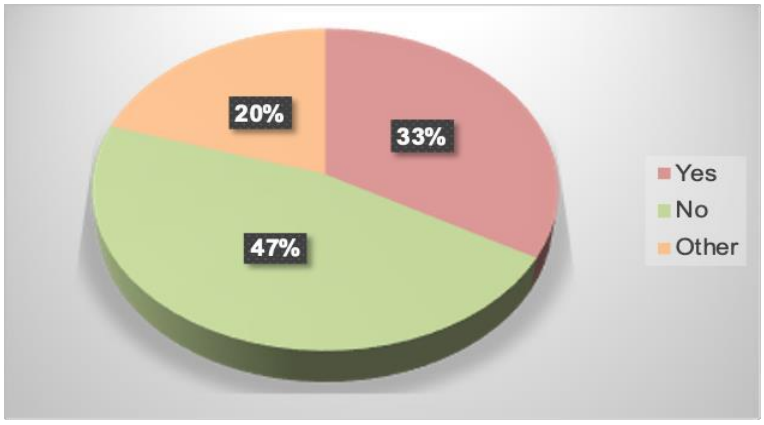


Figure 27. Have you experienced any political or social barriers when implementing FS childcare expansion?

The most frequent political issue faced by LAs implementing FS childcare expansion was that of local politicians querying why their wards were not included. Swansea Council has tackled this issue where there is a breakdown in communication between members and officers by introducing a Transformation Board, where multiple stakeholders come together to discuss plans for expansion. The Transformation Board includes representatives from all partner agencies including SBUHB management, LA officers from several departments, and Swansea's WG Account Manager.

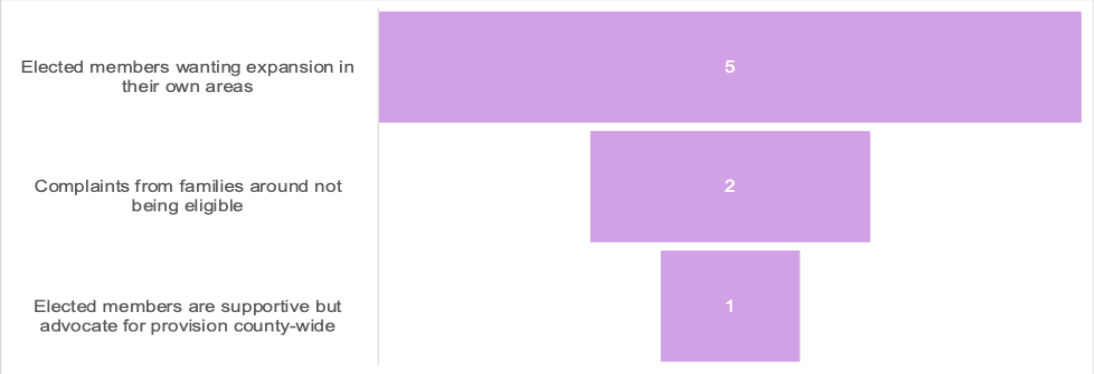


Figure 28. Breakdown of political or social barriers faced by LAs implementing FS childcare expansion.

Geographical Barriers

LAs were also asked whether they have experienced any geographical barriers when implementing the recent expansion of childcare provision in their areas. Two-thirds reported experiencing such issues (see *Figure 29*). Subsequently, these responses have been broken down further into the following categories (see *Table 10*).

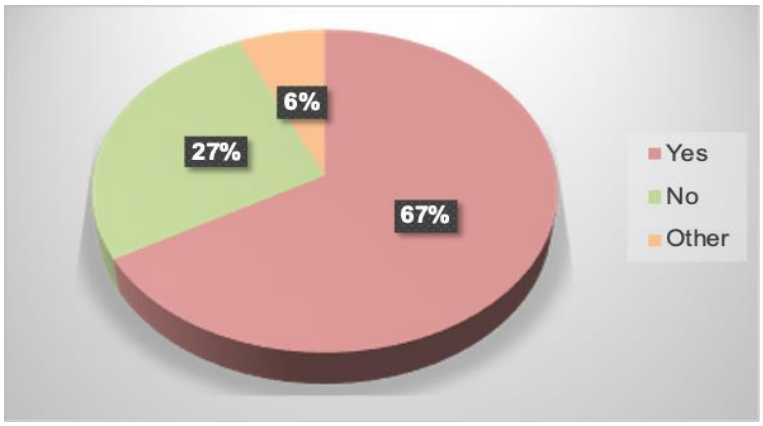


Figure 29. Have you experienced any geographical barriers when implementing FS childcare expansion?

Table 10. Issues highlighted by LAs experiencing geographical barriers when implementing FS childcare.

Outreach utilised to support families in need which were not eligible under the WIMD Data.
Insufficient childcare places or buildings, including within walking distance.
Rural spread of population.
Alternative data used to WIMD provided. E.g. school meal, Child in Need, Looked After Children data.
RCT has not expanded geographically, but on a needs-based approach.
New build homes not listed on internal GIS data.
LSOA boundaries are misunderstood compared to Ward boundaries.

Logistical Difficulties

Respondents were asked a further question regarding logistical difficulties when planning and implementing FS childcare expansion (see *Figure 30*). Only one LA responded that they did not experience logistical difficulties.

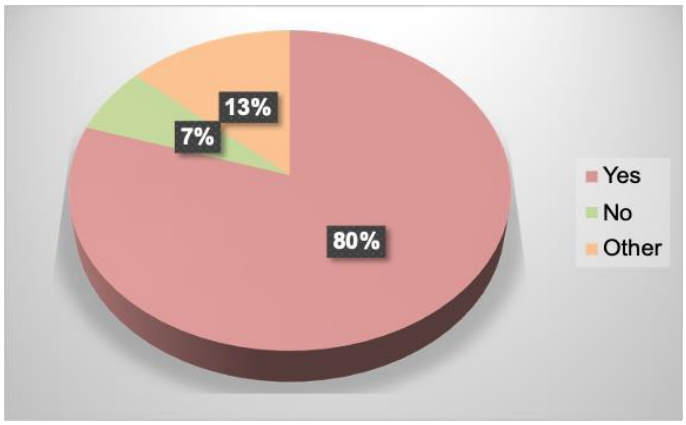


Figure 30. Have you experienced any logistical barriers when implementing FS childcare expansion?

The comments from LAs regarding logistical difficulties are displayed in *Table 11*. They include both positive and negative experiences, including suggestions to how they overcame any challenges.

Table 11. LA responses to logistical challenges, including positive and negative experiences.

Settings are reluctant to join procurement framework.	• Two LAs responded that this was due to increased requirements from LAs and WG in respect to qualifications, session timings and funding. One of the LAs deemed it as "not worth the investment for the costs provided" for the providers.
Rurality and/or not enough childcare places.	• Some LSOAs are very rural, with no nearby childcare provision. • One LA response confirmed that to combat insufficient numbers of childcare places, they plan to develop four new childcare provisions as a result of the recent (and future) expansion. • Another LA commented that they had to change their existing childcare commissioning model to a procurement framework model to ensure there was childcare coverage across the entire borough, not just within the original postcode areas. This same LA also commented that they had to expand their Childcare Quality Assurance Team to accommodate and meet internal quality assurance standards. • A further LA reported that they did not expand into one LSOA from the WIMD ranked data as there was no childcare in the area. This suggests that children living in an area of deprivation have subsequently lost out on attending FS childcare as there is no childcare available in the area. • Overall, eight LAs included comments around insufficient childcare places in their responses.
Support from local agencies and partners.	• One LA commented that they felt well supported by local partners, such as the CWLWM providers in order to overcome any difficulties.
Sufficient childcare available.	• Four LAs noted that they had sufficient high-quality childcare already available, within walking distance, of all LSOAs. They did not experience any logistical issues.
Cross-border logistics.	• Two LAs stated that they were still developing cross-border arrangements, due to funding arrangements and childcare models differing between bordering LAs. This was also a trend that became apparent during two of the interviews (see *Section 4.3*).
Data sharing with local health board.	• One LA noted that their partner health board refused to provide data of eligible families, and the LA therefore had to explore how to gather this demographic data from elsewhere. This was something also identified during an interview (see *Section 4.3*).

Biggest Challenges Faced by LAs

Finally, LAs were asked to respond with a single challenge that they felt was the largest that they faced, and how they overcame it. The single largest issue identified was the overall sufficiency of childcare places and provision within the LAs (see *Figure 31*). This trend will be further explored in *Section 5.2*.

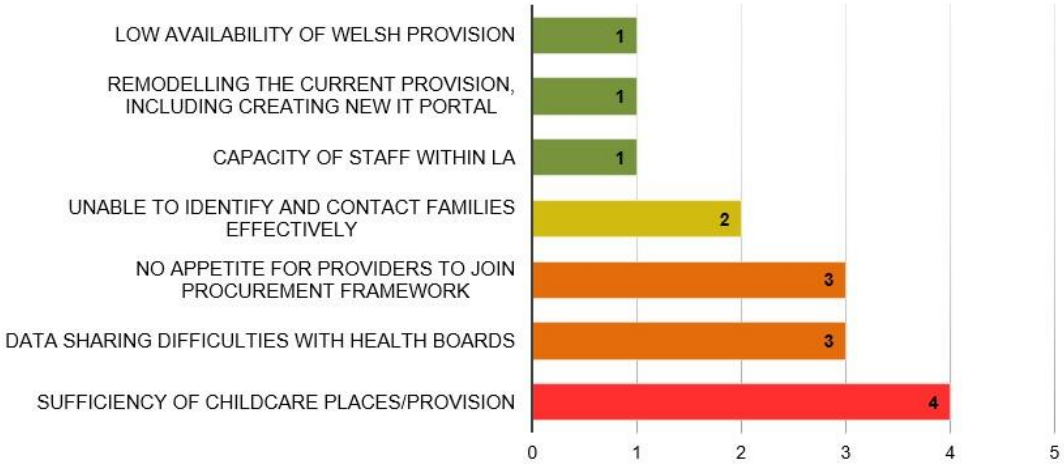


Figure 31. Largest issues faced by LAs when implementing FS childcare expansion.

Interviews

Interviews were held with five participants (see *Appendix D* for interview questions). Each interview varied between 18 and 60 minutes. Interviews were conducted with survey respondents who volunteered to be contacted for a follow-up discussion. All participants were senior managers within their LA and had direct decision-making responsibilities over the FS programme.

Processes for Implementing FS Expansion

Participants were asked what processes they followed when implementing FS childcare expansion within their LA and prompted with a generic example if necessary. *Figure 32* shows the key trends that emerged. One LA outlined the difficulties they experienced when trying to gather data on how many children were living in newly expanded areas, in order to contact them to offer a childcare place. The struggle came when asking the local health board to share this data from their generic HV service. The health board rejected the request on the basis of them not being an official partner in the second phase of the childcare expansion, as the only element offered to families was childcare, rather than the full entitlement.

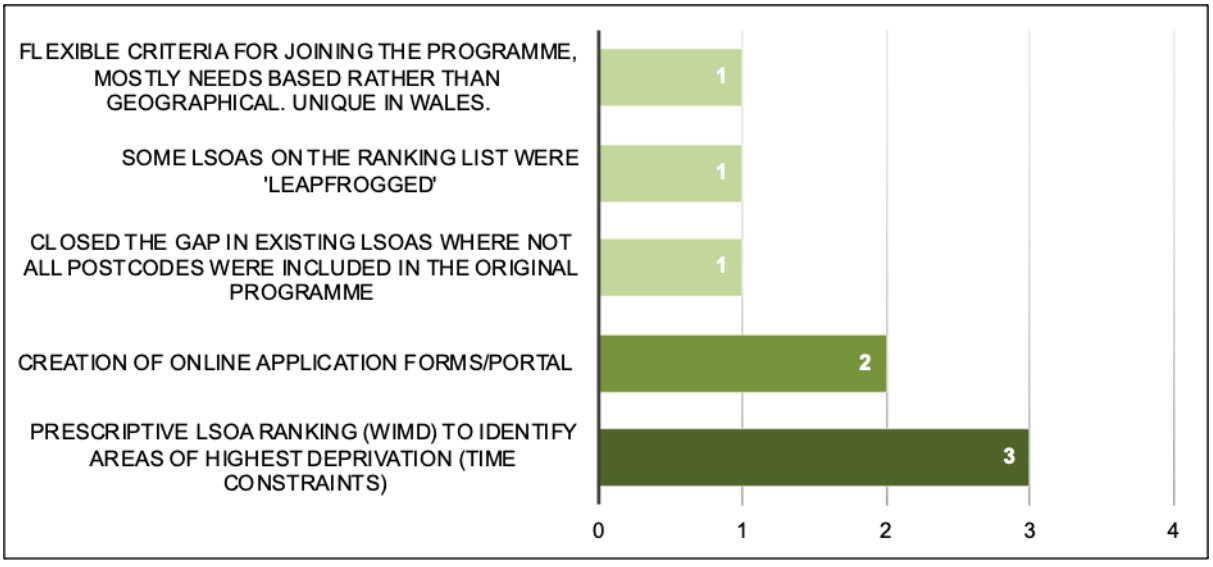


Figure 32. Emergent themes in FS expansion implementation.

Financial Restrictions and Budget Planning

Questions two and three focused around finance and budget planning within the original FS programme and expansion implementation. Question two was asked as a follow up to a theme that was evident within the survey responses, around the ringfencing of budgets between the different phases of FS. There was a mixed response from the participants regarding their feelings towards the separation of budgets, however the overall feeling was that it would be easier to administer and implement FS with one overall budget (see *Table 12*).

Table 12. LA responses to budget ringfencing.

LA 1	No concerns regarding budget pot. Underspent in the last financial year by £500,000 which was handed back to WG. Only inconvenience is that of having to report data separately, in different formats (Microsoft Word, Microsoft Excel).
LA 2	Keeping finances separate was complex. Found it easier to keep data separate.
LA 3	Budgets in original FS programme have not increased in line with local government pay awards and struggled to bring a balanced budget. Underspend on the "cash rich" Phase 2 budget. Aggregation of budgets would provide "more flexibility to have a holistic approach rather than a segmented one."
LA 4	There was frustration in 2023/24 budget as there was underspend in Phase 2 budget. "If budgets could be merged and even used on other CCG projects for EY, that would be beneficial in future proofing services."
LA 5	Found it difficult to recruit staff within the limits of ringfenced budgets.

Similarly, question three outlined another trend evident from the survey: budget planning and not having a long-term financial plan in place from WG. A key theme which emerged was the lack of permanency for staff, and the difficulties surrounding recruiting to professional roles on a fixed-term basis. The only exception to this was *LA 4*, who did not experience this issue due to their core team being funded internally (see *Table 13*).

Table 13. LA responses to short-term indicative budgets from WG.

LA 1	Hiring professionals, such as Education Psychologists, for one year is difficult. The LA attempted to recruit to a SALT post three times, and internal policies had to be adjusted to account for the risk of hiring beyond the budget period. Staff members are concerned about job security.
LA 2	It was very beneficial when WG provided a 3-year budget several years ago, as the LA was able to advertise and recruit to posts on a 3-year basis. A repetition of this would be very appreciated, especially if it were increased to 5 years.
LA 3	Difficulties recruiting to posts, especially with local health board trying to recruit HVs. As funding could only be guaranteed until March 2025, the LA was unable to recruit to backfill the post as there were no applications. The previous 3-year indicative budget was helpful.
LA 4	The internal team for this LA is not funded by the CCG, and instead funded by the LA itself. There are therefore no concerns surrounding job security, and this LA is fully confident in WG's commitment to FS, as it is a flagship programme, and would be "reputationally disastrous" to pull funding now, especially as the programme received cross-party signup during its conception.
LA 5	Issues experienced trying to recruit staff to fixed-term posts. Grateful for WG providing new pots of funding, but this is often on a short-term basis, and it is difficult to recruit to a 6-month role, due to the lengthy recruitment process and lack of permanency.

LA Alignment with Strategy

The most mentioned strategies by participants when asked if their LA aligned the way they implemented FS with local strategies was the local PSB, with 60% of the participants reporting this (see *Figure 33*).

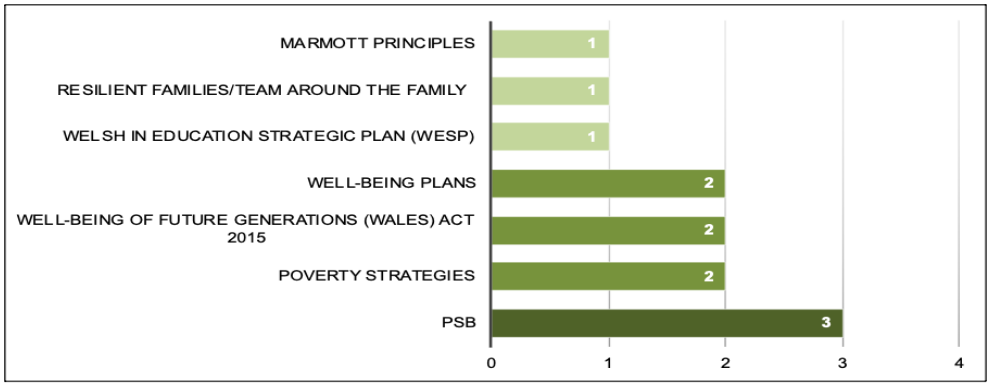


Figure 33. Most mentioned strategies considered by LAs when implementing FS.

Participants were also asked how much of a role, if any, do Welsh Government strategies play in the implementation of FS in their LA. The most common answer was that WG FS guidance was followed. The only LA that did not mention this, *LA 4*, quoted legislation instead. It is interesting to note that the other four respondents did not acknowledge strategy or legislation wider than that of FS-related documents. Although two of the participants answered Well-being of Future Generations (Wales) Act 2015 in the previous question, which was centred around local policy rather than national.

Table 14. Alignment with WG strategy and policy.

LA 1	The LA aligns more with local needs but does follow WG FS guidance.
LA 2	All decisions are led by WG FS guidance. This is significant in terms of understanding and workload, but the LA has a good relationship with its WG Account Manager. They attend LA Transformation Board meetings and remain flexible and accessible.
LA 3	WG FS guidance is followed.
LA 4	Social Services and Well-being (Wales) Act 2014; UNCRC; Childcare and Play legislation (such as the CSA and Play Sufficiency Duty).
LA 5	WG FS guidance and FS policies in general are followed.

Interpretation of FS Eligibility

The overall theme from Question 5 of the interview was that of LA discretion and responsibility in controlling the communications disseminated to members of the public regarding whether their address is eligible for FS childcare expansion. This tends to be an issue with the childcare expansion element, as all non-original FS families have generic HVs, rather than FS HVs. For original FS families, who have FS HVs, and are entitled to all four elements of FS, they are surrounded with the knowledge from their allocated professionals regarding their entitlement to services from when the child is born. Children with generic HVs, however, are reliant on communications from the LA and/or their HV informing them that they are eligible for childcare at a certain point before the child becomes eligible aged 2. This can often become confusing, as expansion areas are still relatively new and HVs are still getting used to which areas are now eligible.

Table 15. Interpretation of FS eligibility by members of the public.

LA 1	Needs based approach means that there are less queries surrounding postcode eligibility.
LA 2	Members of the public feel that FS is sometimes a "postcode lottery." Lessons were learnt, however, from the Childcare Offer, which was rolled out in certain wards, and taking more calls from ineligible families than those eligible. Fine balance between publicising widely without getting the hopes up for those families who are not (yet) eligible.
LA 3	Member of the public can unfortunately misinterpret WG information, and it is up to individual LAs to make sure FS is publicised appropriately to those eligible. Use of leafleting, for example. The additional demand has been managed well within the LA's FIS service. The Outreach programme can ensure that those families not eligible, but in need of FS, can apply based on their need. Need for person centred commissioning.
LA 4	It's about getting the message out there correctly. Complaints have been received by local politicians and the CEO. As long as the LA is able to provide a rationale for ineligibility, there are rules to follow. The LA managed to "squash" a lot of misconstrued information by implementing effective communications. LA discretion is key.
LA 5	The LA asked WG if they were able to advertise FS Childcare Expansion as a non-FS initiative to prevent members of the public becoming confused, however this was not accepted, as FS was being used as the vehicle for driving this policy. There is also the potential for families thinking they will be eligible for Outreach based on a social need of the child, rather than more demanding needs.

Leading by Example

Finally, the participants were asked to share any processes or behaviours within their LA that are not necessarily standard practices across Wales, which they think could be a benefit to FS implementation.

Table 16. Leading by example: how LAs feel they effectively implement FS.

LA 1	All areas should have a needs-based approach, rather than being geographically based. WG are incorporating this by recently encouraging the use of outreach. This LA also feels that they have reached all children on a needs-based approach and would consider the possibility of means-tested eligibility for future phases.
LA 2	This LA has been highly commended by the National Day Nurseries Association for their collaboration with CWLWM partners throughout the childcare expansion process, involving providers as the key stakeholders in designing childcare provision.
LA 3	An online system was developed to collect data, track applications and childcare attendance. This has enabled the LA to deliver the expansion on such a large scale. The LA is currently working alongside a neighbouring authority to potentially help them design a similar system.
LA 4	The EY provision in this LA stretches beyond ages 0-4 and instead covers from antenatal up to 7 years of age. This LA commented how other LAs might feel that this would "open the floodgates" and increase pressure on the already stretched budgets, however it has proved very effective within their borough. The LA has also recently employed a member of staff to work specifically on EY and FS communications and marketing.
LA 5	This LA co-locates with all elements of the FS programme, meaning HVs, SALT staff, parenting staff, and childcare advisory staff all work alongside one another, as well as the LA's internal FS team. Context and information around families can be provided in a simple and effective manner. For example, a child moved into the LA from a neighbouring authority, but it wasn't until a further conversation with a co-located HV professional that they found out the child was in foster care.

Swansea as a Case Study

Two senior managers within Swansea's EY Team were interviewed throughout the research process, and the culture of the EY Team and the wider Commissioning and Resources Service was identified as overall very positive. *Figure 34* outlines the positive culture aspects that were identified during the discussions.

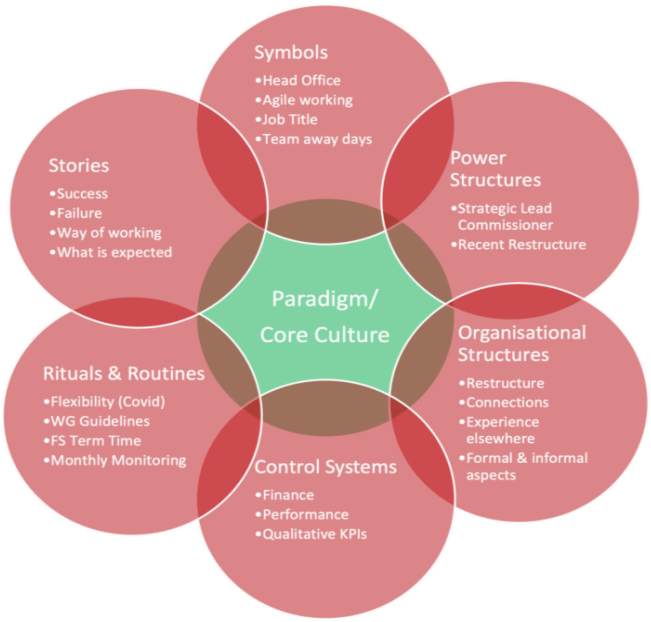


Figure 34. Cultural web outlining the perceived culture within the EY Team in Swansea. Adapted from Whittington et al. (2020).

Further discussion with the Swansea EY managers found that an updated model of outreach is due to be implemented in October 2024, where childcare will be opened up to a wider range of families, on a needs-based basis, with generic HVs referring in families who would benefit from attending the funded childcare for up to 12.5 hours per week. Hails (2024) recommends that LAs increase participation and engagement with families, and to ensure effective delivery, link FS outreach with wider tackling poverty programmes. Hails (2024) also suggests conducting primary research with service users would be beneficial on how best to implement FS and determine whether a universal vs. needs-based approach is preferable.

Further discussion with the LA managers found that Swansea Council had also found difficulty in obtaining data from SBUHB surrounding demographics and where children receiving a generic HV service live. This was due to data sharing concerns raised by SBUHB's Information Governance Department, despite there being a Service Level Agreement and data sharing protocols in place for the original FS programme.

Discussion

Implementation of FS, and its alignment with Local Authority strategy.

Introduction

This chapter will address the research question and examine how this project contributes to existing academic knowledge in the EY and FS field.

Key Findings

Table 17. Key findings from the research.

Smooth rollout perception	Over 56% of respondents reported that the second phase of FS childcare expansion, costing £26 million, was implemented "smoothly" or "very smoothly," indicating positive feedback on the rollout.
Variability in implementation dates	Most LAs expanded in 2023, but two LAs began as early as 2020, prior to the official Wales-wide announcement, suggesting some pre-agreement with the Welsh Government, or perhaps a mistake in the inputting of dates when completing the survey.
Targeting families	While all LAs felt that the original FS programme reached families who need it at least 50% of the time, improvements in targeting are still needed. This is especially the case regarding the expanded childcare element, where fewer LAs felt it consistently reaches the right families.
Stakeholder engagement	LAs involved multiple stakeholders in the childcare expansion, with five LAs engaging parents and families. Childcare providers and local councillors were key collaborators, as expansion impacted provider capacity and required political approval.
Resource allocation concerns	While two-thirds of respondents found funding for the original FS program adequate, 20% felt it was inadequate, especially regarding challenges like stagnant budgets and rising costs. Conversely, 93% felt funding for childcare expansion was adequate, though issues with ringfenced budgets were noted.
Staffing shortages	Almost three-quarters of respondents indicated that their teams lacked sufficient staff to meet the expanded childcare needs, leading to restructuring and new hiring, with one LA recruiting seven new staff members.
Strategic alignment	85% of LAs stated that FS implementation aligns with local strategies, particularly corporate plans and PSBs, underscoring the importance of local policy alignment.
Challenges faced by LAs	Political barriers, such as concerns from local politicians about ward inclusion, and geographical barriers, experienced by two-thirds of LAs, were highlighted. Logistical challenges, such as capacity and staffing, were also prominent.
Financial and Staffing constraints	Short-term financial planning from WG and issues with non-permanent staffing roles due to fixed-term contracts posed significant challenges for LAs. Only one LA did not face staffing issues due to internal funding.
Eligibility confusion	There was confusion among families regarding FS childcare eligibility, particularly for non-original FS families with generic health visitors. This led to communication challenges as LAs had to inform eligible families in expanded areas.
Leading by example	Some LAs identified unique practices or processes they believed could benefit FS implementation across Wales, suggesting room for shared best practices. Best practices included: a flagship outreach model; close collaboration with CWLWM partners; the development of online information management system; broadening the EY offer; and, colocation of FS staff.

Synthesis With Literature Review

During the literature review, it was found that only 4.3% of respondents in the CSA survey stated that they access FS childcare. This is critically under representative of the number of families that do actually access FS funded childcare. As of June 2024, 830 children across Swansea were attending FS childcare provisions (see *Figure 35*). The CSA also mentioned that time of day of accessing childcare was a salient issue for parents, something which is rigid under WG FS guidance: "[FS] childcare sessions are 2.5 hours per day, 5 days a week because the evidence shows that shorter, more frequent higher quality childcare sessions

lead to the best outcomes for the child" (Welsh Government, n.d.). The CSA also highlighted the need to support those in need outside of the existing catchment. This could be targeted by the implementation of a new outreach programme, which is currently being developed in Swansea and due to launch in October 2024.

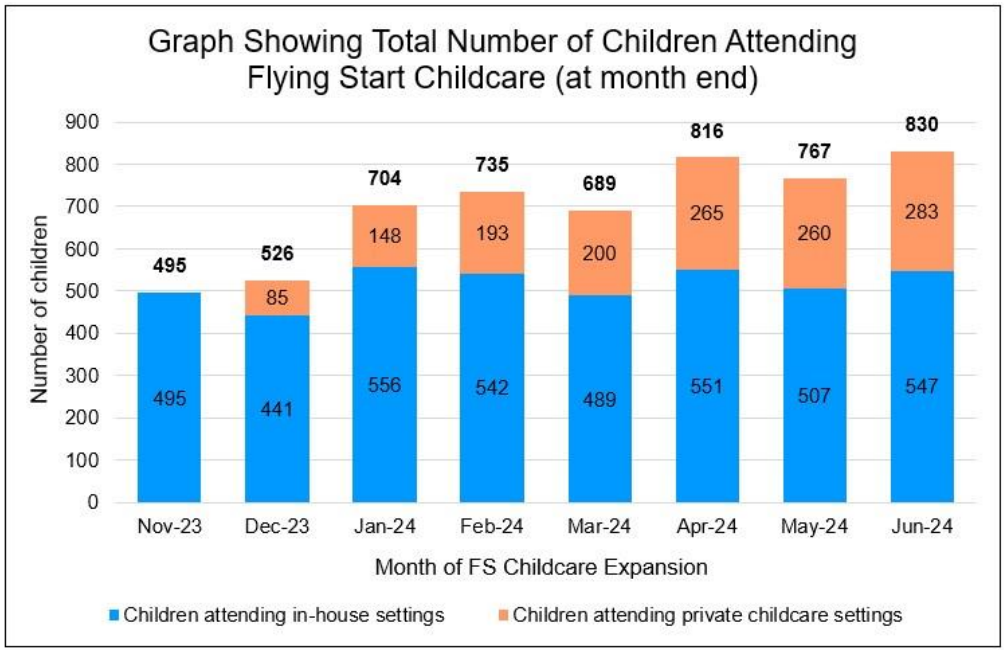


Figure 35. Total number of children attending FS childcare (Swansea Council, 2024d).

Similarly, *Figure 35* also shows that the number of children accessing FS provision has increased by almost 68% from 495 attending as of November 2023, compared to 830 attending as of June 2024. The expansion of addresses eligible for childcare has had a significant impact on the number of children accessing services.

Pre-November 2023, between 17%-100% of 38 LSOAs were part of the original FS programme (all four elements). From November 2023, those existing LSOAs that were under 100% coverage were 'topped-up' to be fully included as part of the childcare only element. In addition to this, the LA also added 39 new full LSOAs to be included for the childcare only element (see *Appendix E*). 51% of addresses in Swansea are now eligible for at least Flying Start childcare (with half of those LSOAs being eligible for the full original FS entitlement).

The stakeholder environment surrounding the EY Team within the Resource and Commissioning Service in Swansea Council is displayed in *Figure 36*. Essentially, the power/interest matrix identifies both internal management and political stakeholders as the most influential in the context of FS implementation, implying that Swansea Council has the ability to work with WG to influence and adapt how FS is implemented.

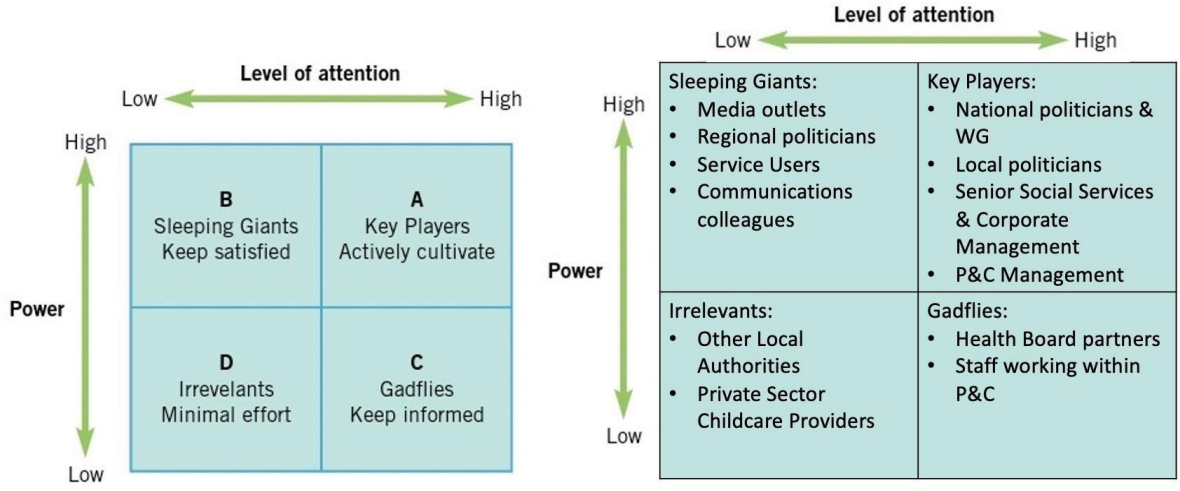


Figure 36. Swansea Council's stakeholder environment adapted from Whittington et al. (2020).

Co-production is one of the key themes that arose throughout the research. In Swansea Council, the understanding and awareness of VBHC and Prudent principles is limited. It would be beneficial for LA staff to learn about the guiding principles behind their key partner's ethos. This would be especially prevalent in the context of the department's utilisation of the IPC Commissioning Cycle, where co-production is highly encouraged.

Synthesis With Research Objective

The key findings from both the primary and secondary sources shows numerous trends and themes that are relevant across LAs, and not just specific to Swansea. These are presented below in relation to the research objectives (see *Table 18*).

Table 18. Research objectives - key findings.

What are the best ways to implement FS in Swansea?	Analysis of the literature and research findings suggest that improvements can be made in the following areas: targeting families in need more effectively via outreach in the first instance; enhancing inter-agency collaboration; streamline data-sharing processes; ensure sufficient and flexible resource allocation by working closely with WG; and refine communication strategies to reduce confusion surrounding FS eligibility.
Gain insight from good practice initiated by other other LAs and how they implement FS.	Swansea could investigate the worthiness of taking a more needsbased approach to future phases of childcare expansion, in line with the necessary discussions with WG. Swansea could also potentially benefit from continuing to enhance its work in coproducing alongside stakeholders, including CWLWM partners and childcare providers. Swansea has recently developed an online portal to capture FS childcare applications, which allows providers to be paid, data to be reported to WG, and for a general management of the FS childcare element. As implied by interview responses, working alongside neighbouring LAs could be even more beneficial in creating a cohesive approach towards FS implementation, especially in the instance of cross-border applications for childcare. In line with the digital age, communications and marketing are key, and this is also something Swansea could harness going forward. Finally, relationships with stakeholders could be improved by increased co-location. Currently, FS HVs are co-located in some of the childcare settings, however, further work could be done to improve co-location across all four elements, and even within the internal LA and SBUHB management team.

Evaluate how Swansea and other LAs align implementation of FS with local strategies.	Corporate plans were the most frequently mentioned strategy, ensuring that FS fits within the wider goals of each LA. LAs utilise these plans to integrate FS with longer-term objectives, such as reducing poverty and improving outcomes for families. Swansea can similarly harness its corporate plan to ensure that the future expansion of FS services complements other LA goals and vice versa. Most LAs reported that their FS expansion aligns not only with local, but also WG strategy. For example, LAs frequently refer to guidance from the Well-being of Future Generations (Wales) Act 2015, which ensures that services like FS support long-term social, economic and environmental well-being. Some LAs, including Swansea, experience challenges when aligning FS expansion with strategic goals, such as budgetary restrictions, which potentially leads to staffing limitations and limited service provision. It is important to keep in mind that Swansea and many other LAs have managed to adapt and continue to align FS delivery to their strategy despite these challenges.

These themes have been applied to a Hoshin Kanri Policy Deployment Matrix (see *Figure 37*). There are clearly current gaps in knowledge surrounding LA interpretation and prioritisation of WG policy and strategy. The matrix assists in identifying these gaps and suggests several methods of implementation.

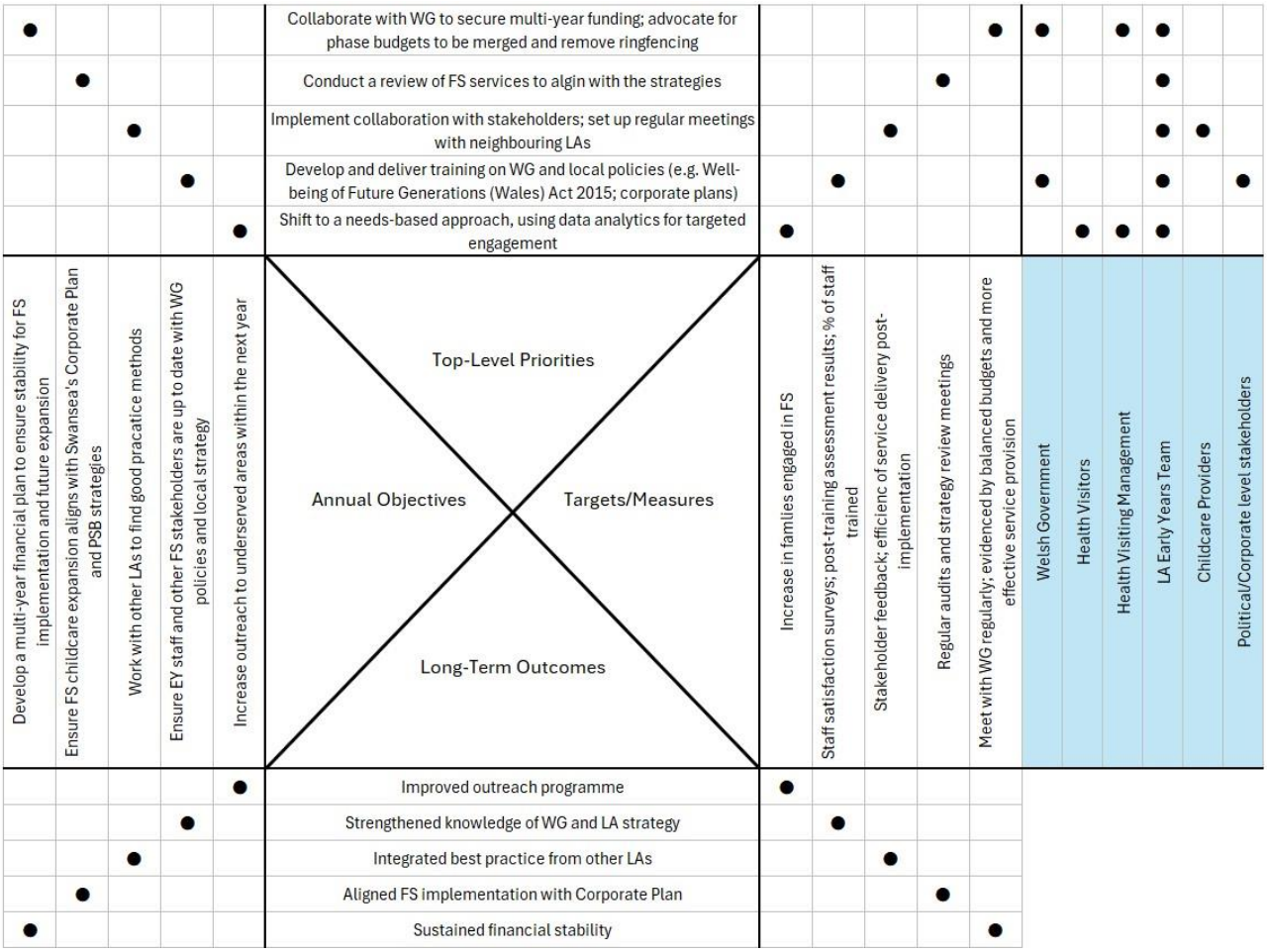


Figure 37. Hoshin Kanri - Policy Deployment Matrix. Based on version used in Rich and Shararah (2020, p.183).

Force Field Analysis

Figure 38 highlights the forces required to strengthen the effectiveness of FS implementation.

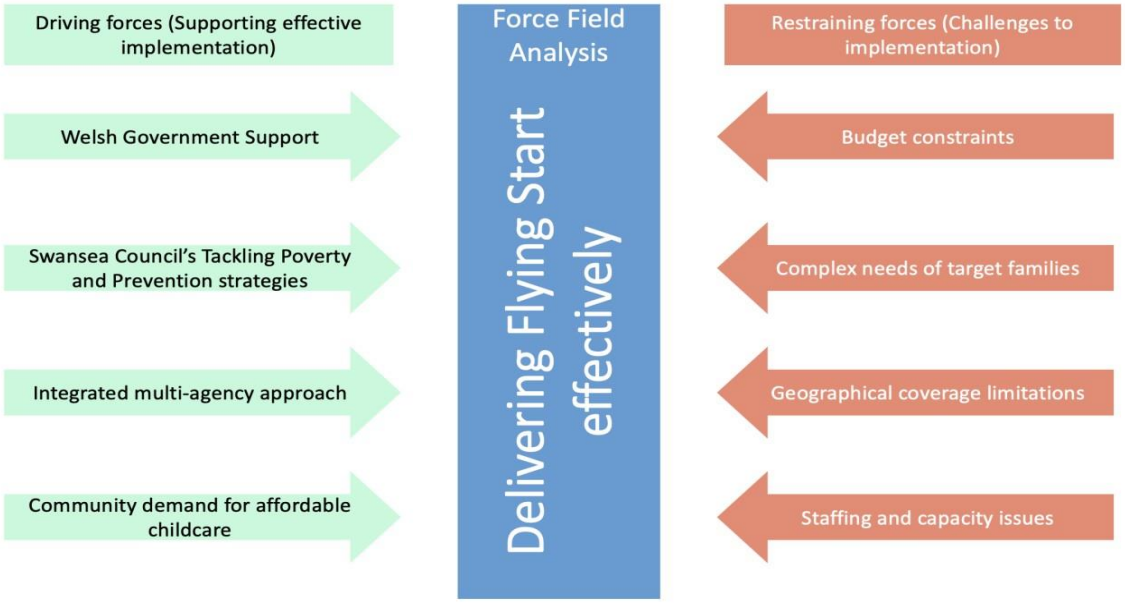


Figure 38. A Force Field Analysis detailing the implementation of FS.

Contribution to Academic Debate

By examining the implementation of FS and the recent childcare expansion, the research outlined in this project fills a gap in the literature surrounding LA strategies and the interaction with national policies such as "*A Healthier Wales*". The report has highlighted gaps in how national strategies are interpreted at a local level, and the challenges or successes that arise from such implementation. This contributes to debates on policy diffusion and local governance in the context of EY and FS programmes.

Furthermore, the research has highlighted the practical challenges of co-production and stakeholder engagement. It contributes to discussions on public sector co-production, within the context of commissioning EY services. This also includes the necessary work that LAs need to do alongside WG colleagues to produce longer-term budget planning and removal of ring-fencing.

The research has undertaken a study in whether FS reaches the families that it was initially designed to. By exploring gaps in outreach and potential needs-based or means-tested approaches for future phases of expansion, the research has addressed debates on how social policy and intervention programmes can more effectively target marginalised members of the community.

Finally, the research project has bridged a gap between academic research and real-world practice by analysing FS data, but also proposing recommendations based on best practice and theory.

Discussion Summary

Research on FS contributes to academic discussion by identifying the best practice for implementation, highlighting financial sustainability, stakeholder engagement, and effective outreach. This research answers the question of how FS can be best implemented in Swansea by offering insights into resource allocation, local strategy, and lessons from other LAs.

Recommendations

Table 19. Recommendations for future implementation.

1.	Embrace the Commissioning Cycle to increase service quality	By embedding the IPC Commissioning Cycle into the implementation of FS, LAs can enhance accountability, flexibility and sustainability in delivering EY services and commissioning in general (IPC, 2002, 2010).
2.	Co-produce alongside stakeholders	As identified by the research findings, and in line with the Social Care Institute for Excellence co-production principles of equality, diversity, accessibility and reciprocity (2022).

4.	Engage with parents, carers and families	In line with CSA recommendations, it would be beneficial to engage with families regarding their FS requirements. Swansea's EY Team is currently in the process of formulating a parent/carer survey to gather feedback on childcare throughout Swansea. This is something that FS staff could harness to increase engagement and feedback.
5.	Enhance and develop existing outreach provision	GSR (2014) state that there is a need to clearly and systematically signpost families between services so that they can fully take advantage of their entitlements. Hails (2024) recommended the following to improve implementation at a local level within Cardiff Council: Create a multi-agency forum to steer outreach policy and delivery review; consider allowing 'discharge' from FS Outreach; and consider barriers surrounding transport or accessibility. This is something which can be applicable to all LAs, especially within the context of Swansea Council, as it is due to launch its new outreach programme in October 2024.
6.	Utilise CSA to inform future decision making	The CSA is a critical piece of work which outlines the needs of families in Swansea. Working alongside the authors of the 2025 CSA would be extremely beneficial to FS, as it would provide an insight and an opportunity to work with other stakeholders to develop future phases of childcare expansion, and even improve current FS implementation.
7.	Increase local demographic and geographic knowledge	Enhancing the use of GIS such as GeoDiscoverer and QGIS to improve the EY Team's knowledge of the local area and the challenges presented, alongside local population trends and estimates and 2021 Census data. The Swansea Local Development Plan 2010-2025 (Swansea Council, 2019) can also be used to forward plan for future roll-out of FS expansion; whether this be childcare only expansion or the inclusion of more areas in the original programme.
8.	Enhance and develop data collection and analysis	Improved collaboration with partners such as SBUHB would allow for greater knowledge of families living in non-FS areas. Developing data sharing agreements would allow for this to happen and ensure that data is shared securely. Utilising the new online portal created in Swansea to provide insights and reports would lead to the collection and analysis of meaningful data, helping to inform the programme and how it is serving the most disadvantaged families.
9.	Increase understanding of strategy, policy and legislation	Applicable to all LAs, this recommendation suggests that there is always more to understand regarding strategy, policy and legislation. This is relevant for both local and national levels, where it is crucial to have awareness of such documents in order to achieve the goals of FS.
10.	Target communications and marketing to the	Generic HV services already promote FS childcare to families that are living within a 'phase 2' postcode and eligible for the childcare element of FS expansion. Communications need to be
	right audience	targeted to the right families, and this is something that working with a marketing or communications officer would help achieve.
12.	Remove ringfencing of budgets	This would only be achievable by working alongside other LAs and WG to discuss how budgets are currently planned and deployed. Removal of ringfencing would alleviate pressure on services, both administrative and on the front line of service delivery.

Conclusion

Overview and Key Findings

A Welsh Government report stated that "strategic integration alone is not enough to sustain good practice, outputs and outcomes… Flying Start also needs to have established mechanisms for influencing the strategic direction of local plans and associated services" (GSR, 2014, p.12). This perspective provides context and direction for the recommendations outlined in the previous chapter.

It is essential to note that over 75% of WG's total revenue funding is allocated to Health and Social Services, and Finance and Local Government (see *Figure 39*). Within this allocation, funding for FS is provided through CCG, reflecting WG's commitment to EY intervention as a core component of its public service and social care strategy within the remit of the Social Services and Well-being (Wales) Act 2014 and the Well-

being of Future Generations (Wales) Act 2015. FS is no small programme and is pivotal in the development of children at such a young age.

Ultimately, tailored EY support, which takes account of demographics may seem costly. However, it has proved more effective, especially with high need families, than its generic counterpart (GSR, 2014).

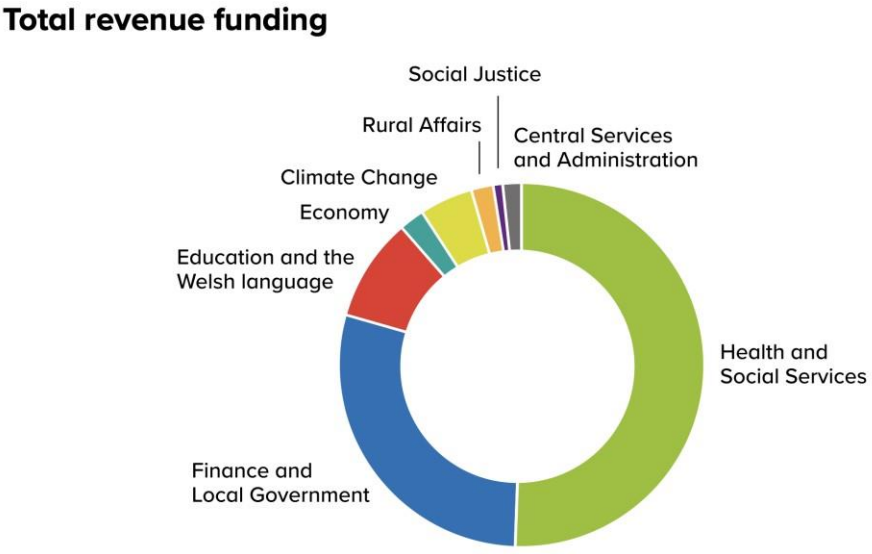


Figure 39. Budget allocation split for total revenue funding in Wales (Welsh Government, 2022).

Figure 40 demonstrates a process by which the EY Team can take the recommendations on board and how they can be implemented effectively.

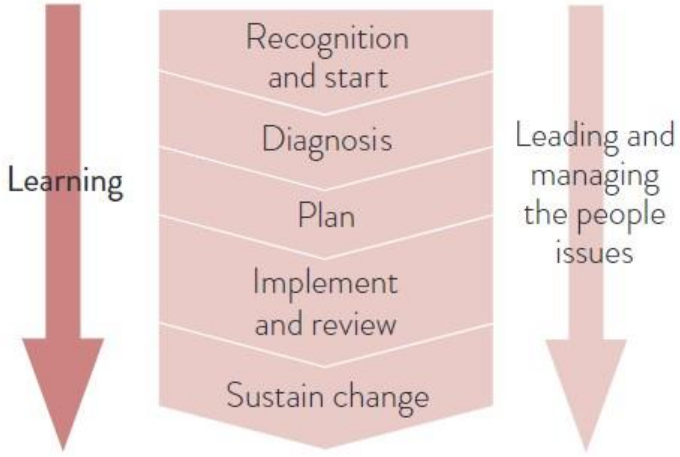


Figure 40. A flow diagram demonstrating stages of learning and adjusting to a changing environment (Hayes, 2022).

Reflections and Future Research

Conducting this research project has been both enlightening and valuable, and hopefully the recommendations suggested are reasonable and practical to take forward and implement.

The researcher has already been asked by WG Research colleagues to discuss findings from this research project, as they are interested in understanding the views of LAs further. Further research into FS implementation would allow for a more cohesive approach to EY within Social Care and Education departments across Wales.

Conclusion

It is fundamental not to overlook the significant achievement of Swansea Council, and all other Welsh LAs, in implementing the recent expansion of FS childcare, as it has had such a crucial impact on families already

by allowing them to access funded childcare (in line with barriers to childcare outlined by the 2022 CSA). The recommendations outlined in *Chapter 6* act as a guide on how to streamline the implementation of any future phases and ease both the financial and administrative burden on LAs. Aligning strategies across departments within Swansea Council and with stakeholders such as SBUHB will ensure a cohesive approach to poverty reduction, EY intervention, and the achievement of overall well-being.

The recommendations have been produced to ensure that the ethos of FS is accomplished: “to make a decisive different to the life chances of children by mitigating the impact of poverty” (Welsh Government, 2017).

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Appendix A: Research Ethics Approval

Swansea University
Prifysgol Abertawe

Approval Date: 18/07/2024

Research Ethics Approval Number: 2 2024 10297 9701

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	Implementation of the Flying Start programme in Swansea and its alignment with Local Authority strategy
Applicant name	MRS ALISHA RICHARDSON
Submitted by	MRS ALISHA RICHARDSON /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/12393

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Appendix B: Online Survey circulated to 22 Welsh Local Authorities

Implementation of Flying Start and its alignment with Local Authority strategy
Background Information
My name is Alisha Richardson, and I am currently undertaking a research project as part of my MSc in Advanced Health and Care Management (Innovation and Transformation), with Swansea University. As part of my master's degree, I am focusing on the implementation of Flying Start within Local Authorities and how it aligns with both LA strategy, and Welsh Government policy guidance.

Research Project: Implementation of the Flying Start programme and its alignment with Local Authority strategy.
You are invited to take part in a research project. This research will comprise of an exploratory study into Welsh Local Authorities and their implementation of Flying Start, including the expansion of its childcare element.

The following questionnaire should take no more than 15 minutes of your time. Completion of the questionnaire implies consent to participate in the research project. Please note that your response will be anonymised before the findings are published.

The information gathered will be used to produce a report. This report will not include any information that could be used to identify individual participants.

Swansea University is the data controller for the research. However, any personal data provided through the questionnaire will be deleted, and anonymised.
Your participation is voluntary and if you decide later that you do not wish to take part or be sent reminders then please reply to the invitation email and your details will be removed.

Swansea University will hold the personal data until the end of the project, and any personal data not already removed will be deleted within three months after the end of the project. This includes your contact details.

The contact for this research Alisha Richardson at Swansea University
E-mail address: Alisha.Richardson@Swansea.gov.uk or 2232404@Swansea.ac.uk
Telephone number: 07534 174065

Individual rights
Under UK GDPR, you have the following rights in relation to the personal information you provide as part of this research. You have the right:

- To access a copy of your own data;
- For us to rectify inaccuracies in that data;
- To object to or restrict processing (in certain circumstances);
- For your data to be 'erased' (in certain circumstances); and
- To lodge a complaint with the Information Commissioner's Office (ICO) who is our independent regulator for data protection.

The contact details for the Information Commissioner's Office are: Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Phone: 0303 123 1113. Website: www.ico.gov.uk

Thank you for both your time and participation.

1. Please select the Local Authority you represent:
   - ○ Blaenau Gwent County Borough Council (Cyngor Bwrdeistref Sirol Blaenau Gwent)
   - ○ Bridgend County Borough Council (Cyngor Bwrdeistref Sirol Pen-y-bont ar Ogwr)
   - ○ Caerphilly County Borough Council (Cyngor Bwrdeistref Sirol Caerffili)
   - ○ Cardiff Council (Cyngor Caerdydd)
   - ○ Carmarthenshire County Council (Cyngor Sir Gaerfyrddin)
   - ○ Ceredigion County Council (Cyngor Sir Ceredigion)
   - ○ Conwy County Borough Council (Cyngor Bwrdeistref Sirol Conwy)
   - ○ Denbighshire County Council (Cyngor Sir Ddinbych)
   - ○ Flintshire County Council (Cyngor Sir y Fflint)
   - ○ Gwynedd Council (Cyngor Sir Gwynedd)
   - ○ Isle of Anglesey County Council (Cyngor Sir Ynys Môn)
   - ○ Merthyr Tydfil County Borough Council (Cyngor Bwrdeistref Sirol Merthyr Tudful)
   - ○ Monmouthshire County Council (Cyngor Sir Fynwy)
   - ○ Neath Port Talbot County Borough Council (Cyngor Bwrdeistref Sirol Castell-nedd Port Talbot)
   - ○ Newport City Council (Cyngor Dinas Casnewydd)
   - ○ Pembrokeshire County Council (Cyngor Sir Penfro)
   - ○ Powys County Council (Cyngor Sir Powys)
   - ○ Rhondda Cynon Taf County Borough Council (Cyngor Bwrdeistref Sirol Rhondda Cynon Taf)
   - ○ Swansea Council (Cyngor Abertawe)
   - ○ The Vale of Glamorgan County Borough Council (Cyngor Bwrdeistref Sirol Bro Morgannwg)
   - ○ Torfaen County Borough Council (Cyngor Bwrdeistref Sirol Torfaen)
   - ○ Wrexham County Borough Council (Cyngor Bwrdeistref Sirol Wrecsam)
2. What is your role or position within the Local Authority?

Programme Rollout

3. How would you describe the rollout process of Flying Start Childcare Expansion in your Local Authority?
   a. Very smooth
   b. Smooth
   c. Neutral
   d. Difficult
   e. Very Difficult
   f. Comments:
4. When did your Local Authority begin implementing expanded Flying Start childcare services?
5. The Flying Start Programme (all four elements) reaches those families who need it the most.
   a. Always
   b. Almost Always (90% of the time)
   c. Frequently (70% of the time)
   d. Sometimes (50% of the time)
   e. Occasionally (30% of the time)
   f. Rarely (10% of the time)
   g. Never

6. Flying Start Childcare (and its recent expansion) reaches those families who need it the most.
    a. Always
    b. Almost Always (90% of the time)
    c. Frequently (70% of the time)
    d. Sometimes (50% of the time)
    e. Occasionally (30% of the time)
    f. Rarely (10% of the time)
    g. Never

Stakeholder Involvement

7. Which stakeholders were involved in the planning and implementation of Flying Start Childcare Expansion in your Local Authority? (Select all that apply)
    a. Local Government officers
    b. Local Councillors and Cabinet Members
    c. Childcare providers
    d. Parents and families
    e. Cwlwm Partners (Clybiau Plant Cymru Kids' Clubs, Early Years Wales, Mudiad Meithrin, National Day Nurseries Association Cymru, Professional Association for Childcare and Early Years (PACEY Cymru))
    f. Community and Third Sector organisations
    g. Others (please state):

Resources

8. How adequate was the funding received for the implementation of the core Flying Start Programme (via CCG)?
    a. Very adequate
    b. Adequate
    c. Neutral
    d. Inadequate
    e. Very inadequate
    f. Further comments

9. Is funding received for the Expansion of Flying Start Childcare (via CCG) adequate to meet the needs of families that receive expansion childcare?
    a. Very adequate
    b. Adequate
    c. Neutral
    d. Inadequate
    e. Very inadequate
    f. Further comments

10. Were there sufficient staff members within your internal team available to meet the needs of expanded services?
    a. Yes. Please describe how you were able to work within existing resources.
    b. No. Please describe how you overcame this.

Service Quality and Strategic Alignment

11. Does the Flying Start programme and its recent childcare expansion align with the strategies and policies of your Local Authority?
    a. Yes, please explain
    b. No, please explain
    c. Other, please explain
    d. Further comments

Overcoming Challenges and Barriers

12. Have you experienced any political or social barriers when implementing Flying Start Childcare Expansion?
    a. Yes, please explain
    b. No, please explain
    c. Other, please explain
    d. Further comments

13. Have you experienced any geographical barriers (e.g. LSOA queries) when implementing Flying Start Childcare Expansion?
    a. Yes, please explain
    b. No, please explain
    c. Other, please explain
    d. Further comments

14. Have you experienced any logistical difficulties when planning and implementing the Flying Start Childcare Expansion?
    a. Yes, please explain
    b. No, please explain
    c. Other, please explain
    d. Further comments

15. What is the largest issue your Local Authority faced regarding the implementation and delivery of Flying Start and the recent childcare expansion? Please also explain how you overcame this.
    a. Comments:

Additional Comments

Please provide any additional comments or insights regarding the implementation of Flying Start Childcare Expansion.

Please state if you are happy to be contacted for a follow-up interview.

Yes/No

Contact email address if yes:

Appendix C: WG Survey communication

From: Ryan-Phillips, Callum (HSCEY - Communities & Tackling Poverty - Early Years, Childcare & Play) **On Behalf Of** Flying Start
Sent: Wednesday, July 31, 2024 10:55 AM
Cc: Seddon, Victoria (ECWL - Communities & Tackling Poverty - EPC Evidence & Support Division) <Victoria.Seddon@gov.wales>; 'alisha.richardson@swansea.gov.uk' <alisha.richardson@swansea.gov.uk>
Subject: Prosiect Ymchwil: Rhoi'r rhaglen Dechrau'n Deg ar waith a sut mae'n cyd-fynd â strategaeth yr Awdurdod Lleol / Research Project: Implementation of the Flying Start programme and its alignment with Local Authority strategy.

Gwybodaeth Gefndir Fy enw i yw Alisha Richardson ac ar hyn o bryd rwy'n ymgymryd â phrosiect ymchwil fel rhan o fy MSc mewn Rheoli Iechyd a Gofal Uwch (Arloesedd a Thrawsnewid) gyda Phrifysgol Abertawe. Fel rhan o fy ngradd meistr, rwy'n canolbwyntio ar sut y caiff Dechrau'n Deg ei rhoi ar waith o fewn Awdurdodau Lleol, a sut mae'n cyd-fynd â strategaeth yr ALl a chanllawiau polisi Llywodraeth Cymru. **Prosiect Ymchwil: Rhoi'r rhaglen Dechrau'n Deg ar waith a sut mae'n cyd-fynd â strategaeth yr Awdurdod Lleol.** Fe'ch gwahoddir i gymryd rhan mewn prosiect ymchwil. Bydd yr ymchwil hon yn cynnwys astudiaeth archwiliadol i Awdurdodau Lleol yng Nghymru a'r ffordd y maent yn rhoi Dechrau'n Deg ar waith, gan gynnwys ehangu'r elfen gofal plant. Ni ddylai cymryd mwy na 15 munud i gwblhau'r holiadur canlynol. Drwy gwblhau'r holiadur rydych yn rhoi caniatâd i gymryd rhan yn y prosiect ymchwil. Sylwer y bydd eich ymateb yn cael ei anonymeiddio cyn i'r canfyddiadau gael eu cyhoeddi. Dolen i'r arolwg- Cymraeg: https://forms.office.com/e/yuC6wJaTAT Gellir cyflwyno ymatebion erbyn 9 Awst. Diolch am eich amser a'ch cyfranogiad.	**Background Information** My name is Alisha Richardson, and I am currently undertaking a research project as part of my MSc in Advanced Health and Care Management (Innovation and Transformation), with Swansea University. As part of my master's degree, I am focusing on the implementation of Flying Start within Local Authorities and how it aligns with both LA strategy, and Welsh Government policy guidance. **Research Project: Implementation of the Flying Start programme and its alignment with Local Authority strategy.** You are invited to take part in a research project. This research will comprise of an exploratory study into Welsh Local Authorities and their implementation of Flying Start, including the expansion of its childcare element. The following questionnaire should take no more than 15 minutes of your time. Completion of the questionnaire implies consent to participate in the research project. Please note that your response will be anonymised before the findings are published. A link to the survey is here - English: https://forms.office.com/e/nu6SCKZjf7 Please can responses be submitted by the 9th of August. Thank you for both your time and participation.

Dyddiad cau estynedig i 16eg o Awst / Deadline extended to the 16th of August

F

Callum.Ryan-Phillips@gov.wales on behalf of FlyingStart2@gov.wales

Cc: Victoria.Seddon@gov.wales; Alisha Richardson

Mon 2024-08-12 13:

Retention: Delete Emails older than 14 Years (14 years) Expires: Mon 2038-08-09 13:11

CAUTION: External email - Do not click links/open attachments unless you recognise the sender and know the content is safe

Gwybodaeth Gefndir Fy enw i yw Alisha Richardson ac ar hyn o bryd rwy'n ymgymryd â phrosiect ymchwil fel rhan o fy MSc mewn Rheoli Iechyd a Gofal Uwch (Arloesedd a Thrawsnewid) gyda Phrifysgol Abertawe. Fel rhan o fy ngradd meistr, rwy'n canolbwyntio ar sut y caiff Dechrau'n Deg ei rhoi ar waith o fewn Awdurdodau Lleol, a sut mae'n cyd-fynd â strategaeth yr ALl a chanllawiau polisi Llywodraeth Cymru. **Prosiect Ymchwil: Rhoi'r rhaglen Dechrau'n Deg ar waith a sut mae'n cyd-fynd â strategaeth yr Awdurdod Lleol.** Fe'ch gwahoddir i gymryd rhan mewn prosiect ymchwil. Bydd yr ymchwil hon yn cynnwys astudiaeth archwiliadol i Awdurdodau Lleol yng Nghymru a'r ffordd y maent yn rhoi Dechrau'n Deg ar waith, gan gynnwys ehangu'r elfen gofal plant. Ni ddylai cymryd mwy na 15 munud i gwblhau'r holiadur canlynol. Drwy gwblhau'r holiadur rydych yn rhoi caniatâd i gymryd rhan yn y prosiect ymchwil. Sylwer y bydd eich ymateb yn cael ei anonymeiddio cyn i'r canfyddiadau gael eu cyhoeddi. Dolen i'r arolwg- Cymraeg: https://forms.office.com/e/yuC6wJaTAT Diolch am eich amser a'ch cyfranogiad.	**Background Information** My name is Alisha Richardson, and I am currently undertaking a research project as part of my MSc in Advanced Health and Care Management (Innovation and Transformation), with Swansea University. As part of my master's degree, I am focusing on the implementation of Flying Start within Local Authorities and how it aligns with both LA strategy, and Welsh Government policy guidance. **Research Project: Implementation of the Flying Start programme and its alignment with Local Authority strategy.** You are invited to take part in a research project. This research will comprise of an exploratory study into Welsh Local Authorities and their implementation of Flying Start, including the expansion of its childcare element. The following questionnaire should take no more than 15 minutes of your time. Completion of the questionnaire implies consent to participate in the research project. Please note that your response will be anonymised before the findings are published. A link to the survey is here - English: https://forms.office.com/e/nu6SCKZjf7 Thank you for both your time and participation.

Appendix D: Interview questions

Location: (Online/In-person – Teams/Guildhall, Swansea)

Date & time

Setting context: (whether it was quiet, loud, private, public, or any interruptions)

Background information about the respondent: (Job title, Local Authority)

Observations of how the interview went:

Interview with Respondent A

Introductions and outline recording of interview.

Question 1: How did your local authority implement Flying Start childcare expansion, in terms of processes followed? (Prompt: for example, how did you decide on which areas to prioritise?)

Question 2: A trend that was evident from the survey circulated to the 22 LAs was that of financial restrictions, particularly surrounding the ringfencing of budgets as Welsh Government instruct that the Original and Phase 1 budget must be kept separate from the Phase 2 budget. Is this something that you have experienced, or have any opinions on?

Question 3: Another funding trend that was evident from the survey was that of budget planning, and not having a long-term financial plan from Welsh Government. Has this been something which has affected you, and if so, how?

Question 4: Do you align the way you implement Flying Start and expansion with any local strategies, and does this affect the way you deliver what Welsh Government require from your LA?

Question 5: Does misinterpretation of WG directives by members of the public lead to miscommunication and increased workload within your Family Information Service? If so, what are you doing to combat this?

Question 6: How much of a role, if any, do Welsh Government strategies play in the implementation of FS in your Local Authority?

Question 7: Are there any processes or behaviours within your LA that are not standard across all other Welsh LAs, which you think could be a benefit to the implementation of Flying Start?

Appendix E: Partnership & Commissioning Hub Service Plan 2023/24

SERVICE PLAN 2023/24

OUR VISION	
Commissioning and Partnership working to enable people to live their best lives	
SERVICE AREA	**KEY SERVICE RESPONSIBILITIES**
Partnership & Commissioning (Cross Directorate Social Services) 	○ Strategic Commissioning ○ Strategic Partnerships ○ Cross Directorate Working ○ Involvement & Engagement ○ Grant Programmes ○ Capital Programme ○ Financial Management (Revenue & Capital) ○ Compliance (FPRs and CPRs)

Commissioning is the process by which services are planned, purchased and monitored. To enable this to be as effective as possible this needs to be informed by good quality **engagement and participation** so we understand what matters to people so this informs commissioning decisions. We also need to ensure **effective partnership arrangements** are in place to maximise opportunities for joint working. By integrated working across the Directorate, the wider Council, and with external partners we can achieve the better outcomes for people, ensure value for money, and maximise grant opportunities, and maintain strong fiscal control.

Partnership working plays a significant part of commissioning for better outcomes for people, our partnerships with external agencies are essential and play a key role within the commissioning cycle so we have a shared common agenda. We are responsible for and part of many different partnerships, these include; Community Safety and Community Cohesion, Early Years and Childcare, Play, 3rd Sector Compact, Ageing Well, Children and Young People, VAWDASV, Area Planning Board, Family Support, and PSB Objectives.

	Budget 2023/24				
Description	**Accountable Officer**	**Revenue Core Budget**	**Revenue Grant Budget**	**Capital Budget (Core and Grant)**	**Savings target**
Partnership & Commissioning	*Jane Whitmore*	£3,950,568	£24,931,577	£5,500,000	See below, these have been removed from the base budget figures listed and tracked through PFM
Savings Proposals					
Replacing core costs of non-statutory teams with Grant money which may become available through a range of local or regional opportunities					-30,000

Assessment – delivering last years' Service Plan

Barriers

- Recruitment and retenion of staff
- Scale and pace of change
- Managing expectations and demands
- Information and data systems
- Reduction in one off funding
- Mix of home working/hybrid working
- Staffing capacity is certain teams
- Social media and accessible information
- Short term funding
- Recruitment freeze
- Constant change
- Inflation/Cost of Living pressures
- Change of IT systems

Successes

- Positive Can Do attitude
- Collobration working across the teams
- Integration and expansion of teams including new starters
- Team feel trusted whihc results in confidence for you to do a good job
- Deliverying on objectives often at short timescales
- Confirmation of longer term funding in some areas
- All deadlines for grants/timetabled finance tasks met
- Good partnerships built to help delivered shared priorities
- Strength of engagement and involvement work
- Increased visability

Summary - overall progress. What can be done better?

- Improve systems to more accurately understand need and what we can and should deliver
- Engage with service users and include voice of those with lived experience in commissioning and partnerships work
- Increased direct face to face work
- Networking opportunities
- Better Communication
- Clarity on governance of partnership work
- Forward planning - short, medium and long term plan

Key Service Strengths

- People focus, rights based focus on involvement and co-production
- Committed flexible teams and go the extra mile in difficult times
- Collaborative partnership approach (Directorate, Whole Council, Regional, Health, Schools, 3rd Sector, Welsh Government)
- Co-ordinated response to funding opportunities to develop new initiatives and opportunities
- Expertise in Grant Funding, Finance and Procurement processes
- Supportive, low sickness and good resilience

Main Service Weaknesses

- Understanding population needs, data collection to inform work
- Appropriate staffing resource to meet all responsibilities
- Perception of key partners from past service areas, historic expectations
- Stability and change agenda, time to embed new roles and functions
- Managing expectations, being reactive rather than strategic
- Service area identify, who we are and what we do

Key Opportunities for the Service

- New ways of working and greater partnership opportunities
- Refresh approaches and be clear with a purpose and function of the Service
- Shaping future service to become sustainable
- Promote and raise awareness working internally and externally
- Digital technologies and improved social media presence
- Support citizens to shape services that meet their needs and improve their well-being

Main Threats (Risks) to the Service

- Legal challenge of not testing the market because of timing – going to the same suppliers
- Potential breach of T&C of grant due to the short turn around needed and having to rush/ capacity issues
- Capacity for professional development, succession planning and resilience
- Embedding systems eg Oracle Fusion Project, ECM, Share Point
- Funding pressures (internal and external)

OUR KEY PRIORITIES AND OBJECTIVES FOR 2023/24

CUSTOMERS

Ensure pathways between communication, engagement, participation and co-production so voice and involvement is central in policy and service design

Build on community engagment accross Swansea and marginlised groups to ensure involvement of citizens becomes part of business as usual

Ensure what people have said that matters to them feeds into service delivery design and improvement as part of the comm

PROCESSES

Embed a consistent approach to commissioning to ensure no duplication, a joined up approach, best value, and compliance

Develop clear timescales and processes around evey element of the commissioning cycle (Analyse, Plan, Do, Review)

Maintain and develop clear arrangements and linkages between local and regional partnerships cross directorate and in a varity of sectors with clear work programmes, and expected outcomes

Key Service Priorities

Working in partnership to meet the needs of communities by fully utilising the commissioning cycle principles of Analyse, Plan, Do and Review.

WORKFORCE

Continue to develop a clear and coherent structure, purpose and remit for this service area

Stabalise workforce and suport wellbeing throughout transformation

Ensure roles and responsibilities understood and updated and areas for professional development identified

FINANCIAL

Ensure we maintain tight fiscal discipline

Directorate approach to budget setting, monitoring, grants and income to achieve clear and transparency processes which are compliant

Maximise income and new grant opportunities

Directorate Capital Investment programme accounted for in the main Capital programme with monitoing processes in place

How the service intends to work sustainably when meeting the objectives in the Service Plan.	**Addressing long term challenges or trends:** • *Secure longer term funding and alternative grant funding .* • *Plan for budget challenges in future years with careful consideration for use of reserves to meet potential financial shortfalls* **Preventing problems from occurring or from getting worse:** • *Improve outcomes for service users by delivering the right service, at the right time based on needs and making effective use of data* • *Set clear work objectives and performance indicators with clear lines of responsibilities both internal and externally commissioned services* **Integration – joining things up and avoiding duplication / conflicting priorities:** • *Improve communication between the team and beyond to ensure everyone is aware of who we are, what we do and what is being delivered.* **Involving people - including the public, service users and stakeholders:** • *Embed co-production embedded with the commissioning cycle.* • *Transform Community Engagement to ensure there is one consistent approach across all ages and groups* **Working in partnership and collaborating with other organisations:** • *Build on existing frameworks of partnerships to work together to develop solutions and improve services.* • *Ensure partnership arrangements are cohesive and understood by all and add value not duplicate*

CRITERIA FOR SUCCESS

1	• Partnership working for better outcomes for people
2	• More communities supported to live their best lives
3	• Increased grant income to help balance budget (revenue and capital)
4	• Sustained and stable workforce

Service Improvement Objective	Corporate Objective (tick box)						Key Measure / Criteria for Success
	Safeguarding	Education & Skills	Economy & Infrastructure	Tackling Poverty	Natural Resources & Biodiversity	Transformation & Future Council	
Embed all aspects of the commissioning cycle (analyse, plan, do and review) ensuring clarity of roles and responsibilities to carry out all functions and ensure compliance						✓	• Consistent approaches in place in Commissioning and Transformation teams • Fully recruited to both areas and new roles embedded • Training and development undertaken with IPC for full understanding • Develop data systems to become more informed around recommissioning and budget setting • Develop a consistent approach to contract management including visiting projects/services for quality assurance
Ensure clear governance and outcomes of partnership arrangements (local and regional) are understood and promoted to ensure join up and understanding across the council and wider partners						✓	Clarity of governance and outcomes of: • Safer Swansea Partnership • Play Sufficiency • Early Years Integration • PSB Objectives • Ageing Well Steering group/Age Friendly Cities • Children's Right Network/Children's Rights Scheme • Family Support Network
Develop and re-design a robust structure for the Community Integration Team to respond to changing priorities						✓	• Clear roles and responsibilities to drive forward the Safer Swansea priorities • Exit plan in place for end of funding • Additional funding sources to support

Service Improvement Objective	Corporate Objective (tick box)						Key Measure / Criteria for Success
	Safeguarding	Education & Skills	Economy & Infrastructure	Tackling Poverty	Natural Resources & Biodiversity	Transformation & Future Council	
Maintain good financial planning and control to maximise grant and income opportunities and balanced budgets						✓	• Enhance forecasting ability • Clear financial planning • Maintaining strong fiscal control measures • Increased new grant income secured
Develop a clear and coherent Capital Programme which aligned both regional and local priorities to maximise capital grant income			✓				• Capital Programme established • Capital team developed fully • Increased capital funding secured
Develop a service performance report which captures the diverse activity and outcomes of the service area to be reported through PFM on a quarterly basis	✓	✓		✓			Clear performance meaningful measures developed for: • Childcare and Early Years • Early Years Expansion • Externally Commissioning • Capital Programmes • Finance (Income and Grants) • Community Safety and Community Cohesion • Engagement and Involvement
Continue to develop and roll out the WG Programme for Government commitment for childcare for 2 years olds aligning to existing programmes	✓	✓	✓	✓			• Target numbers set by WG met • Transformation programme delivered • Risks and level of change and interdependencies understood and shared with all stakeholders
Embed a new structure for Early Years and Childcare team to ensure integration with transformation elements and respond to changing priorities						✓	• Clear roles and responsibilities to embed the restructure • Changes to variety of programmes integrated and embedded
Extend the partnership & involvement work to maximise capacity and ensure consistency around Community Engagement and Involvement	✓	✓		✓			• Consistent approach to community engagement across Swansea • Inclusive of all age range and marginalised groups

Appendix F: Flying Start LSOA Coverage in Swansea

Key

	Eligible for all four FS elements pre-November 2023
	Eligible for FS childcare expansion from November 2023
	Eligible for FS childcare expansion from April 2024

LSOA Ranking	LSOA Name	% coverage 2023
1	Morriston 5	100
2	Townhill 4	100
3	Castle 1	97.5
4	Townhill 3	99.59
5	Mynyddbach 1	96.63
6	Penderry 4	96.86
7	Townhill 6	99.66
8	Townhill 2	93.42
9	Cockett 8	92.88
10	Clydach 4	100
11	Townhill 1	99.19
12	Mynyddbach 2	100
13	Penderry 5	97.49
14	Landore 1	0
15	Penderry 3	99.14
16	Landore 2	17.4
17	St. Thomas 1	100
18	Bonymaen 1	46.5
19	Penderry 2	100
20	Castle 5	6.85
21	Townhill 5	97.85
22	Bonymaen 2	44.7
23	Sketty 4	100
24	Penderry 1	100
25	Bonymaen 4	9.64
26	Pontardulais 4	100
27	Cwmbwrla 3	0
28	Llansamlet 8	100
29	Penderry 7	99.79
30	West Cross 3	0
31	Castle 3	58.6
32	St. Thomas 4	0.15
33	Llansamlet 6	0
34	Uplands 4	89.59
35	Morriston 7	91.22
36	Pontardulais 3	0.19
37	Penyrheol 4	0
38	Clydach 3	98.23
39	Clydach 1	0
40	Uplands 7	0
41	Castle 6	0.12
42	Morriston 9	99
43	Cockett 6	5.93
44	Castle 4	89.25
45	Morriston 6	0
46	Upper Loughor 2	0
47	Cockett 3	0
48	Cockett 7	0
49	Uplands 8	0.36
50	St. Thomas 2	56.78
51	Cwmbwrla 1	0
52	Mynyddbach 5	0
53	Gowerton 2	0
54	Landore 4	78.54
55	Penclawdd 2	0
56	Landore 3	0
57	Cwmbwrla 5	11.19
58	Castle 7 West	0
59	West Cross 4	0
60	Penderry 6	99.13
61	St. Thomas 3	0
62	Castle 2 North	28.53
63	Morriston 1	0
64	Cockett 1	0
65	Cwmbwrla 4	0
66	Uplands 2	4.01
67	Gowerton 1	0
68	Penllergaer 2	0
69	Mawr	0
70	Cwmbwrla 2	0
71	Cockett 2	0
72	Llansamlet 7	0
73	Penyrheol 3	0
74	Cockett 4	3.75
75	Dunvant 1	0
76	Lower Loughor	0
77	Morriston 4	0
78	Mynyddbach 6	1.47
79	Gorseinon 1	0
80	Llansamlet 1	0
81	Penyrheol 2	0
82	Llansamlet 5	0
83	Oystermouth 3	0
84	Pontardulais 2	0
85	Gorseinon 2	0
86	Mynyddbach 4	5.38
87	Uplands 6	0
89	Penyrheol 1	0
90	Fairwood 1	0
91	Kingsbridge 1	0
92	Clydach 5	0
93	Sketty 5	22.86
94	Castle 8	94.94
95	Gowerton 3	0
96	Llansamlet 4	0
97	Morriston 8	0
98	Gower 2	0
99	Morriston 11	0
100	Upper Loughor 1	0
101	Llansamlet 2	0
102	Sketty 1	0
103	Dunvant 3	0
104	Mynyddbach 3	0
105	Newton 2	0
106	Bonymaen 3	0
107	Kingsbridge 3	0
108	Morriston 10	0
109	Uplands 9	0
110	Cockett 5	0
111	Pontardulais 1	0
112	Killay 3	0
113	Uplands 1	0
114	Bishopston 2	0
115	Sketty 3	9.12
116	Killay North 2	0
117	Llansamlet 3	0
118	Oystermouth 1	0
119	Morriston 3	0
120	West Cross 2	0
121	Pennard 2	0
122	Bishopston 1	0
123	Uplands 5	0
124	Llangyfelach 2	0
125	Sketty 7	0.42
126	Kingsbridge 2	0
127	Sketty 2	0
128	Llangyfelach 3	0
129	Castle 2 South	0
130	Fairwood 2	0
131	Gower 1	0
132	Clydach 2	0
133	West Cross 1	0
134	Uplands 3	0
135	Castle 7 East	0
136	Sketty 9	0
137	Dunvant 2	0
138	Morriston 2	0
139	Sketty 8	0
140	Penllergaer 1	1.04
141	Mayals 1	0
142	Sketty 6	0
143	Llangyfelach 1	0
144	Killay South 1	0
145	Penclawdd 1	0
146	Pennard 1	0
147	Mayals 2	0
148	Oystermouth 2	0
149	Newton 1	0

Exploring Healthcare Innovators' Perspectives on a Role for Blockchain in Personalised Medicine Data Management

Andrew J. Hall
Project Lead
Life Sciences Hub Wales
Email: Andrew.Hall@lshubwales.com

Abstract:

Personalised medicine has the potential to transform healthcare by customising treatments based on individual genetic, environmental, and lifestyle factors. However, managing the vast and complex data generated in this context presents significant challenges. This study investigates healthcare innovators' perspectives on using blockchain technology to support the management of personalised medical data, focusing on its benefits, limitations, and how it could be integrated into evolving healthcare systems. Survey and interview data from health innovation professionals was interpreted using reflexive thematic analysis, revealing blockchain's capacity to improve data security, give patients more control over their health records, and address challenges in data sharing and privacy protection. Despite these promising aspects, the research identifies substantial obstacles, including technical complexity, high costs, and regulatory barriers. It can be concluded that while blockchain holds potential for revolutionising data management in personalised medicine, its widespread adoption will depend on overcoming these technical and financial challenges. Additionally, the lack of blockchain expertise among healthcare professionals further complicates its implementation. Future research should investigate the feasibility and process for successfully integrating blockchain technologies into existing healthcare infrastructure. The findings highlight the need for further research and policy development to facilitate blockchain integration in personalised medicine, addressing the identified knowledge gaps and regulatory challenges to support widespread adoption.

Keywords: Blockchain, Personalised Medicine, Data Management, Healthcare Innovation

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Introduction

Background and Context

Implementation of personalised medicine will provide significant benefits through disease prevention, earlier diagnosis, and the use of more effective treatments. Underpinning these improvements will be new technologies that utilise the individual characteristics of each patient using genetic, environmental, and lifestyle factors to predict, prevent, and manage disease (Langreth & Waldholz, 1999; Wilsdon, 2018). These advancements could replace the “one-size-fits-all” model of health and care, with optimised services for the individual.

Delivering the benefits of personalised medicine will be dependent on transformative changes to health infrastructure to allow the integration of these new technologies. These will include the building of new facilities, training of clinical staff, and robust data storage solutions (Stefanicka-Wojtas, 2023). Management of data will provide challenges including the integration of diverse data sets such as from genomics and other “-omics” fields, imaging, haematology, wearable devices, and lifestyle and environmental sources (Oldoni et al., 2022). In turn, these diverse sources of data will provide challenges such as variability and noise, highlighting the need for large and well-defined patient cohorts and technologies available to manage these (Guo & Chen, 2023).

The development of advanced machine learning and data analytics techniques will be essential for processing and interpreting this data, ensuring accurate predictions and the development of personalised treatment plans. Improvements in data sharing and interoperability among health and care systems will be necessary to facilitate the seamless exchange of patient information, whilst addressing privacy, security, and ethical concerns (MacEachern & Forkert, 2021).

Table 1 highlights how advancements in personalised medicine will impact data storage, stressing the need for integration, security, and rapid access. Genetic testing and pharmacogenomics require secure genetic data storage, with a prospective future expansion for more diseases and precise drug formulations (Yadalam et al., 2022). Proteomics and metabolomics will demand high-capacity storage for complex "-omics" data integration (Visvikis-Siest et al., 2018) while microbiomics will require large-scale storage for personalised microbiome-based therapies (Kumar et al., 2024). Epigenetics will need systems for sensitive data management in personalised interventions (Avramescu et al., 2021). Systems biology and stem cell therapies will require integrative platforms and secure storage for patient data (Wood-Charlson, 2023; Yadalam et al., 2022). Immunotherapy and nanotechnology will require systems to manage immunogenetic data and nanoscale storage for drug delivery (Chintala, 2023; Koleva-Kolarova et al., 2022).

The preferred solutions for managing these growing data demands are cloud storage, or hybrid solutions with the continued partial use of local storage (Martin, 2022). Cloud services are provided by a few multinational hyperscalers, such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud, which can offer the infrastructure needed to scale when increased demand is placed on the system (Floerecke et al., 2023). However, smaller vendors, particularly in regions like Europe, are gaining traction where data sovereignty concerns are prevalent. In such cases, organisations may opt for regional or local cloud providers to ensure compliance with stringent data protection regulations, such as the General Data Protection Regulation (GDPR), while maintaining greater control over where sensitive data is stored and processed (Maelen, 2021).

While cloud storage offers a foundation to meet the growing demands of data storage in personalised medicine, it also presents several limitations, including vulnerability to data breaches, corruption, mutability, and a lack of interoperability (Ang’udi, 2023). Blockchain technology, first conceptualised in 1991 by Stuart Haber and W. Scott Stornetta as a method for timestamping digital documents to prevent tampering (Haber & Stornetta, 1991) has since evolved into a robust solution for secure and immutable data management. It has been proposed that blockchain could complement cloud storage to address these issues (Ashraf, 2021). Since its implementation in the cryptocurrency Bitcoin (Nakamoto, 2009), blockchain has shown potential to revolutionise industries, including healthcare and personalised medicine, by ensuring secure, transparent, and immutable management of patient data. By decentralising medical records, blockchain enables seamless and secure sharing of patient information across healthcare providers, thereby enhancing the accuracy and efficiency of personalised treatment plan execution. Furthermore, blockchain’s robust security measures protect sensitive genetic and health data from breaches, ensuring patient privacy (Wenhua et al., 2023). For example, blockchain smart contracts can automate consent management,

allowing patients to control who accesses their data, fostering trust and encouraging greater participation in personalised medicine initiatives (Ali et al., 2023).

Table 1. Categories of Personalised Medicine Solutions, Their Current and Potential Future Applications, and Their Data Requirements

Type of Personalised Medicine	Current Applications	Future Applications	Data Needs	Reference
Genetic Testing and Pharmacogenomics	Identifies genetic mutations associated with specific diseases and tailors drug prescriptions based on genetic profiles	Expansion to more diseases and more precise drug formulations	Secure storage for genetic data, patient privacy management, and rapid access for healthcare providers	(Yadalam et al., 2022)
Proteomics and Metabolomics	Studies proteins and metabolites to understand disease mechanisms and develop targeted therapies	Integration with other "omics" data for comprehensive health profiles	High-capacity storage for large datasets and complex data integration systems	(Visvikis-Siest et al., 2018)
Microbiomics	Examines the microbiome's role in health and disease, influencing treatments in areas like gastroenterology and immunology	Personalised microbiome-based therapies and probiotics	Secure large-scale storage and computational resources for microbiome sequencing and analysis	(Kumar et al., 2024)
Epigenetics	Studies changes in gene expression without altering DNA sequences, impacting cancer treatment and ageing research	Personalised interventions based on epigenetic modifications	Robust systems for managing sensitive epigenetic data and longitudinal studies	(Avramescu et al., 2021)
Systems Biology	Integrates biological data to understand complex interactions within cells and organs	Enhanced predictive models for disease progression and treatment outcomes	Integrative platforms for multi-omics data and computational power for complex modelling	(Wood-Charlson, 2023)
Stem Cell and Regenerative Medicine	Uses stem cells for treating neurological disorders, cardiac diseases, and more	Personalised stem cell therapies and tissue engineering.	High-security storage for patient-derived cell data and regulatory compliance systems	(Yadalam et al., 2022)
Immunotherapy	Tailors immune-based treatments for cancers and autoimmune diseases	Advanced personalised vaccines and cell therapies	Systems for managing immunogenetic information and treatment response data	(Chintala, 2023)
Nanotechnology	Utilises nanomaterials for targeted drug delivery and diagnostics	Personalised nanomedicine and advanced biosensors	Storage for high-resolution imaging data and nanoscale molecular data	(Koleva-Kolarova et al., 2022)

Research Problem

The introduction of new personalised medicine interventions, spanning from preventative measures to diagnostics and therapies, will generate vast and diverse datasets. This evolution presents substantial challenges in data management, control, and access, and the implementation of new solutions to address these issues will encounter significant obstacles, detailed below.

Data Integration and Interpretation

The rapid advancement of high-throughput technologies has resulted in an abundance of "-omics" data (e.g., genomics, transcriptomics, and proteomics). However, integrating and interpreting these diverse datasets remains a significant challenge due to their complexity and the "noisy" nature of the data (C. Guo & Chen, 2023).

Privacy and Security

Ensuring the privacy and security of sensitive patient data is a critical concern. The sharing of genomic and clinical data between healthcare providers and researchers raises substantial privacy risks. Effective data governance frameworks are required to protect patient information while enabling data sharing for research (Oestreich et al., 2021).

Predictive Performance and Validation

The predictive performance of machine learning models in personalised medicine often falls short of clinical expectations (Wilkinson et al., 2020). Factors such as small sample sizes, high noise levels in the data, and complex, non-linear relationships between patient characteristics and clinical outcomes contribute to this issue. Rigorous validation protocols are necessary to ensure the reliability of these models in clinical practice (Maleki et al., 2020).

Stakeholder Perceptions of Blockchain

Despite the theoretical advantages of blockchain technology in healthcare including enhanced data security, improved transparency, and better patient control over personal data, there is a lack of research to understand stakeholders' perceptions on its implementation in evolving health applications (Esmaeilzadeh, 2022).

The Public

The trust of service users in the security and privacy of their medical data is highly important. Research is needed to understand their willingness to adopt blockchain technology, considering its potential to provide them with greater control over their data. Studies have shown that while blockchain offers robust security and transparency, concerns around usability, data sovereignty, and technological literacy may affect user acceptance (Zhang et al., 2018, p. 1). Understanding these factors is crucial for fostering trust and facilitating the widespread adoption of blockchain in healthcare (Agbo et al., 2019).

Healthcare Providers

Healthcare professionals must see the benefits of blockchain, such as streamlined data access and improved interoperability, for its adoption to be successful. Their perspectives on the usability and integration of blockchain into existing systems are crucial (Lee et al., 2020).

Policymakers

Policymakers play a critical role in regulating and standardising the use of blockchain in healthcare. Understanding their views on the legal and ethical implications, as well as the infrastructural requirements for blockchain implementation, is essential (Sahu et al., 2024).

Summary

This research aims to fill this gap by exploring the perceptions of healthcare innovators on the use of blockchain for managing personalised medical data. This will provide a initial exploration of the practicality, benefits, and challenges associated with its implementation. Addressing the challenges of data management in personalised medicine and exploring these stakeholders' perceptions of blockchain technology are critical steps towards realising the potential of personalised healthcare.

Research Objectives

The research objectives are to explore:

1. The perceptions of using blockchain for the management of health data.
2. What enables and constrains the integration of blockchain in data management by healthcare providers

3. The role of policy in consideration of the putative role of blockchain in data privacy and security in personalised medicine data management.

Report Structure

Section 1 has contextualised the research problem, highlighting the challenges related to data storage and access that arise from the implementation of blockchain in personalised medicine. It has also outlined current solutions and introduced the concept of using blockchain technology to address the weaknesses and risks inherent in these systems. Section 2 will present a review of the existing literature on blockchain technology in healthcare. Section 3 will detail the research methodology and data analysis, while Section 4 will cover the research findings. Sections 5 and 6 will focus on the discussion, conclusions, and recommendations, respectively.

Literature Review

Purpose

This review aims to provide an analysis of the existing literature on blockchain technology and data management in personalised medicine. The integration of personalised medicine into healthcare has significantly transformed patient treatment approaches, allowing for more tailored and effective therapies. However, managing the vast amounts of sensitive data generated by these approaches presents considerable challenges. Blockchain technology, with its decentralised, immutable, and secure nature, offers promising solutions to these challenges. This systematic literature review explores the potential of implementing blockchain solutions in data management for personalised medicine.

Security and Privacy

Security and privacy are paramount in managing sensitive healthcare data. Blockchain technology offers robust security mechanisms through its decentralised and immutable ledger system. Blockchain empowers patients by providing a secure infrastructure for managing healthcare information and supporting applications such as mobile health (mHealth) (Agbo et al., 2019). The encryption and distributed nature of blockchain ensures that patient data is protected against unauthorised access and modification, highlighting its potential to safeguard against data breaches (Isravel et al., 2023).

Interoperability

Interoperability between various healthcare systems is essential for efficient data exchange and improving patient care. Blockchain technology can enhance this interoperability by providing a standardised, secure, and transparent method for data exchange, which is crucial for integrating genomic data into Electronic Patient Records (EPRs) and implementing personalised medicine. This ensures that healthcare providers have access to comprehensive patient data, significantly improving the overall effectiveness of healthcare systems (Kasyapa & Vanmathi, 2024).

Health Information Exchange

Effective Health Information Exchange (HIE) is vital for personalised medicine. Blockchain technology can facilitate secure and efficient HIE by providing a transparent and immutable record of transactions. Blockchain enables the secure sharing of health information across different healthcare organisations, which is essential for genomic data sharing and personalised medicine. This is corroborated by how blockchain can streamline HIE processes, reducing administrative burdens and improving data accuracy (Chen et al., 2019).

Blockchain in Personalised Medicine

Integrating genomic data into healthcare systems presents significant challenges due to the volume and complexity of the data. Blockchain can offer a decentralised platform for securely managing and sharing genomic data. The integration of genetic data into EPR systems is essential for advancing personalised medicine. Blockchain ensures that this data is stored securely and can be accessed by authorised parties when needed. This is further supported by the demonstrated use of blockchain in efficiently managing large-scale genomic data sets (Oliva et al., 2024).

Patient consent and data ownership are critical issues in personalised medicine. Blockchain can provide a transparent and secure mechanism for obtaining and recording patient consent. Blockchain technology can

manage patient consent and data ownership efficiently, ensuring that patients have control over their data and can grant or revoke access as needed. This approach not only enhances patient autonomy but also ensures compliance with regulatory requirements (Esposito et al., 2018).

The security and privacy of genomic data are crucial for the success of personalised medicine. Blockchain technology offers enhanced security measures through its cryptographic algorithms and decentralised nature. Blockchain can provide secure and transparent data management solutions, ensuring that sensitive patient data is protected against breaches. This is echoed by the potential of blockchain to safeguard genomic data from cyber threats (Zarchi et al., 2023).

Scalability is a major challenge when implementing blockchain solutions in healthcare. The vast amount of data generated in personalised medicine and genomics can place considerable strain on blockchain networks. Hybrid models that combine blockchain with other technologies like cloud computing may be required to address these scalability issues, as they can leverage the strengths of both blockchain and cloud computing, providing scalable and secure data management solutions (Ali et al., 2023).

Implementing blockchain in healthcare also involves navigating complex regulatory and legal landscapes. Different jurisdictions have varying regulations regarding data privacy and security, making it essential to ensure that blockchain solutions comply with these regulations to avoid legal issues. There is a need for regulatory frameworks that support the adoption of blockchain in healthcare, ensuring that these solutions comply with existing data protection laws (Ali et al., 2023).

The integration of blockchain technology into existing healthcare systems requires significant technical expertise. Healthcare organisations must invest in training and hiring skilled personnel who can manage and maintain blockchain networks. Integrating blockchain with legacy systems can be complex and may necessitate substantial modifications. Successful implementation of blockchain in healthcare requires a thorough understanding of both blockchain technology and healthcare IT systems (Haleem et al., 2021).

Table 2 is a comparative overview of traditional databases, cloud storage, and blockchain technology across several key attributes relevant to data management. Traditional databases offer moderate security and privacy, relying on centralised control, but face challenges in scalability and integration with existing systems (Wylde et al., 2022; Zhu et al., 2023). Cloud storage, while highly scalable and generally secure, is dependent on the provider's infrastructure and has limitations in user control over privacy and regulatory compliance (Ashraf, 2021). Blockchain, in contrast, excels in security and privacy through decentralisation and cryptographic methods, but faces challenges in scalability, cost, and the complexity of integration of these solutions (Sakthidevi & Fathima, 2024). Furthermore blockchain emphasises user control and transparency but requires significant user education and can involve high energy consumption, although there are initiatives to mitigate this through use of renewable sources (Gawusu et al., 2022).

Table 2. Comparison of Blockchain with Traditional Databases and Cloud Storage for Key Attributes of Data Management

Attribute	Traditional Databases	Cloud Storage	Blockchain Technology	Reference
Data Security	Moderate, relies on centralised control mechanisms	High, but dependent on the provider's security measures	Very high, due to decentralisation and cryptographic security	(Zhu et al., 2023)
Privacy	Controlled by the database administrator	Managed by cloud service provider	User-controlled privacy and data access	(Wylde et al., 2022)
Interoperability	Limited, requires custom APIs for integration	High, with standardised APIs and services	High, with potential for seamless data sharing via decentralised networks	(Panarello et al., 2018)
Scalability	Can be challenging with large datasets	Highly scalable, depends on cloud service plans	Currently limited, ongoing research to improve scalability	(Sakthidevi & Fathima, 2024)
Cost	Variable, depending on infrastructure and maintenance	Cost-effective, pay-as-you-go model	High initial cost, potentially lower long-term costs	(Gökalp et al., 2018)
Regulatory Compliance	Requires compliance measures by administrators	Managed by provider, but user	Built-in compliance features, but complex regulatory landscape	(Saeed et al., 2022)

Table 2. Comparison of Blockchain with Traditional Databases and Cloud Storage for Key Attributes of Data Management

Attribute	Traditional Databases	Cloud Storage	Blockchain Technology	Reference
		must ensure compliance		
Integration with Existing Systems	Typically straightforward with existing IT infrastructure	Generally easy, especially with SaaS solutions	Complex, requires significant integration efforts	(Fatoum et al., 2021)
User Education and Training	Moderate, familiar to most IT professionals	Minimal, as cloud services offer user-friendly interfaces	High, due to the complexity of blockchain technology	(Bornelus et al., 2020)
Data Ownership	Centralised, controlled by the organization	Controlled by the cloud provider, with user agreements	Decentralised, users have more control over their data	(Aldamaeen et al., 2022)
Standardisation	Well-established standards (SQL, ACID properties)	Standardised APIs and protocols	Emerging standards, still developing	(Corte-Real et al., 2024)
Ethical Considerations	Managed by administrators	Managed by the provider, subject to service terms	Significant focus on consent, transparency, and user control	(Hyrynsalmi et al., 2021)
Data Integrity	Ensured by central authority	Ensured by the provider, with backups and redundancy	Ensured through immutability and decentralised consensus	(Pandey et al., 2020)
Transparency	Low, dependent on internal policies	Moderate, depending on provider's policies	High, due to public ledger nature (for public blockchains)	(Velmovitsky et al., 2021)
Latency	Low latency, suitable for real-time applications	Variable, can be low but depends on network conditions	Higher latency, not ideal for real-time applications	(Ejaz et al., 2021)
Energy Consumption	Moderate, based on infrastructure	Depends on provider's data centres	High, particularly for proof-of-work blockchains	(Schinckus, 2022)

Future Direction

There are challenges in implementing blockchain technology in personalised medicine, requiring continuous innovation and collaboration between industry, academia, regulatory bodies, and government to develop scalable solutions. Establishing policies and standards for blockchain use in healthcare is crucial. Standardisation can enhance interoperability and ensure that blockchain solutions are compatible across various healthcare systems. Policymakers must work closely with all stakeholders to create frameworks that support the adoption of blockchain technology. Standardised protocols and guidelines are essential for the successful integration of blockchain into healthcare systems (Meinert et al., 2019).

There are currently no universally adopted global standards for using blockchain in health data management, however various international and regional initiatives are ongoing. The ISO/TC 307 committee is working on general blockchain standards, which could impact health data use in areas like security and privacy (Chen et al., 2022). The World Health Organization (WHO) and the Healthcare Information and Management Systems Society (HIMSS) have explored blockchain's potential in healthcare, particularly for securing patient data and improving interoperability (Mohan & Ferris, 2023). In the EU, GDPR poses challenges for blockchain's immutable nature, but solutions integrating off-chain storage are being proposed to ensure compliance (Belen-Saglam et al., 2023). Other countries and regions including the United States are developing national strategies, focusing on secure, interoperable healthcare systems using blockchain (Kasyapa & Vanmathi, 2024).

Investing in education and training programmes for healthcare professionals and IT specialists is necessary for the successful implementation of blockchain solutions. These programmes should focus on the technical aspects of blockchain technology and its applications in healthcare. The importance of continuous

education and professional development is needed to ensure that healthcare providers are well-equipped to use blockchain technology effectively in the long-term (Tagde et al., 2021).

Welsh Perspective

The "Healthier Wales: Our Plan for Health and Social Care" strategy envisions a patient-centred, integrated health and social care system that relies on data-driven decision-making and improved patient trust (Welsh Government, 2022). Blockchain technology can play a significant role in achieving these goals by providing a secure and decentralised platform for data sharing among healthcare providers, social care services, and patients. This ensures accurate, up-to-date information is accessible to all stakeholders, improving coordinated care and patient outcomes (Abbate et al., 2023). Furthermore, blockchain's smart contract capabilities can empower patients by allowing them to control access to their health data, leading to greater trust and engagement (Vardhini, 2021).

The "Genomics for Precision Medicine Strategy" focuses on the secure management and sharing of genomic data to advance personalised medicine and research (Welsh Government, 2019). Blockchain can support this strategy by offering a secure, transparent platform for storing and sharing genomic data, thereby facilitating collaboration across institutions. This technology aligns with the strategy's patient-centric approach, enabling patients to control their genomic data and participate in research and personalised health and care plans.

To implement blockchain effectively in Wales, pilot programmes could be introduced to integrate blockchain with existing health systems, increasing awareness and providing evidence of the benefits and drawbacks of the technology. Collaboration with industry and providing education and training for healthcare professionals, researchers, and patients will be essential in adopting and effectively implementing blockchain technology. By aligning blockchain with the strategic objectives of the Healthier Wales and genomics strategies, Wales could enhance healthcare integration, security, and efficiency, ultimately improve patient outcomes and strengthen the Welsh health and care system.

Conclusions

Blockchain technology presents promising solutions for the data management challenges in personalised medicine. Its capacity to provide secure, transparent, and interoperable data exchange mechanisms makes it well-suited for managing sensitive healthcare data. However, several challenges, including scalability, regulatory compliance, and technical integration, must be addressed. Ongoing research, policy development, and education are crucial to unlocking the full potential of blockchain in healthcare. The following methods section outlines the approach taken to explore these challenges, including gathering insights from professionals familiar with or working in blockchain technology and health.

Research Methodology

Research Philosophy

This research adopts a pragmatic approach to explore the role of blockchain technology in managing personalised health data. By focusing on practical outcomes, it addresses key challenges in healthcare, such as data privacy, interoperability, and regulatory compliance. Pragmatism, as the guiding philosophy, emphasises problem-solving and real-world applications, making it suitable for engaging with stakeholders who possess at least a basic understanding of blockchain technology. The study aims to provide insights into how blockchain could support the management of personalised health data while ensuring that it aligns with the needs of healthcare providers, patients, and regulators.

Through a qualitative approach, the study utilises the flexibility of pragmatism to address the complexity of integrating blockchain into healthcare systems. This adaptability enables the study to consider the emerging technological and regulatory environment, ensuring that the findings remain relevant and actionable. The iterative nature of the research, which moves between theory and empirical data, reflects a commitment to developing practical solutions that contribute both academically and practically to the implementation of blockchain in personalised medicine, with the current study acting as a starting point for this process.

Research Design

The study design is shaped by Saunders' Research Onion model (Saunders et al., 2009), which helps provide structure and clarity to the development of the methodology (Figure 1).This framework facilitates

the systematic layering of research philosophy, approaches, and techniques, essential for exploring complex technologies such as perceptions of blockchain use in healthcare. Table 3 summarises how the Research Onion informs the research approach for this report, across the different and interconnected layers.

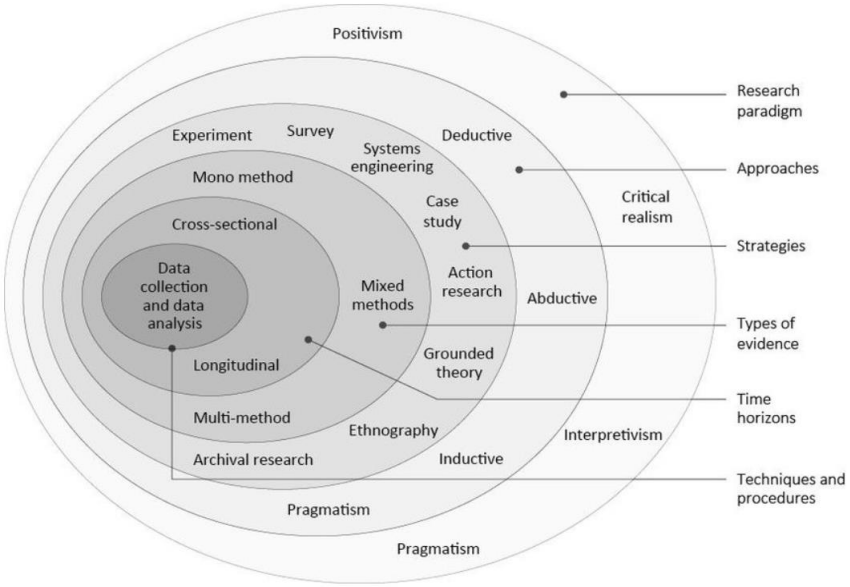


Figure 1. The Research Onion (Saunders et al., 2009).

Table 3. Application of the Research Onion model to the Research Study

Layer	Description and Justification
Ontology (Outside)	A realist ontology was used to reflect the belief that blockchain's impact on healthcare is an objective reality, but it is influenced by stakeholders' perceptions and the context of its implementation. This view supports the practical and problem-solving focus of the research, assuming that real-world outcomes of blockchain adoption can be measured and understood.
Research Paradigm	Pragmatism was chosen as it offers the flexibility to balance theory with real-world outcomes, which is crucial when studying emerging technologies like blockchain. This philosophy emphasises problem-solving and actionable insights, making it appropriate for addressing the practical challenges of securing personalised medical data. By focusing on the tangible impact of blockchain in healthcare, this approach aligns with aim of developing workable solutions.
Approaches	An abductive approach was selected because it provides the opportunity for the research to iterate between theory and empirical data. Given that blockchain is an evolving field, this approach enabled the adaptation of hypotheses based on real-world insights collected during the study. This ensures that theoretical frameworks can be refined as more is learned about blockchain's potential in managing personalised health data, particularly if the research continues beyond the end of the current study.
Strategies	The primary research strategy was a survey-based approach, leveraging online questionnaires to gather qualitative data on perceptions of blockchain in healthcare.
Types of Evidence	The combination of interviews and surveys provided individual experiences while also identifying key concepts, which are vital for creating a considered analysis.
Time Horizon	A cross-sectional time horizon was appropriate for capturing a snapshot of current attitudes and perceptions towards blockchain technology. Since the study sought to understand the present state of blockchain adoption in personalised medicine, collecting data at a single point in time was justified.
Techniques and Procedures (Core)	The use of semi-structured interviews and surveys ensured that the study collected rich, qualitative data. Semi-structured interviews allowed for

	flexibility in exploring stakeholder perspectives, while surveys provided the mechanism to identify general perceptions of blockchain use in healthcare.

Systematic Literature Review

The Systematic Literature Review (SLR) explored the use of blockchain technology in healthcare data management, following the search criteria principles outlined in the book Research Methods for Business Students (Saunders et al., 2009). The process involved defining the research question, selecting relevant databases, choosing appropriate keywords, applying inclusion and exclusion criteria, and synthesising findings from the selected literature. As outlined in the same reference, this process is iterative, allowing for continuous refinement and reassessment at each stage to enhance the quality of the results (Paul & Criado, 2020).

The SLR specifically examined current research on blockchain's use in healthcare, with a focus on managing personalised medical data. The review aimed to identify blockchain's capabilities in enhancing data security and addressing interoperability challenges in healthcare systems. By analysing relevant studies from 2018 to 2024, the review provided a robust theoretical foundation for the study. However, the need to clearly define the project's scope, coupled with time constraints, limited the ability to comprehensively refine the search strategy. While some adjustments were made to the keywords and databases, the restricted timeframe prevented more extensive iterations. Consequently, the review relied on peer-reviewed articles published from 2019 onwards, using databases such as PubMed, IEEE Xplore, and ScienceDirect (Paul & Criado, 2020; Snyder, 2019).

The SLR followed a structured and stepwise approach to ensure comprehensive coverage of relevant studies (Paul & Criado, 2020; Saunders et al., 2009), starting with the research question, which was central to guiding the review. This was: "How could blockchain technology address key challenges in managing personalised medical data, particularly in terms of security, privacy, and interoperability?". This question helped focus the review on identifying studies that were both relevant and impactful to the research area.

Next was the selection of databases. Several academic databases were chosen to ensure broad coverage of multidisciplinary literature, with a focus on healthcare, technology, and data management. The selected databases included PubMed, IEEE Xplore, ScienceDirect, and Google Scholar. These databases were selected for their ability to provide peer-reviewed studies closely related to the research topic.

Following this, search strings were developed using search terms and Boolean operators (AND, OR). These were designed to capture studies related to the application of blockchain technology in healthcare. Examples of search strings used were:

- "Blockchain" AND "healthcare" AND "personalised medicine" AND "data management"
- "Blockchain" AND "genomic data" AND "interoperability"
- "Blockchain" AND "data security" AND "healthcare" AND "privacy"
- "Precision medicine" AND "blockchain" AND "data sharing"

To ensure that only relevant and high-quality studies were included, inclusion and exclusion criteria were applied. More details of these criteria are shown in Table 4.

The inclusion criteria were:

- Peer-reviewed journal articles
- Published between 2018 and 2024
- Focus on blockchain in healthcare or personalised medicine
- Studies addressing issues of data security, privacy, or interoperability

The exclusion criteria were:

- Non-peer-reviewed sources
- Articles not available in English
- Publications that did not focus on blockchain or personalised medicine

Table 4 provides a summary of the literature review search criteria and justification for choosing these.

Table 4. Systematic Literature Review Search Criteria and Rationale

Component	Criteria	Rationale
Databases	PubMed, IEEE Xplore, ScienceDirect, Google Scholar	Selected to cover a broad range of peer-reviewed literature across medical, technological, and scientific fields, ensuring comprehensive coverage.
Keywords	Blockchain, healthcare, data security, interoperability, patient care, health information exchange, genomics, personalised medicine, precision medicine, cloud services	Keywords were chosen to capture the diverse aspects of blockchain applications in healthcare, ensuring relevant studies were included in the review.
Inclusion Criteria	Peer-reviewed articles Publications from 2018-2024 Studies focusing on blockchain applications in healthcare	Focused on high-quality, recent studies and articles to ensure the review reflects current developments and peer-reviewed research for reliability and validity
Exclusion Criteria	Articles not available in English Non-peer-reviewed sources Studies not directly addressing the research question	To maintain the quality and relevance of the review, non-English articles and non-peer-reviewed sources were excluded, as well as studies outside the scope of the research question.

The study selection process involved screening titles and abstracts of the identified papers, followed by a thorough assessment of the full text. Each study was evaluated based on its relevance and contribution to understanding blockchain's potential for improving healthcare data management, particularly in the context of personalised medicine (Snyder, 2019).

During data extraction, key information was gathered from each selected study. The data focused on:

- The applications of blockchain in healthcare
- Challenges identified, such as scalability, privacy, and regulatory compliance
- Proposed solutions for blockchain in data management
- Future directions and gaps in the literature

Finally, the synthesis and reporting of the data involved organising the extracted information into key themes. This provided a comprehensive analysis of the current state of research on blockchain in healthcare. The synthesis identified significant trends, as well as gaps in the literature, such as limited real-world implementations and the challenges associated with scalability.

Data Collection Methods

Surveys

Surveys were distributed electronically via the Qualtrics platform to a wider group of healthcare stakeholders. The survey aimed to assess participants' understanding and perceptions of blockchain technology, with a particular focus on its application in personalised medicine. This online distribution method ensured broad accessibility and convenience for respondents.

A total of 18 healthcare professionals participated in the Qualtrics survey, recruited via an introductory email. These participants represented varying levels of familiarity with the use of blockchain in healthcare.

The survey itself comprised a combination of Likert Scale (Likert, 1932) and open-ended questions, designed to gather insights into healthcare professionals' perspectives on blockchain technology. It focused on understanding the perceived benefits, challenges, and feasibility of its application in personalised medicine.

Interviews

Prospective participants were approached through purposive sampling, focusing on professionals with expertise in healthcare, IT, and policy. Semi-structured interviews were designed to collect qualitative data on how blockchain could address issues related to data security, healthcare interoperability, and ethical factors.

The interview questions were carefully crafted to be clear, specific, and aligned with the research objectives, following Judith Bell's guidelines for effective questioning (Bell, 2010). The structure of the interviews

followed a logical flow, beginning with background questions, then exploring participants' perceptions of blockchain in detail, and concluding with discussions on policy perspectives and open-ended questions.

Due to scheduling constraints, only one interview was conducted, with an innovation lead specialising in AI and blockchain applications in healthcare. This semi-structured interview lasted approximately 35 minutes. It was recorded and transcribed verbatim, allowing for open-ended responses and providing an in-depth exploration of the participant's insights on blockchain's role in healthcare and data management.

Data Analysis

The study followed Braun and Clarke's six-phase process for reflexive thematic analysis (Braun & Clarke, 2019), which firstly required reviewing the data by reading through interview transcripts and survey responses to identify key ideas and patterns. The next step was systematically coding the data to highlight significant themes, which were then grouped into broader categories such as "Data Security," "Patient Empowerment," and "Challenges of Adoption". The themes were then reviewed to ensure they accurately represented the data, with adjustments made as necessary. Once finalised, the themes were defined to reflect the core ideas emerging from the data. This formed the basis of a detailed account of the themes supported by data from the interviews and survey responses.

Ethics Approval

Participants were fully briefed on the study's purpose and provided informed consent before data collection began. Data was anonymised to protect participants' identities, and strict confidentiality protocols were followed throughout the research. Ethical approval was obtained from the Swansea University Ethics Committee, ensuring adherence to ethical standards in healthcare research (Appendix A).

Limitations

The reflexive approach offers significant benefits for the current study, particularly in exploring the subjective and nuanced perspectives of healthcare professionals on blockchain technology in personalised medicine. Reflexive thematic analysis allows for flexibility in identifying patterns and themes without being held to rigid frameworks, enabling the researcher to adapt to the complexity of the data (Braun & Clarke, 2019). Furthermore, the approach recognises the researcher's active role in shaping the analysis, which is beneficial in studies where personal interpretation and context are needed. However, the cross-sectional nature of this study limits its ability to track changing perceptions over time, as it captures participants' views at a single time point. A longitudinal approach could provide deeper insights into how attitudes towards blockchain technology evolve as it matures in the healthcare sector (Nowell, 2017). Another limitation lies in the relatively small qualitative sample size, which may restrict the generalisability of findings to wider healthcare settings. Moreover, the reflexive approach can introduce researcher bias, as personal perspectives and assumptions might influence the analysis (Jamieson et al., 2023). The study can, however, serve as a foundation for a larger body of work that addresses these limitations.

Findings

This research is based on a small-scale study, consisting of 18 survey responses and one interview. Due to the limited dataset, the findings could not be generalised. Instead, a qualitative approach was adopted, using reflexive thematic analysis to explore individual perspectives in greater depth (Braun & Clarke, 2019). Although the insights gained are valuable, they are intended as an initial exploration to inform future, more comprehensive research. A detailed description of the processes used to analyse the survey and interview data and the questions asked can be found in Appendices B and C, respectively.

Survey Findings by Theme

The survey data revealed six key themes, summarised in Table 5, with four primary themes explored in greater detail in this section: data security, patient-centred data management, barriers to adoption, and ethical and privacy concerns. The Likert Scale questions offered further insights into participants' perceptions, backgrounds, and understanding of blockchain technology.

Table 5. Summary of Themes Identified from the Perception Survey on Integrating Blockchain into Data Management Solutions for Personalised Medicine

Theme	Definition	Supporting Quote	Challenge
Blockchain for Data Security	Blockchain's role in protecting and ensuring data integrity	"*Blockchain can provide better transparency for patient data and ensure it remains secure*"	Integration with existing systems like EPRs
Patient-Centred Data Management	Blockchain empowers patients with control over their health records	"*Patients could potentially manage and share their records in a secure way, putting them in control*"	Healthcare infrastructure may not be ready for decentralised, patient-controlled systems
Barriers to Adoption	Technical, financial, and regulatory hurdles in implementing blockchain	"*Understanding and familiarity are the biggest challenges, especially at the patient level*"	Technical complexity, knowledge gaps, regulatory hurdles, and cost of implementation
Regulatory Concerns	The need for compliance with existing healthcare regulations may slow down adoption	*"It is unclear how blockchain fits into existing healthcare data regulations, which could delay its implementation*"	Current regulatory frameworks are not built for blockchain systems
Data Privacy	Blockchain's potential to enhance privacy by decentralising data access.	"*Blockchain could ensure that only authorised individuals access patient data, improving privacy*"	Ensuring privacy while allowing data accessibility to authorised parties remains a technical challenge.
Cost of Implementation	The financial burden of integrating blockchain into healthcare systems	"*The cost of adopting blockchain technology, particularly for smaller healthcare providers, may be prohibitive*"	High initial costs and ongoing maintenance are significant concerns

Blockchain for Data Security

Participants emphasised the potential of blockchain to enhance data security, protect sensitive health information, and maintain data integrity through increased transparency. The technology was consistently perceived as capable of safeguarding healthcare data from breaches or tampering.

One respondent highlighted that "blockchain can provide better transparency for patient data and ensure it remains secure," stressing the importance of controlled access. Another participant wrote, "It [blockchain] will be key in keeping health records safe from tampering or fraud," reinforcing the belief that blockchain has a crucial role in protecting medical records.

The responses demonstrated a strong conviction in blockchain's ability to prevent data breaches and ensure that health records remain tamper-proof. Participants frequently pointed to the potential for transparency, allowing both healthcare providers and patients to monitor any changes to their data. However, there were concerns about integrating blockchain with existing systems, such as EPRs. While enhanced security is a clear advantage, the practical challenges of implementation were also acknowledged.

Patient-Centred Data Management

This theme centres on blockchain's capacity to decentralise the management of healthcare data, giving patients greater control over their records. Participants suggested that blockchain could empower individuals to decide who has access to their information and how it is shared.

One respondent noted, "Patients could potentially manage and share their records in a secure way, putting them in control," emphasising the empowerment that blockchain could provide. Another commented, "Blockchain could be a game-changer for patients who want more control over their health data," highlighting the potential shift towards patient-led data systems.

Participants recognised blockchain as a tool that could offer patients more autonomy over their data. The decentralisation aspect was seen as an advantage, shifting control from centralised institutions to individuals. Respondents believed that blockchain could address privacy concerns by enabling patients to grant or revoke access to their health records in real time. However, some raised questions about the feasibility of such a system, given the current state of healthcare infrastructure.

Barriers to Adoption

Participants raised concerns about the numerous obstacles to implementing blockchain in healthcare, including technical complexity, high costs, and regulatory challenges. The knowledge gap among healthcare professionals and patients was also viewed as a major barrier to adoption.

One participant noted, "Understanding and familiarity are the biggest challenges, especially at the patient level," highlighting the lack of knowledge about blockchain. Another noted, "The integration with existing cloud services and electronic patient records will be very challenging," pointing to the technical difficulties that blockchain faces in its implementation.

While participants acknowledged the potential benefits of blockchain, there was a strong awareness that its adoption would not be straightforward. The complexity of the technology, combined with the costs of integrating it into current healthcare systems, were seen as significant hurdles. Additionally, regulatory barriers and the need for education around blockchain were viewed as obstacles that must be addressed before widespread adoption can take place. Despite these challenges, participants expressed a degree of optimism, recognising that these barriers would need to be overcome for blockchain's full potential to be realised in healthcare.

Ethical and Privacy Concerns

Ethical and privacy concerns emerged as a key theme in the survey data, with participants expressing concerns over the lack of clear guidelines for data access and ownership in decentralised systems. While blockchain is recognised for its ability to enhance data security, the absence of well-defined policies was viewed as a significant risk for exposing sensitive patient information to unauthorised access.

One participant commented that "the lack of clarity on who controls the data makes me concerned about unauthorised access," reflecting the broader fear among respondents. Despite blockchain's potential to improve privacy, many survey respondents noted that decentralised data management could lead to vulnerabilities if ownership and access controls are not properly addressed.

Several participants highlighted the need for stronger regulatory frameworks to prevent privacy breaches, with many seeing this lack of regulation as a key barrier to blockchain's adoption in healthcare. Concerns about how blockchain would integrate with existing systems like cloud services and electronic patient records were also frequently mentioned, further emphasising the requirement for clear and robust policies.

Survey Responses to Likert Scale Questions

The majority of participants expressed limited familiarity with blockchain technology. Five respondents described themselves as "slightly familiar," while another five admitted they were "not familiar at all." Only two participants identified as "very familiar" with blockchain. This highlights a general lack of deep understanding of the technology among respondents, which could influence their perceptions of its use in healthcare.

When considering blockchain's potential to improve data management, opinions were mixed but generally provided a positive outlook. Seven respondents were uncertain, suggesting blockchain "might or might not" improve data management. Five participants believed it would "probably" offer benefits, while two were more convinced, stating it would "definitely" improve data management. This reflects a sense of cautious optimism mixed with uncertainty, and likely originating from their limited familiarity with the technology.

Participants identified several barriers to adopting blockchain in healthcare. Among the most commonly mentioned were the challenges of integrating blockchain with cloud services and electronic patient records, as well as a widespread lack of understanding and familiarity at both the professional and patient levels. Additional barriers included the need for greater education, outdated or absent policies and regulations, and the perception of blockchain's association with unregulated finance. These responses underscore the technical, educational, and regulatory challenges that could prevent the successful implementation of blockchain within healthcare settings.

Interviews

The interview data revealed four key themes: data security, patient empowerment, barriers to adoption, and ethical and privacy concerns. Blockchain was highlighted for its potential to secure healthcare data and give patients greater control, but concerns were raised about technical challenges, regulatory hurdles, and

the costs of implementation. Ethical issues, particularly around data ownership and privacy, were also emphasised, underscoring the need for clearer guidelines and policies to support blockchain adoption in healthcare.

Blockchain for Data Security, Integrity, and Interoperability

This theme explores the potential of blockchain to improve the security and integrity of healthcare data by decentralising storage and enabling real-time access. Key aspects include preventing unauthorised alterations, ensuring transparency, and maintaining tamper-proof data. However, a significant challenge to realising these benefits is the lack of interoperability between blockchain platforms and existing healthcare systems, which inhibits broader adoption.

The interviewee, an innovation lead, provided valuable insights into the potential of blockchain. They noted that "it makes it easier to track and harder to tamper with the data...improves transparency of data and potentially could improve data integrity." Additionally, they highlighted the importance of live access to patient information, stating, "real-time access to live patient data as well as reducing duplication errors is one of the most important factors". Despite these advantages, they acknowledged the current limitations, commenting that "those systems are not in place yet to allow for that level of interoperability".

The analysis suggests that blockchain's decentralised structure offers significant benefits for data security, making it more difficult to tamper with healthcare records. The technology's potential to provide real-time access to data could also reduce errors and duplication in healthcare management. However, the lack of interoperability with existing systems remains a major barrier, indicating that blockchain's full potential is yet to be realised due to current technological constraints.

Patient Empowerment Through Blockchain

Blockchain has the potential to empower patients by giving them greater control over their healthcare data. Its decentralised structure allows patients to manage who has access to their information, promoting transparency and enabling more informed decision-making regarding their healthcare pathways.

The interviewee emphasised this potential, stating, "blockchain could potentially provide patients with more control over their own data and allow them to make more informed decisions". They further noted that "blockchain would allow patients to make informed decisions about their healthcare pathways".

The analysis highlights blockchain's ability to transform how patients interact with their healthcare data. By decentralising control, it could empower patients to take a more active role in managing their information. This increased autonomy aligns with broader trends towards patient-centred care and shared decision-making, which are becoming central priorities in Welsh healthcare systems (Withers et al., 2021).

Barriers to Blockchain Adoption in Healthcare

The adoption of blockchain in healthcare faces significant obstacles, including technical challenges, regulatory barriers, and high implementation costs. Furthermore, scepticism surrounding blockchain, largely originating from its association with cryptocurrencies, may slow its acceptance by healthcare providers and patients.

The interviewee highlighted these issues, stating, "there's a potential lack of interoperability with current systems, and because they're not set up to manage that sort of interface with blockchain, it could be quite difficult". They also noted that "I don't think regulation is in place where it could be fully utilised by healthcare yet," and pointed to the broader issue of scepticism, saying, "there's a general sort of scepticism towards blockchain due to its association with cryptocurrencies".

The analysis reveals that technical barriers, particularly the lack of interoperability with existing healthcare systems, are a major concern. The interviewee also emphasised that current regulations are not keeping pace with the technological advancements of blockchain, complicating its adoption. Additionally, the association with cryptocurrencies has fostered a level of scepticism, which could hinder acceptance within healthcare. High implementation costs and the complexities of system integration were also flagged as substantial challenges to blockchain's widespread use.

Ethical and Privacy Concerns in Blockchain Data Management

Blockchain's application in healthcare raises important ethical concerns regarding data privacy, ownership, and access control. While the technology has the potential to secure patient data, the lack of clear

guidelines around data ownership and access could introduce significant privacy risks. The interviewee noted, "there isn't a clear guideline at the moment on who could access that data, so whether there would continue to be data security or privacy issues". They also emphasised that, "how access to data would be controlled using the blockchain would be the main concern".

The analysis underscores the ethical challenges surrounding data privacy and ownership. While blockchain's decentralised structure could enhance security, the absence of well-defined policies on data access and ownership is a significant issue. Without clear guidelines, there is a risk that sensitive patient information could be exposed to unauthorised access, heightening privacy concerns. Striking a balance between protecting data and ensuring proper access remains a crucial challenge for the integration of blockchain into healthcare.

Discussion

Introduction

The study explored healthcare innovators' perspectives on the role of blockchain in managing personalised medicine data, producing findings that complement the existing literature on elements including patient-centred care, technical integration, and operational challenges. Key themes emerged around data security, patient empowerment, barriers to adoption, and ethics and privacy. While these insights highlight blockchain's potential to enhance healthcare data management, they also emphasise significant limitations, such as technical complexity and regulatory hurdles, which would need to be addressed to ensure successful adoption of this technology.

Key Findings and Alignment to Literature

Blockchain for Data Security

One of the most consistent findings in this study was the belief that blockchain could enhance the security and integrity of healthcare data by decentralising storage and enabling real-time access. According to the interviewee, "blockchain can provide better transparency for patient data and ensure it remains secure". This view aligns with the literature that describes blockchain's capacity to prevent data breaches and ensure tamper-proof records (Esposito et al., 2018; Chen et al., 2019). However, concerns were raised about integrating blockchain into existing healthcare systems, such as EPRs. The interviewee highlighted that "those systems are not in place yet to allow for that level of interoperability," echoing studies like those of Ali et al. (2023), which discuss technical challenges as a key barrier to widespread blockchain adoption. Thus, while the potential for data security is clear, the practical implementation remains hindered by the complexity of system integration.

Patient-Centred Data Management

Blockchain's potential to decentralise healthcare data management and give patients more control over their records was another prominent theme. The interviewee expressed the belief that blockchain could empower patients by allowing them to manage who accesses their information, promoting greater transparency. This aligns with literature on patient-centred care, which advocates for increased patient autonomy and control over personal data (Abbate et al., 2023). However, both the interview and the survey data reflected concerns about the readiness of healthcare infrastructure to support this model. The interviewee commented on the challenge of integrating decentralised systems within existing healthcare frameworks, aligning with findings from studies that stress the complexity of adopting patient-led data management in current healthcare settings (Visvikis-Siest et al., 2018).

Barriers to Adoption of blockchain technology

The study identified several significant barriers to blockchain adoption, including technical complexity, high costs, and regulatory challenges. The interviewee commented on the lack of interoperability between blockchain and current healthcare systems, describing it as *"one of the biggest challenges".* This mirrors findings from the systematic literature review, where integration challenges and the need for substantial investment in infrastructure were frequently highlighted (Ashraf, 2021). Additionally, the interviewee noted the scepticism surrounding blockchain, particularly due to its association with cryptocurrencies. This sentiment is supported elsewhere, by recognition that the public perception of blockchain as a speculative technology might slow its adoption in healthcare (Mohan & Ferris, 2023).

Blockchain Ethical and Privacy Concerns

Ethical concerns regarding data privacy and ownership emerged as a significant theme in both the survey and interview data. Participants highlighted the complexities of data ownership and the implications of decentralised data management. As blockchain enables a distributed model, questions arise about who controls access to sensitive health information and how to ensure proper safeguards are in place.

One survey respondent noted, "Blockchain could provide enhanced privacy, but it's not clear who controls that data, which makes me concerned about unauthorised access." This sentiment was echoed by others who raised concerns about "the lack of clear guidelines on data ownership, especially in decentralised systems where multiple parties might access the same data".

In the interview, the participant similarly pointed out that "there isn't a clear guideline at the moment on who could access that data, so whether there would continue to be data security or privacy issues." They further commented that "how access to data would be controlled using the blockchain would be the main concern."

This theme underscores the tension between the promise of enhanced security through decentralisation and the risk of privacy breaches due to undefined ownership and access controls. Both the survey and interview data indicate a strong desire for regulatory clarity, with many participants suggesting that without robust ethical guidelines and privacy frameworks, blockchain's potential may not be fulfilled. These concerns align with literature that emphasises the importance of establishing clear data ownership protocols and ethical standards in the deployment of blockchain in healthcare (Isravel et al., 2023).

Participants also flagged the potential risks of blockchain's decentralised model inadvertently exposing sensitive patient information to unauthorised parties. To mitigate these concerns, the integration of blockchain into healthcare will require not only technical solutions but also a comprehensive legal and ethical framework that clearly defines ownership, access, and the responsibilities of each stakeholder involved.

Alignment to Objectives

The study found that participants generally recognised blockchain's potential to enhance the management of healthcare data, particularly by improving security and transparency, aligning with the first objective of exploring perceptions of blockchain in medical data management. However, integrating blockchain with existing healthcare systems, such as electronic patient records, was identified as a significant challenge.

In relation to the second objective, the study highlighted that blockchain could enable greater patient control over health data, empowering patients to manage access to their information. However, substantial barriers to integration were noted, including technical complexity, high costs, and regulatory challenges. The lack of interoperability with current healthcare systems and scepticism due to blockchain's association with cryptocurrencies were seen as key constraints.

Finally, in addressing the third objective, the study underscored the critical role of policy in supporting blockchain adoption. Participants pointed out the absence of clear regulatory frameworks, particularly in areas like data ownership, privacy, and security. Developing these policies will be essential to fully realise blockchain's potential in personalised medicine.

Currently In Europe, GDPR compliance remains a critical aspect for blockchain technologies, especially when dealing with sensitive health information. The challenge lies in aligning blockchain's immutable nature with GDPR's "right to be forgotten" principle, prompting the use of hybrid blockchain models that store sensitive data off-chain to remain compliant (Tatar et al., 2020). In the U.S., the Health Insurance Portability and Accountability Act (HIPAA) mandates that blockchain implementations ensure data confidentiality and secure access controls, and any blockchain handling patient data must adhere to HIPAA's privacy and security rules (Ettaloui et al., 2024).

Globally, there is growing emphasis on building frameworks that allow for data interoperability, ensuring that blockchain systems can securely interact with existing healthcare IT systems like Electronic Health Records (EHR) (Schmeelk et al., 2022). Emerging regulations also cover the pharmaceutical supply chain to combat counterfeit medicines, such as the Drug Supply Chain Security Act (DSCSA) in the U.S., which blockchain can help meet by providing transparent product tracking (Morcillo-Bellido et al., 2023).

Contribution to Literature

This study provides both academic and practical contributions. Academically, it adds to the growing body of research on blockchain in healthcare by exploring the specific use case of personalised medicine data management. Practically, the study offers healthcare innovators, providers, and policymakers' insights into the benefits and barriers to blockchain adoption. By understanding these perspectives, healthcare institutions can better assess the feasibility of integrating blockchain into their data management strategies.

Conclusions and Recommendations

Summary of Key Findings

This report has highlighted the key features and challenges of implementing blockchain in healthcare systems including data security and access, technical complexity, and regulatory challenges. Despite offering robust solutions for data management, such as transparency and immutability, blockchain faces substantial challenges, particularly due to a lack of interoperability with existing healthcare systems. Significantly, 3 out of the 18 survey participants did not complete all the questions, possibly reflecting a lack of knowledge, interest, or concern in blockchain technology. This underscores a broader issue: lack of awareness or confidence of the potential of emerging technologies like blockchain, mirroring a general challenge of improving the understanding of new innovations in the health and care sector. This knowledge gap further complicates blockchain's integration into healthcare practice.

Recommendations

In rapidly evolving healthcare technology fields, organisations need adopt a strategic, multi-disciplinary approach to assess, prioritise, and implement innovations. This involves evaluating technologies based on impact, feasibility, and alignment with existing systems and regulations, while addressing knowledge gaps through training. The approach also emphasises the use of pilot programmes to test and refine technologies before full-scale deployment, ensuring scalability and sustainability. Table 6 shows a draft process to meet this approach, derived from insights gained through the strategic literature review, as well as survey and interview responses.

Table 6. Draft Process for the Strategic Assessment, Prioritisation, and Implementation of New Healthcare Technologies

Step	Considerations	Implementation Steps
1. Identify the Knowledge Gaps	Evaluate the knowledge gaps in blockchain, AI, and other technologies among healthcare professionals. Understand the specific areas of lack, including interoperability and security concerns.	Conduct surveys, interviews, and focus groups to gather data on the knowledge gaps. Identify the key areas where education and training are needed.
2. Develop a Technology Integration Plan	Create an agile-based plan for assessing the impact of new technologies. Focus on areas like technical feasibility, interoperability, security, and privacy. Establish feedback loops for iterative improvement.	Develop a step-by-step agile roadmap with regular sprints for testing technology components. Involve IT, healthcare professionals, and legal teams to ensure compliance and practicality.
3. Address Welsh Challenges	Consider challenges such as funding, regulatory compliance (GDPR, patient consent), and system readiness. Engage stakeholders from early stages, especially those who are resource-constrained	Collaborate with regional policymakers and regulatory bodies to ensure all legal and compliance frameworks are addressed early on. Identify potential barriers related to funding and data protection.
4. Select and Prioritise High-Impact Technologies	Identify technologies that solve multiple healthcare challenges and have synergy with AI, blockchain, and IoT. Focus on technologies that improve patient outcomes, data security, and operational efficiency.	Assess the technological landscape and choose systems that align with healthcare goals. Focus on modular, scalable technologies that can integrate with existing systems.
5. Develop Financial and Resource Strategies	Maximise financial resources by leveraging public-private partnerships and prioritising technologies with a strong return on investment. Focus on reducing long-term costs (e.g., through data integration, AI automation).	Engage in discussions with private partners, explore grants or other funding options. Build a financial model that outlines expected ROI, potential cost reductions, and long-term benefits.

6. Implement Pilot Programs and Test Synergies	Begin with small-scale pilots to test the effectiveness of new technologies. Focus on testing synergies between technologies like AI and blockchain to enhance diagnostic accuracy and real-time data sharing.	Run pilots in select departments or hospitals to test technologies in real-world settings. Ensure data collection and feedback are integrated into the pilot process.
7. Continuous Monitoring, Feedback, and Scaling	Monitor performance and continuously collect feedback from stakeholders. Use data-driven insights to guide scaling of successful pilot projects. Make adjustments to regulatory compliance and user adoption strategies.	Analyse pilot results and create a scaling plan. Address any interoperability issues or regulatory barriers before full-scale implementation. Implement continuous monitoring for ongoing improvements.

A key barrier to the successful adoption of advanced technologies like blockchain, AI, and the Internet of Things (IoT) is the knowledge gap that exists among healthcare professionals (Apell & Eriksson, 2023). To address this, comprehensive surveys, interviews, and focus groups with key stakeholders can provide valuable insights into where educational efforts should be focused. For example, these might include areas such as data security, interoperability, and the practical applications in patient care. Understanding these gaps will help healthcare organisations implement targeted, role-specific training programmes that increase awareness and understanding, thereby facilitating a smoother path to acceptance and eventual adoption of new technologies.

Following this assessment, the next step is to develop a robust, agile-based technology integration plan. This plan should be dynamic, allowing for iterative improvements and adaptations as technology and healthcare needs evolve (Mamatha & Bhosle, 2023). Key areas of focus should include technical feasibility, ensuring that new systems can work seamlessly with existing infrastructure, and prioritising interoperability with the broader healthcare ecosystem. Security and privacy, particularly in the context of highly sensitive patient data, should be foundations of the integration strategy. Engaging healthcare IT professionals, clinicians, and legal experts from the outset ensures that the plan remains practical, compliant with regulations, and aligned with the daily operations of healthcare providers.

In addition to technical challenges, Welsh-specific factors such as funding, regulatory frameworks, and system readiness must be addressed early in the implementation process. In Wales, the " Healthier Wales: Our Plan for Health and Social Care" framework advocates for a digitally enabled healthcare system (Welsh Government, 2022); within this blockchain could play a pivotal role in enhancing data security, improving patient outcomes, and streamlining healthcare processes. To align technological advancements with regional healthcare goals, policymakers and regulatory bodies must collaborate to develop a supportive legal framework. This framework should include clear guidelines on data ownership, access control, and interoperability standards, all of which are essential to ensuring that blockchain and other technologies can be successfully integrated without compromising patient privacy.

Once the regulatory and financial landscapes have been assessed, it is essential to focus on selecting and prioritising high-impact technologies. These are innovations that not only address multiple healthcare challenges but also offer synergies between fields such as AI, blockchain, and IoT. By focusing on technologies that improve patient outcomes, enhance data security, and increase operational efficiency, healthcare providers can ensure that their investments yield substantial long-term benefits. For example, AI-driven genomic testing tools have the potential to revolutionise cancer diagnosis and personalised medicine by rapidly analysing genetic data to identify cancer-related mutations or predict patient responses to specific treatments (Guo et al., 2023). These tools not only improve diagnostic accuracy but also enable more personalised treatment plans, resulting in better patient outcomes and reduced healthcare costs (Mendhe et al., 2024).

Following the selection of high-impact technologies, the implementation of small-scale pilot programmes is the next step. Pilots allow healthcare providers to test the effectiveness of new technologies in real-world settings before committing to large-scale rollouts. These programmes should focus on the synergies between technologies like AI and blockchain, particularly in enhancing diagnostic accuracy, improving real-time data sharing, and ensuring seamless integration with existing systems. Continuous monitoring of pilot programmes, coupled with data collection and stakeholder feedback, will provide insights into how well the technologies perform in practice and where adjustments are needed. These findings can then inform the scaling of successful pilots, with a particular focus on ensuring regulatory compliance and fostering user adoption strategies that address any remaining scepticism or knowledge gaps.

Future-proofing new technologies is another essential consideration. The healthcare landscape is evolving rapidly, with advancements in artificial intelligence, machine learning, genomics, and data security continuously reshaping how healthcare is delivered. To avoid obsolescence, organisations must adopt modular, scalable technologies that can evolve with these advancements. Designing systems using open standards such as Fast Healthcare Interoperability Resources (FHIR) will help ensure that new technologies remain compatible with future platforms and tools, while also allowing for incremental updates that avoid the need for costly overhauls (Vorisek et al., 2022).

Ensuring that technologies comply with evolving regulatory and ethical standards is also critical. Healthcare providers must engage with regulatory bodies during the development phase to ensure that their systems remain flexible enough to adapt to future changes in regulations, particularly in areas such as patient data protection. This proactive engagement can help avoid legal challenges that might otherwise lead to technology becoming obsolete or unusable.

A key aspect of ensuring the long-term relevance and success of new technologies is actively involving end-users, healthcare professionals, administrators, and patients in the development process. By engaging with these stakeholders through co-creation and iterative feedback, healthcare organisations can tailor technologies to meet real-world needs and workflows. Technologies that align with the actual practices and requirements of end-users are far more likely to be adopted and maintained over time, reducing the risk of redundancy (Lyles et al., 2021).

Collaboration across disciplines and industries is also essential for creating technologies that are adaptable and integrated into the broader healthcare ecosystem. By working closely with stakeholders in related fields such as genomics, AI, and big data, healthcare providers can ensure that their technologies evolve in tandem with advancements in other areas. This cross-disciplinary approach fosters synergies that make the systems more robust, adaptable, and capable of addressing a wider range of healthcare challenges.

In summary, the successful adoption of healthcare technologies requires a well-coordinated, flexible approach that prioritises adaptability, continuous improvement, and stakeholder engagement. By addressing knowledge gaps, developing agile technology integration plans, and selecting high-impact technologies, healthcare providers can ensure that their systems remain relevant and effective in the rapidly changing healthcare landscape. Through collaboration, proactive engagement with regulatory bodies, and future-proofing strategies like modular design and cloud computing, healthcare organisations can avoid obsolescence and maximise the long-term benefits of new technologies, ultimately improving patient outcomes and system efficiency.

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Appendix A: Ethics Approval Form

Swansea University
Prifysgol Abertawe

Approval Date: 11/07/2024

Research Ethics Approval Number: 1 2024 9945 9520

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	2135218 MN-D021P Research in a Health and Care Context Proposal
Applicant name	DR ANDREW HALL
Submitted by	DR ANDREW HALL /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/12020

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Dyddiad Cymeradwyo: 11/07/2024

Rhif Cymeradwyo Moeseg Ymchwil:

Diolch am gwblhau cais moeseg ymchwil am gymeradwyaeth foesegol ac am gyflwyno'r ddogfennaeth ofynnol drwy'r platfform ar-lein.

Teitl y Prosiect	2135218 MN-D021P Research in a Health and Care Context Proposal
Enw'r Ymgeisydd	DR ANDREW HALL
Cyflwynwyd gan	DR ANDREW HALL /
Dolen i'r ffurflen gais lawn	https://swansea.forms.ethicalreviewmanager.com/Project/Index/12020

Mae'r pwyllgor moeseg Humanities and Social Sciences wedi cymeradwyo'r cais moeseg ymchwil, yn amodol ar yr amodau a amlinellir isod:

Amodau cymeradwyo

1. Mae'r gymeradwyaeth yn seiliedig ar yr wybodaeth a roddir yn y cais, a gwneir y gwaith yn unol â hyn. Yr ymgeisydd sy'n gyfrifol am sicrhau bod yr holl reoliadau, polisïau a deddfau mewnol ac allanol perthnasol yn cael eu dilyn.

- Gall y prosiect hwn gael ei adolygu gan y pwyllgor o bryd i'w gilydd. Gellir atal neu ddirymu'r gymeradwyaeth ar unrhyw adeg os bydd yr amodau'n cael eu torri.
- Caiff unrhyw addasiadau sylweddol i'r cais a gymeradwywyd eu cyflwyno i'r pwyllgor moeseg cyn i'r fath newidiadau gael eu rhoi ar waith.

Amodau penodol ynghylch y cais hwn:

Barnwyd bod y cais yn risg Low i'r Brifysgol.

Dim amodau ychwanegol.

Datganiad o gydymffurfiaeth

Penodir y pwyllgor yn unol â'r trefniadau llywodraethu ar gyfer pwyllgorau moeseg ymchwil. Mae'n cydymffurfio â chanllawiau Ymchwil ac Arloesi yn y DU (UKRI) a'r concordat i gefnogi uniondeb ymchwil.

Cadeirydd Ymchwil a Moeseg, Humanities and Social Sciences

Prifysgol Abertawe.

Os oes gennych ymholiadau ynghylch yr hysbysiad hwn, yna mae croeso i chi gysylltu â gweinyddwr moeseg ymchwil eich cyfadran.

- Ar gyfer Gwyddoniaeth a Pheirianneg, e-bostiwch FSE-Ethics@abertawe.ac.uk

- Ar gyfer Meddygaeth, Iechyd a Gwyddor Bywyd, e-bostiwch FMHLS-Ethics@abertawe.ac.uk
- Ar gyfer y Dyniaethau a'r Gwyddorau Cymdeithasol, e-bostiwch FHSS-Ethics@abertawe.ac.uk

Appendix B: Survey Questions and Process of Analysis

Survey Questions and Answers

1. How long have you been involved in delivering or supporting healthcare services?

5 Years or More: **8 responses**

1-3 Years: **5 responses**

3-5 Years: **3 responses**

Less than 1 year: **1 response**

2. What category best fits your employment?

NHS Wales Health Board or Trust: **5 responses**

Welsh Government: **4 responses**

Other: **4 responses**

Industry: **2 responses**

University: **2 responses**

3. Would you describe your role as patient-facing? (Y/N)

No: **14 responses**

Yes: **2 responses**

4. How familiar are you with blockchain technology?

Slightly familiar: **5 responses**

Not familiar at all: **5 responses**

Moderately familiar: **4 responses**

Very familiar: **2 responses**

5. Do you believe blockchain could improve the management of your medical data?

Might or might not: **7 responses**

Probably yes: **5 responses**

Definitely yes: **2 responses**

Probably not: **1 response**

6. How important is data privacy to you when it comes to your medical records?

Extremely important: **11 responses**

Very important: **4 responses**

Moderately important: **1 response**

7. Do you trust blockchain technology to keep your medical data secure?

Might or might not: **8 responses**

Probably yes: **3 responses**

Definitely yes: **2 responses**

Probably not: **1 response**

8. Would you be willing to use a blockchain-based system to manage your medical data?

Maybe: **9 responses**

Yes: **4 responses**

No: **1 response**

9. How likely do you think blockchain technology is to improve the efficiency of medical data management?

Somewhat likely: **6 responses**

Neither likely nor unlikely: **3 responses**

Somewhat unlikely: **3 responses**

Extremely unlikely: **1 response**

10. To what extent do you believe blockchain could reduce administrative burdens in healthcare?

Significantly: **6 responses**

Moderately: **3 responses**

Slightly: **3 responses**

Not at all: **1 response**

11. Do you think blockchain can improve the accuracy and reliability of medical records?

Probably yes: **7 responses**

Might or might not: **5 responses**

Definitely yes: **1 response**

12. How challenging do you think it will be to integrate blockchain technology into existing healthcare systems?

Very challenging: **9 responses**

Extremely challenging: **4 responses**

13. Do you believe blockchain can enhance patient engagement and empowerment?

Might or might not: **4 responses**

Probably yes: **4 responses**

Probably not: **3 responses**

Definitely not: **1 response**

Definitely yes: **1 response**

14. How concerned are you about data privacy and security in personalised medicine?

Extremely concerned: **5 responses**

Very concerned: **4 responses**

Slightly concerned: **3 responses**

Not concerned: **1 response**

15. Do you think blockchain can address current data privacy issues in personalised medicine?

Probably yes: **6 responses**

Maybe: **4 responses**

Probably not: **2 responses**

16. What are the key barriers to implementing blockchain in healthcare from a policy perspective?

Cloud services and electronic patient records: **1 response**

Understanding and familiarity at lay level: **1 response**

17. How do you envision the future of blockchain in healthcare data management?

- I see blockchain playing a role in the future of healthcare data management
- Slow

- As systems convert to full digital platforms and [federated] data exchange and management becomes the norm, it should make processes more robust and reliable, increasing effectivity and productivity across health and social care; enable more 'joined up' systems
- Supporting privacy and control of various types of patient data
- Supporting privacy and security of health data
- Unclear
- A long road, with potential issues for remediation of errors in data
- Managing privacy and security
- There is an opportunity to empower personal data management through blockchain that would enable all citizens to be the owners of their own data. This could lead to a future where individuals fully control access to their data, opening the door to true personalised medicine and health and wellbeing

18. Is there anything else you would like to share about your views on the use of blockchain for managing medical data in healthcare?

- Nothing else
- I have nothing else to add
- Xxxxxxxxxxxx
- No Thank you
- Practical challenge of implementing in a broad and comprehensive way given the lack of digital maturity and interoperability across current [Welsh] digital systems
- Very little experience personally
- No currently
- I don’t know enough about blockchain
- Not at the moment
- Not currently
- None at the moment
- Not at this time
- Not right now
- There are many examples from across the world where the application of this technology has significantly enhanced data management

Reflexive Thematic Analysis Process

To perform the reflexive thematic analysis manually, the following steps were used to analyse the questionnaire responses. Key outputs from the report are integrated to illustrate how these steps were applied.

Step 1: Familiarisation with Data

- Review the questionnaire responses thoroughly to identify recurring themes and patterns.
- **Output**: The survey responses highlighted several key areas:
    - **Familiarity with Blockchain**: Many participants were only somewhat familiar with blockchain, which may influence their perceptions.
    - **Data Privacy Importance**: Most respondents considered data privacy as "very important" or "extremely important" when managing their medical records.
    - **Trust in Blockchain**: There was a cautious optimism about trusting blockchain to keep medical data secure, but many respondents remained neutral or somewhat agreed.

Step 2: Generating Initial Codes

- Apply open coding by systematically highlighting significant responses from the questionnaire data.
- **Output**:
    - **Trust in Blockchain**: "Somewhat Agree" responses on trust reflected cautious optimism about blockchain's role in securing medical data.
    - **Blockchain's Benefits**: Participants who were more familiar with blockchain tended to agree that it could improve data management.
    - **Challenges**: Responses showed concerns about blockchain's integration into existing systems, with many citing it as "very challenging" or "challenging."

Step 3: Collating Codes into Themes

- Group similar codes together into broader themes that represent the core findings from the data.
- **Output**:
    - **Data Security and Trust**: Responses showed varying levels of trust in blockchain's ability to keep medical data secure.
    - **Patient Empowerment**: A significant portion of respondents believed that blockchain could enhance patient engagement and empowerment.
    - **Barriers to Adoption**: The most significant barriers identified were technical challenges (integration with current systems) and a general lack of trust in blockchain technology among less familiar respondents.

Step 4: Reviewing and Refining Themes

- Reassess and refine the themes to ensure they accurately represent the data and are supported by the questionnaire findings.
- **Output**:
    - **Refinement**: The theme **"Data Security and Trust"** was expanded to reflect the spectrum of trust in blockchain, with responses ranging from cautious optimism to scepticism.
    - **Refinement**: **"Barriers to Adoption"** was refined to focus on technical integration issues and concerns about regulatory hurdles.

Step 5: Defining and Naming Themes

- Finalise clear, concise names for each theme and define them in a way that reflects the essence of the findings.
- **Output**:
    - **Theme 1: Blockchain for Data Security and Trust**: This theme reflects the varying degrees of trust respondents had in blockchain to secure medical data.
    - **Theme 2: Patient Empowerment Through Blockchain**: This theme highlights respondents' views that blockchain could give patients more control over their medical data.

- **Theme 3: Barriers to Blockchain Adoption in Healthcare**: This theme explores the perceived technical, regulatory, and trust barriers to adopting blockchain in healthcare.
- **Theme 4: Ethical and Privacy Concerns in Data Management**: This theme focuses on respondents' concerns around data privacy, ownership, and the need for clear policies.

Step 6: Producing the Report

- Use the finalised themes to structure the discussion of findings in the report. Ensure that each theme is supported by direct responses from the questionnaire data.
- **Output**:
  - The theme **Blockchain for Data Security** emerged as a significant area of both trust and scepticism among respondents. Those familiar with blockchain expressed more confidence in its ability to secure data, while others remained neutral.
  - The theme **Patient Empowerment** was consistently supported by responses indicating that blockchain could enhance patient control over data, though concerns about integration and infrastructure readiness were noted.
  - **Barriers to Adoption** were highlighted, with most respondents noting the challenge of integrating blockchain into existing healthcare systems, as well as the need for regulatory clarity and updated policies.
  - **Ethical and Privacy Concerns** surfaced as another key theme, with participants expressing concerns over unclear guidelines for data access and ownership in decentralised systems. While blockchain offers enhanced data security, the lack of well-defined policies could expose sensitive patient information to unauthorised access. Both the survey and interview data emphasised the need for robust regulatory frameworks to address these issues.

Appendix C: Interview Questions and Process of Analysis

Interview Questions

These are the interview questions used in the study, structured to gather insights into healthcare innovators' perceptions of blockchain in personalised medicine data management:

Section 1: Background and Role

1. Can you describe your background and your current role, particularly in relation to healthcare and data management?
2. How familiar are you with blockchain technology, and have you had any direct experience working with these technologies?

Section 2: Perceptions of Blockchain Technology in Healthcare

1. In your opinion, what are the potential benefits of using blockchain technology for managing medical data compared to current systems?
2. What do you see as the major challenges or barriers to implementing blockchain technology in healthcare?
3. To what extent do you believe blockchain could improve the privacy and security of medical records?
4. How do you perceive the role of blockchain technology in enhancing patient engagement and empowerment?

Section 3: Healthcare Providers' Views on Blockchain Integration

1. How likely do you think blockchain technology is to improve the efficiency of medical data management in your organisation?
2. What do you consider to be the key benefits and drawbacks of blockchain compared to other data management systems like cloud storage?
3. From your experience, how challenging do you think it will be to integrate blockchain technology into existing healthcare systems?
4. Do you believe that blockchain technology can significantly reduce administrative burdens in healthcare?

Section 4: Perspectives of Policymakers on Blockchain's Impact

1. How concerned are you about data privacy and security in the context of personalised medicine and genomics?
2. Do you think blockchain can effectively address these privacy concerns? If so, how?
3. What do you believe are the key barriers to implementing blockchain in healthcare from a policy perspective?
4. Should existing healthcare policies be updated to facilitate the adoption of blockchain technology?

Section 5: Additional Insights and Open-Ended Questions

1. What additional opportunities do you see for blockchain technology in improving patient outcomes and reducing costs within the healthcare system?
2. Are there any specific concerns or ethical considerations you have regarding the use of blockchain in healthcare?
3. Is there anything else you would like to share about your views on the use of blockchain for managing medical data in healthcare?

Table C1. Summary of Interview with Innovation Lead - 19th September 2024

Section	Key Points
Background and Role	The innovation lead specifically works on AI projects. He has been involved in using blockchain for value-based healthcare contracts in heart failure pathways.
Familiarity with Blockchain	He has a high-level understanding of blockchain, mainly through his work. While not technically involved, he is familiar with how blockchain enhances data security and integrity.
Benefits of Blockchain in Healthcare	Blockchain's decentralised nature improves data transparency, security, and integrity. It is particularly useful in managing medical records, though current systems lack full interoperability.
Challenges to Blockchain Adoption	Major barriers include high implementation costs, lack of regulatory frameworks, and scepticism due to blockchain's association with cryptocurrencies.
Improving Privacy and Security	Blockchain's encrypted and decentralised structure can minimise data breaches and prevent unwanted edits to medical data.
Patient Empowerment	Blockchain could give patients more control over their own data, allowing them to make informed decisions regarding their healthcare pathways.
Efficiency in Data Management	Real-time access to patient data and reduction in duplication errors were identified as key factors for improving medical data management efficiency.
Blockchain vs Cloud Storage	Blockchain is more secure and transparent, but likely more resource-intensive compared to cloud storage.
Integration Challenges	There is a lack of interoperability between blockchain and existing healthcare systems, which would make integration difficult. Regulation around data security would be essential.
Reducing Administrative Burdens	Blockchain could automate data-sharing processes, but it may have pros and cons depending on how patient data is anonymised and shared.
Policymakers' Role in Adoption	There is a significant lag between technological advancements and policy updates. Blockchain and AI both require updated guidelines and regulations to match the pace of innovation.
Future of Blockchain in Healthcare	With adequate regulation, blockchain could open up greater access to patient data, allowing individuals to make more informed decisions about their health.
Additional Opportunities	Blockchain could improve value-based healthcare contracts, clinical trials management, and possibly medical insurance systems.
Ethical Concerns	Data privacy and ownership are the primary ethical concerns surrounding the use of blockchain in healthcare.

Reflexive Thematic Analysis Process

Step 1: Familiarisation with Data

- Review the interview transcript and survey responses thoroughly to identify recurring themes and patterns.

- **Output**: In the interview, the participant highlighted several overarching concepts:

  Blockchain's Role in Data Security and Integrity: The interviewee viewed blockchain as a method to prevent tampering and improve transparency in medical data.

  Patient Empowerment: The interviewee suggested that blockchain could provide patients with control over their health data.

  Challenges in Adoption: The interviewee expressed concerns about high costs, regulatory barriers, and blockchain's association with cryptocurrencies.

Step 2: Generating Initial Codes

- Apply open coding by systematically highlighting significant statements from the interview and survey data, categorising them into key codes.
- **Output**:

  Blockchain's Benefits: "Blockchain improves transparency of data and potentially could improve data integrity" (interview quote).

  Challenges: "Interoperability with existing systems is a significant barrier" (interview quote).

  Ethical Concerns: "There are no clear guidelines on who can access data, which could lead to privacy issues" (interview quote).

Step 3: Collating Codes into Themes

- Group similar codes together into broader themes that represent the core findings from the data.
- **Output**:

  Data Security and Integrity: The interviewee consistently mentioned blockchain's ability to improve data security and prevent unauthorised changes to medical records.

  Patient Empowerment: The interviewee emphasised the potential of blockchain to enable patients to control access to their data.

  Barriers to Adoption: The most significant barriers identified were technical integration challenges, regulatory hurdles, and the high cost of implementing blockchain in healthcare.

  Ethical and Privacy Concerns: Concerns about data ownership and privacy risks due to a lack of clear guidelines on who controls access to blockchain data were frequently raised.

Step 4: Reviewing and Refining Themes

- Reassess and refine the themes to ensure they accurately represent the data and are supported by the interview and survey findings.
- **Output**:

  Refinement: The theme "Data Security and Integrity" was expanded to include interoperability challenges, as the interviewee expressed concerns about integrating blockchain with existing healthcare systems.

  Refinement: "Barriers to Adoption" was refined to specifically highlight scepticism due to blockchain's association with cryptocurrencies, which was mentioned multiple times in both the interview and survey responses.

Step 5: Defining and Naming Themes

- Finalise clear, concise names for each theme and define them in a way that reflects the essence of the findings.
- **Output**:

  Theme 1: Blockchain for Data Security, Integrity, and Interoperability: This theme captures blockchain's ability to secure healthcare data while addressing challenges in integrating it with current systems.

  Theme 2: Patient Empowerment Through Blockchain: This theme highlights blockchain's potential to give patients control over their medical data and empower them in healthcare decision-making.

  Theme 3: Barriers to Blockchain Adoption in Healthcare: This theme explores technical, regulatory, and financial barriers, including the association with cryptocurrencies, which may impede blockchain's acceptance in healthcare.

  Theme 4: Ethical and Privacy Concerns in Data Management: This theme discusses the ethical issues surrounding data privacy, ownership, and access control, along with the need for clear guidelines.

Step 6: Producing the Report

- Use the finalised themes to structure the discussion of findings in the report. Ensure that each theme is supported by direct quotes and data from the interview and survey responses.
- **Output**:

  Blockchain for Data Security was discussed as a key benefit, with the interviewee expressing confidence in its ability to prevent tampering and improve transparency.

  Patient Empowerment was reinforced with examples from the interview, where the interviewee noted that blockchain could give patients more control over who accesses their health data.

  Barriers to Adoption were discussed in detail, with the interviewee highlighting technical challenges, such as interoperability issues, and regulatory concerns. Additionally, scepticism around blockchain due to its association with cryptocurrencies was a common theme in both the survey and interview data.

  Ethical and Privacy Concerns were tied to the lack of clear guidelines on data ownership and control, with concerns raised about how access would be managed.

About the Author

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Andrew Hall is a Project Lead in the precision medicine programme at Life Sciences Hub Wales, where he specialises in molecular diagnostics. With a background in immunology, Andrew has extensive experience in cell and tissue bioprocessing, analysis, and storage, particularly in stem cell banking. His career spans both academia and industry, with published research on human chitinases in the immune system, as well as significant experience in developing new products for cell therapy applications. Andrew is particularly interested in the challenges of managing data in personalised medicine, especially the complex infrastructure needed to support these rapidly evolving technologies.

Can Network Enabled Haemodialysis Machines Provide Predictive Maintenance Opportunities?

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Abstract:

Background: The National Health Service (NHS) in Wales faces mounting pressure to enhance patient outcomes and deliver greater value. Healthcare organizations are embracing innovation and transformation, with staff recognizing the importance of change. Digital transformation is accelerating the shifts in healthcare delivery and this research focuses on applying it for medical engineering maintenance purposes. Can predictive maintenance be achieved by making use of Artificial Intelligence and connecting medical devices, namely haemodialysis machines.

Methods: Literature review of current practices and establish if this has been done before. Interviewing expert opinion within medical device management and engineering departments to establish whether the concept is achievable, benefits and challenges that may arise.

Results: The concept received positive feedback and literature review informed that it had been successful in other countries and industries. Experts were convinced of its viability and benefits overcoming the challenges that may present.

Conclusion: Artificial Intelligence in the form of Machine Learning can provide highly accurate predictive maintenance models. Data quality and accuracy is essential to success as well as collaboration with medical device manufacturers. Digital transformation can be applied to medical engineering departments core business.

Keywords: Predictive Maintenance, Medical Devices, Haemodialysis Machines, Machine Learning, Networked Machines, Artificial Intelligence

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Introduction

Background and Context

The United Kingdom (UK) has faced many social and economic challenges over the last decade but none more so than today. This has and will affect further policy in the vast task that health and social care sectors have in front of them in delivering services in the future. The devolved Welsh Government (WG) has done much to drive the required changes necessary and has been visionary in its approach and policies since the introduction of the Social Services and Well-being (Wales) Act 2014 and its support of Prudent Health Principles which followed shortly afterwards.

National Health Service (NHS) Wales services are increasingly under pressure to deliver better outcomes and value for patients and stakeholders. Innovation and transformation within organisations are finally happening regularly and being acknowledged by workforces. An acceptance of Prudent and Value Based Healthcare Principles in moving care closer to the community and prevention of health conditions; as well as the digital transformation needed to accelerate these changes. Each and every department needs to do their part in achieving this outcome and being the best service, they can for its citizens.

Renal Technical Services (RTS) are a medical engineering department that manages medical devices relevant to the southwest Wales regional renal service. With this in mind, this research targets the dialysis machines the service is responsible for, and the use of emerging digital technologies. The interconnectivity of medical devices has vastly increased and with that the big data they are able to capture. This has facilitated greater insights into patients' conditions and future care needs. The aim is to determine whether networking these devices can also help predict maintenance interventions with the data extracted being interpreted by machine learning software or artificial intelligence algorithms.

Reviewing current literature to determine how successful, implementation of predictive maintenance or predicting failure of devices has been, and the use of algorithms or Artificial Intelligence (AI) in data interpretation. This paper will discuss the different approaches used, benefits and potential problems, and also whether these technologies have or can be applied to haemodialysis machines.

Key Policies

Table 1.1 outlines key policy drivers that the Welsh Government has published, along with the advisory think tank the Bevan Commission in the last 10 years. These policies have and continue to shape the health and social care landscape for the citizens of Wales. The trend is focused to citizen well-being and health, ownership of care, prevention and early intervention, cooperation and collaboration, integration and digital transformation, quality and safety focused with continuous improvement as well as better outcomes from best value care.

Table1.1. Key Documents Shaping Health and Social Care

Year	Title	Publisher	Key Recommendations
2014	Social Services and Well-being (Wales) Act	Welsh Government	Focus on Well-being Person-Centred Care Integration of Services Prevention and Early Intervention Promoting Independence Strengthening Safeguarding Establishing a National Eligibility Framework Local Authority Duties Carers' Rights Well-being Duty on Public Bodies Access to Information and Advice Regulation and Inspection
2015	A Prudent Approach to Health: Prudent Health Principles	Bevan Commission	Achieve health and Well-being with Less Do Only What is Needed and Do No Harm Involve People in Decisions About Their Care Care for Those with the Greatest Need First Promote Self-Care and Prevention Reduce Harm and Waste Work with Others to Deliver Care Continuously Learn and Improve

			Reduce Inappropriate Variation Through Evidence-Based Practice
2015	Well-being of Future Generations (Wales) Act	Welsh Government	Sustainable Development Principle – not compromising the ability of future generations to meet their own needs Well-being Goals: A Prosperous Wales A Resilient Wales A Healthier Wales A More Equal Wales A Cohesive Wales A Wales of Vibrant Culture and Thriving Welsh Language A Globally Responsible Wales Five Ways of Working to achieve the goals: Long-term vision Prevention Integration Collaboration Involvement Establish Public Services Boards Create Future Generations Commissioner Role Public Bodies; Annual Reports and Reviews: Transparency and Accountability
2015	Informed Health and Care: A Digital Health and Social Care Strategy for Wales	Welsh Government	Patient-Centric Digital Services and Access Integrated Digital Systems across Health and Social Care Sectors Electronic Health Records Telemedicine and Remote Consultations Encouraged Digital Skills Development of the Workforce Data Security and Privacy Promoting Innovation and Research in Digital Health and Social Care Technologies Patient Empowerment Standardization and Interoperability across Services and Regions Data Analytics to Inform Decision Making Public Engagement and Communication of the Benefits of Digital Integration
2016	Regulation and Inspection of Social Care (Wales) Act	Welsh Government	Regulation of Social Care Providers Establishment of the Care Inspectorate Wales Improved Inspection Processes Focus on Citizens Well-being and Outcomes from Care Services Enhanced Accountability and Transparency from Social Care Providers Registration of Managers Regulation of the Workforce Safeguarding and Protection of the Vulnerable Quality Standards and Codes of Practice Regulatory Powers and Enforcement Powers for Care Inspectorate Wales Promotes Service User Involvement
2018	A healthier Wales: long term plan for health and social care	Welsh Government	Quadruple Aims Integrated Working between Health and Social Care Sectors Person-Centered Care – Patient owning their care/Decision making Prevention and Early Intervention – proactive management of citizens health Shift from Secondary to Primary and Community Care Digital Transformation Workforce Development Improving Care for Older People Sustainability and Efficiency Health Inequalities Innovation and Research to Drive Improvements Collaboration and Partnership Working across All Stakeholders Continuous Quality Improvement Introduction of Value Based Principles

A key document, 'A healthier Wales' (WG, 2018) manages to project a fresh vision of its 'long-term plan for health and social care' by combining the key fundamentals of previous Acts and publications, with some additional new approaches. This plan emphasised the need for a shift towards value-based models of care that focuses on efficient and effective high-quality care that improves patient outcomes. In doing this it promotes digital transformation and integration throughout services and across health and social care organisations, and the importance of workforce development to achieve better services.

Table 1.2 shows key documents that support this drive toward digital transformation and integration specifically in the context of health and social care. Again, in the last 10 years it can be seen, policy has followed very similar themes and recommendations, encouraging the take up of digital health. None, more so than a timely reminder to the fresh change to the UK Government by Lord Darzi in his very recent independent review of the NHS in England in which he urges a 'major tilt toward technology and make use of AI's enormous potential', (DHSC, 2024).

Table 1.2. Key Documents Supporting Digital Transformation and Integration in Health and Social Care.

Year	Title	Publisher	Key Recommendations
2015	Informed Health and Care: A Digital Health and Social Care Strategy for Wales	Welsh Government	Develop and Expand Digital Services for Patients Integration of Systems Across Health and Social Care Rapid Implementation of Electronic Health Records Investment in Telemedicine and Remote Monitoring Workforce Digital Skills Development Data Security and Privacy Patient and Public Engagement Promote Innovation and Research Develop and Enforce Digital Health Quality and Standards Collaboration and Partnership with Stakeholders Improving Access to Information for Stakeholders Monitoring and Evaluation the Impact and Effectiveness of Digital Systems
2018	A Healthier Wales: our Plan for Health and Social Care	Welsh Government	Digital health and care transformation plans Integration of digital technologies for patients and healthcare professionals Backed by investment in technology Develop workforce digital skills Data protection and cybersecurity essential
2018	Digital Change in Health and Social Care	The King's Fund	Progress and Challenges discussed: Varied progress with digital uptake across health and social care Barriers to adoption Importance of leadership and culture Potential benefits Patient and public involvement National and local digital alignment
2019	Recommendations on Digital Interventions for Health System Strengthening	World Health Organisation	Digital Health Interventions to Strengthen Health Systems Integration with Health Systems Focus on Evidence-Based Digital Health Interventions User-Centered Design for All Stakeholders Workforce Capacity Building for Efficient Use of Digital Health Systems Data Security and Privacy Scalability and Sustainability Equity and Inclusivity to All Citizens Monitoring and Evaluation of Digital Health Systems Cross Sector Collaboration Policy and Governance of Digital Health Systems

2021	People at the Heart of Care: adult social care reform white paper	Department of Health and Social Security	10 Year Plan: Personalization of Care and Choice Improve Quality of Care Workforce Development through Training Integration with Health and Social Services Address Funding and Financial Sustainability of Social Services Technology and Innovation: Encourage to enhance care delivery Recognise and Support for Carers Data and Evidence Local Leadership and Accountability Access to Services Public Engagement
2022	A plan for digital health and social care	Department of Health and Social Security	Universal Digital Access for Health and Social Care Providers Seamless Integration and Interoperability across Digital Platforms Enhance Patient Digital Empowerment Data Security and Protect Patient Privacy Workforce Training and Support Promote Digital Innovation Equity and Accessibility for All Standardization and Best Practices of Digital Technology Collaboration and Partnerships between Stakeholders Patient and Public Involvement in Digital Solutions Investment in Digital Health Infrastructure Monitoring and Evaluation of Digital Systems
2023	Digital and data strategy for health and social care in Wales: To improve the way we deliver modern health and care services through technology and use of data.	Welsh Government	Unified Digital Infrastructure Across Organisations Patient-Centric Digital Services Data-Driven Decision Making Advanced Data Security and Privacy Enhanced Data Integration Promoting Digital Inclusion Support for Digital Innovation Workforce Training and Development Governance and Accountability Patient and Public Engagement Standardization and Best Practices Investment in Digital Infrastructure
2024	Independent investigation of the National Health Service in England	Department of Health and Social Care	Digital Transformation Capital Investment Community and Preventive Care Address Workforce Strain AI and Innovation

These legislative and informative documents can also guide the considerations when discussing the research question and the outcomes of the literature review discussed in the next chapter.

Research Question, Aims and Objectives

"Can networked-enabled haemodialysis machines provide a predictive maintenance opportunity?"

The aim of this research is to understand whether it is feasible and of value to predict maintenance events in dialysis machines and the methods needed to make it happen. What considerations need to be discussed in doing so?

Personal Motivation of the Researcher

The researcher is an experienced clinical engineer and leader with a strong medical device management and technology background in the healthcare sector. He is interested in the emerging technologies affecting medical devices whether hardware or software biased and how these can be best adopted to improve service innovation.

Understanding these improvements can give a further insight into the benefits to the service and any challenges faced by the workforce. Digital innovation with renal devices that can achieve real value to the service and patients is the researcher's goal.

Conclusions and Structure of this Paper

This chapter has briefly introduced the research concept and key government and organisational papers which have led to the research question. Chapter 2 will provide the details of the literature review conducted and what contributed to the research question in terms of gaps, benefits and challenges. The next thereafter, chapter (3) will form the main analysis of this paper and whether the question is answered, clear evidence interviews and a comparison with the earlier findings. Following this will be the conclusion, covering the main points, key outcomes and recommendations going forward of the study.

Literature Review

Introduction and Purpose

The purpose of this substantive literature review is to establish the current situation of what has been done to date with regards the research question and determine any gaps in available literature. It will also highlight what is important to talk about in the findings and whether the research question is worth exploring further. Identification of the key components of discussion and potential value to the organisation will form the basis of interview questions. Comparison of the literature with findings from the experienced engineers interviewed will determine the argument, was it useful, new and has it contributed?

In establishing the research question, the recent replacement and modernisation of dialysis machines in Morriston Hospital was taken into account and the potential to network these machines for treatment data. This led to the question; could this also provide an opportunity to download system and sub-system data from the machines to establish whether it could be interpreted into proactive maintenance prediction models. This aligns to the digital transformation initiatives mentioned earlier.

The review focuses on predictive maintenance and failure of medical devices including dialysis machines, as well as machine learning, artificial intelligence and device connectivity as the key drivers to achieve this. The paper will explore the benefits and the considerations to take into account, and recommendations for the future.

Methodology and Search Terms

The initial approach was to run a scoping search to get a better understanding of the concepts and terms needed for the research database search. An informal search using Google Scholar using the phrase ‘predictive system medical equipment maintenance’ was used to determine literature albeit of unfounded research value to help narrow down apt search terms for an official research database.

Subsequently, Swansea University’s library access to the Embase and Scopus search engines under the Medicine library guides were used to search the following search terms. The use of Scopus was preferred over Embase but only as the Researcher’s preference with similar results initially observed overall.

Table 2.1. Search Terms for Literature Review.

Scopus Search Grid			
Concept 1	**Concept 2**	**Concept 3**	**Concept 4**
Predict* Maintenance	Haemodialysis Machines or Devices	Connectivity	Machine Learning
Predict* Failure	Haemodialysis Machines or Devices	Internet of Things	Artificial Intelligence
	Medical Devices		
Documents Found After Each Concept Added (n=)			
334,266	269	39	8
			33

As can be seen in Table 2.1, each concept was put into Scopus with the resulting number of documents found (n). After each stage the results showed Concept 1 n = 334,266 documents, Concept 1&2 n = 269 documents, Concept 1&2&3 n = 39 documents with all Concepts resulting in n = 8 documents. In consideration of these 8 documents some were considered of low value to the research question. Therefore, the term artificial intelligence was removed from the search criteria, and this altered the search size to an increase of n = 33 documents.

The researcher read the abstracts and excluded the following criteria:

- Predictive treatment

- Predictive therapies

Included are English and American naming of machines used in haemodialysis/haemodialysis.

A further sifting of the documents this resulted in 14 suitable documents for the literature review process. However, these original documents highlight a few relevant papers and research that has been reviewed and referenced when providing crucial information.

Table 2.2 Existing Research Documents Assessed

Reference	Benefits	Considerations
(Amran et al., 2023) Emerging Cloud-Based Predictive Maintenance for Hemodialysis Reverse Osmosis Purified Water	Enhanced System Reliability Cost Efficiency Remote Monitoring and Data Collection Proactive Maintenance Improved Water Quality Control	Cybersecurity Risks High Initial Investment Integration with Existing Systems Reliability on Internet Connectivity Staff Training and Adaptation
(Carvalho et al., 2019) A systematic literature review of machine learning methods applied to predictive maintenance	Early Failure Detection Cost Efficiency Increased Equipment Lifespan Data-Driven Insights Scalability and Flexibility	Data Quality and Availability Model Complexity Integration with Existing Systems High Initial Costs Interpretability Limiting Understanding and Trust
(Coban et al., 2018) Predictive Maintenance in Healthcare Services with Big Data Technologies	Improved Equipment Reliability Cost Reduction Data-Driven Decision-Making Real-Time Monitoring Increased Patient Safety	Data Privacy and Security Data Quality and Integration High Implementation Costs Complexity of Big Data Analytics Regulatory and Compliance Issues
(Dimitrov, 2016) Medical internet of things and big data in healthcare	Enhanced Patient Monitoring Improved Decision-Making Cost Reduction Patient Empowerment Data-Driven Public Health	Data Privacy and Security Interoperability Issues Regulatory Barriers Data Overload High Costs and Infrastructure Requirements
(Guissi et al., 2024) IoT DO PREDYKCYJNEJ KONSERWACJI KRYTYCZNEGO SPRZĘTU MEDYCZNEGO W STRUKTURZE SZPITALA	Increased Equipment Reliability Cost Savings Real-Time Monitoring and Alerts Extended Equipment Lifespan Enhanced Patient Safety	Data Privacy and Security Integration with Existing Hospital Systems High Implementation Costs Technical Expertise Dependence on Network Infrastructure
(Manchadi, Ben-Bouazza, & Jioudi, 2023) Predictive Maintenance in Healthcare System: A Survey	Improved Equipment Availability Cost Savings Prolonged Equipment Lifespan Enhanced Patient Care Data-Driven Decisions	Data Complexity and Quality Integration with Existing Systems Cybersecurity and Data Privacy High Initial Investment Need for Skilled Personnel
(Manchadi et al., 2024) An Internet of Things-based Predictive Maintenance Architecture for Intensive Care Unit Ventilators	Increased Ventilator Reliability Cost-Effective Maintenance Real-Time Monitoring Improved Patient Safety Data-Driven Insights	Data Security and Privacy Integration with Legacy Systems Initial Costs and Infrastructure Connectivity and Network Reliability Technical Expertise
(Noordin et al., 2023) Failure Prediction for Hemodialysis Units Using Machine Learning and Hall Effect Sensors	Improved Equipment Reliability Increased Patient Safety Cost Savings Data-Driven Insights Prolonged Device Lifespan	Data Complexity and Quality Integration with Existing Systems High Initial Costs Technical Expertise Required Reliance on Network Connectivity
(Rahman et al., 2023) Predicting medical device failure: a promise to reduce healthcare facilities cost through smart healthcare management	Cost Reduction Enhanced Patient Safety Operational Efficiency Prolonged Device Lifespan Improved Service Quality	Data Availability and Quality Integration with Existing Systems Initial Investment Costs Cybersecurity Risks Training and Expertise

(Sabah, Moussa, & Shamayleh, 2022) Predictive Maintenance Application in Healthcare	Enhanced Equipment Uptime Cost Reduction Proactive Approach Improved Patient Care Data Utilization	High Implementation Costs Data Quality and Integration Complexity of Machine Learning Models Data Privacy and Security Resistance to Change
(Shamayleh, Awad, & Farhat, 2020) IoT Based Predictive Maintenance Management of Medical Equipment	Reduced Equipment Downtime Cost Efficiency Real-Time Monitoring Improved Patient Care	Data Security and Privacy High Initial Investment Complex Integration Technical Skills Gap
	Enhanced Data Analytics	Network Reliability
(Sipos et al., 2014) Log-based predictive maintenance	Data-Driven Maintenance Reduced Maintenance Costs Minimal Disruptions Scalability over Multiple Devices Automation Potential	Data Complexity and Volume False Positives/Negatives Integration with Legacy Systems Technical Expertise Privacy and Security Concerns
(Tripathi et al., 2023) Extrapolative Preservation Management of Medical Equipment through IoT	Proactive Equipment Management Extended Equipment Lifespan Cost Efficiency Enhanced Patient Safety Data-Driven Decision Making	High Initial Investment Data Security and Privacy Integration with Existing Systems Network Reliability Need for Skilled Personnel
(Zamzam, Hasikin, & Wahab, 2023) Integrated failure analysis using machine learning predictive system for smart management of medical equipment maintenance	Accurate Failure Prediction Cost Efficiency Improved Equipment Lifespan Enhanced Patient Safety Smart Resource Allocation	Data Quality and Availability Integration with Legacy Systems High Initial Costs Data Security and Privacy Skilled Workforce Requirement

Discussion

Embracing digital transformation and implementing digital solutions can improve service efficiencies and quality of care, whilst addressing the existing barriers and designing them around the needs of both staff and patients, (The King's Fund, 2018). New technologies can respond to increasing lack of funding and resources in the health and social care sectors and align with value-based health and care principles. Although this discussion is not exclusive to health and social care, it forms the basis to discuss the value similar approaches in other industries can add to these sectors.

Predictive Maintenance and Data Types

Maintenance is the core business of service-based business, whether in the form of customers or being applied to machinery in all guises. Types of maintenance regimes deployed by service organisations whether large scale or smaller departments are key to equipment efficiency and reliability. All of the papers reviewed have identified the need to drive toward proactive maintenance and predicting the failure of devices. Since the development of machinery during the industrial revolution, maintenance has been needed. Essentially being reactive to breakdowns and fixing them which remained the standard way for decades. Realisation that planning set scheduled maintenance episodes and replacing parts that were likely to fail from experience due to high wear or low quality came in. This planned preventative maintenance (PPM) is the mainstay of the vast majority of service departments to this day. Many have also moved to a proactive regime of eliminating defects to machine parts as part of engineering quality management systems they deploy. However, few have seriously engaged with the idea of going that step further and using today's rapid advancing technology to help them predict maintenance events and try an eliminate breakdowns. Predictive maintenance (PdM) could truly be revolutionary as the literature reviewed suggests.

PdM can be achieved through differing methods of data analysis. In Zamzam et al. (2023) existing historical maintenance data from a range of medical equipment was studied to establish three failure modes, First Failure Event (FFE), Failure to Year Ratio (FYR) and Failure Frequency. This is reliant on Mean Time Before Failure (MTBF) and how many hours a device runs per year and before failures. Efficient use of machine learning techniques was applied to the datasets to predict these failure metrics. Algorithms including decision trees, random forests and neural networks were used and integrated to forecast potential failures. A slightly differing method although still making use of historical data, is looking at system event log data as seen in (Sipos et al., 2014). The study aims to enhance the ability to forecast equipment failure across

a range of industries by analysing data logs and identifying patterns that precede failures using machine learning to interpret this. By extracting patterns, it distinguishes between what is normal routine operational running and abnormal performance for systems and components. These learned patterns applied to daily log datasets can predict component failure. Applying this technique to two real world medical device datasets has demonstrated its effectiveness and resulted in this system being used by a major medical device provider for scanners.

Amran et al. (2023) introduces sensors to existing systems to continuously measure the live status of water treatment systems used in haemodialysis units. The importance of these types of facilities working continuously to provide safe water for haemodialysis machines and therefore safe and efficient treatment cannot be overstated. Sensors incorporated checked pressures, flow rates, conductivity and temperatures with the data being monitored by machine learning (ML) with effective dashboard type displays available to engineering staff. Likewise, Noordin et al. (2023), also installed Hall Effect sensors into haemodialysis machines to determine the magnetic field strength from a water pump motor to determine a pumps degradation and failure. Carvalho et al. (2019) suggests different data methods that AI and ML within it can make use for PdM purposes. These are historical data, integrity factors (wear/tear, visual aspects, and coloration difference from original) as well as statistical inference methods and engineering approaches. Can a mixture of methods be applied if not all? How complex do you want to go?

Artificial Intelligence and Machine Learning

Carvalho et al. (2019) also points out relevant studies through its systematic literature review of ML methods. PdM aims to deal with breakdowns before they occur, but maintenance approaches which are able to monitor conditions for diagnostic and analytical purposes are grouped into three categories according to (Jardine et al., 2006). These being statistical, AI and model-based approaches. Statistical is highly reliant on mathematical modelling expertise and model-based reliant on explicit machine knowledge. A study comparing several AI approaches compared to statistical approaches (also known as life usage model) to equipment breakdown, found AI significantly outperformed the statistical approach, (Baptista et al., 2018).

Rahman et al. (2023) research is based on a high number of medical devices (approx. 8300) of varying types and frequency of failure. It compares ML algorithms with deep learning optimizers to establish accuracy scores. It concludes ML is initially between 4-8% more accurate than deep learning techniques but after identification of key information the ML can rise to 5-10% better accuracy across the modelling to up to 90 % prediction of failures. However, ML requires a significant more training time compared to deep learning by the operator, although could also become more accurate when unstructured datasets are added (maintenance notes). Deep learning is an advanced subset of ML and can become automated using vast volumes of data and complex algorithms in development of a PdM model.

Big data is mentioned in the fact that vast amounts of data can be downloaded from connected devices at periodic intervals or continuously live. Coban et al. (2018), focuses on the data capture, processing and analysis of data. Types of data are mentioned like structured, semi-structured and unstructured and these could differ dependent on medical device manufacturers.

Conclusions and Key Findings

Benefits

Each research paper associated potentially valuable benefits with using some form of AI to interpret data for PdM purposes. Those mentioned repeatedly are:

- Enhanced Patient Safety – device reliability reflecting less disruption to treatment and monitoring.
- Cost Efficiency – long term savings potential with reduced resource and maintenance costs.
- Device Availability – increased uptime and reliability, better availability and smart allocation.
- Data Driven Decision Making – data dictates maintenance or patient treatment decisions.
- Device Lifespan – potential for devices to last longer due to being better looked after.

Challenges

As well as benefits, challenges or considerations are never too far away when trying to push toward new innovations and transforming the way you do things. The challenges are:

- Data Quality and Availability – data sets have to be available and of quality data.
- Integration with Legacy Systems – difficulty in alignment with old tech legacy systems.
- High Initial Costs – infrastructure, software, training costs will be high initially.
- Data Security and Privacy – legislative, DPIA, cybersecurity hurdles and awareness needed.
- Skilled Workforce – transparency with workforce, skills training, possible outsourcing.

Final Thoughts

The literature review appropriately managed to answer the research question in that it convinced the researcher that an opportunity can be found in networking haemodialysis machines. One paper, Noordin et al. (2023) was the only one which applied the principle to haemodialysis machines and another to the water treatment reverse osmosis plants closely associated to haemodialysis machines, (Amran et al., 2023). However, dialysis machines were mentioned in a couple when referring to how appropriate this technology would be to critical treatments and high-risk machines. The fact is though, the scalability of this can be appropriate across the whole range of connected medical, devices as the broader range of papers makes use of. One paper that truly mentions the opportunity by adding sensors albeit not feasible in the UK due to strict rules governing modification of medical devices (MHRA, 2021), indicates a gap in the literature specific to dialysis machines making use of their systems data. Pre-preparation of the data into structured high-quality formats so that the machine learning models can make use of them is of key importance. A quote that has been attributed to Deming, 'In God we trust. All others must bring data', suggests the importance of data analysis and measurement to gain insight and the benefits from it. Quite apt from one of the fathers of quality improvement and management of our age.

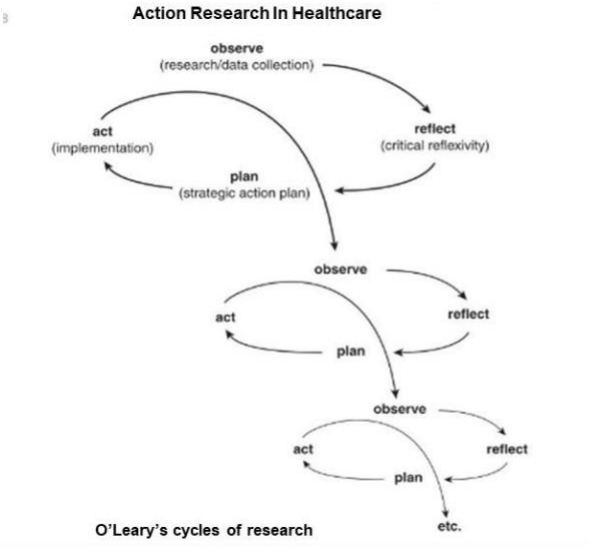
Research Methodology

This section will present and justify the selected research methodology, explaining how it was designed to effectively address the research question.

Research Design

Figure 3.1 shows the researchers chosen research methodology approach to the research question. Action research, the selected methodology, was chosen at the group presentation phase prior to this research paper, and after careful evaluation of best suited methodologies for this research question.

Action research allows learning and improving by doing and reflecting, in a plan, act, observe and reflect cycle. This cycle of action and reflection turns practical experience into knowledge that informs future practice. Taken from Koshy (2010), O'Leary's cycles of research clearly show the cascading nature of the improvement cycles ideal for use in healthcare environments. It is an empowering approach that draws on the researcher's current knowledge and practical skills, as well as being flexible and collaborative.



Koshy (2010)

Figure 3.1. O'Leary's Cycles of Research.

Literature Review

As seen in Chapter 2 a literature review was conducted to establish what has already been written on predictive maintenance with networked haemodialysis machines? The search criteria and results are found in the previous chapter stated.

Action Research & Interviews

The researcher has chosen to use action research methodology and interview choice approach to gain further opinion and insight to whether the research question is feasible and the positives in doing so. What challenges are perceived and would it be beneficial to the organization, patients and service. This qualitative method would also make use of questionnaire or survey if time permitted post interview information gathering.

Participant Selection

Selection of participants was based on presumed fundamental knowledge of the technologies involved in the attempted answering of the research question. This resulted initially the researcher's own service colleagues within RTS due to their explicit knowledge of renal. A wider opinion was also sort with the inclusion of Medical Equipment Management Services colleagues in the RTS parent department. This department is medical engineering on other medical devices within Swansea Bay University Health Board (SBUHB). Also, aware a more rounded approach should include external participants outside of SBUHB and even Wales, the inclusion of other renal technical service managers within the United Kingdom (UK) and also members of the national profession group Association of Renal Technologists (ART) should take place and were included.

In all a relatively small cohort of ten participants took part in the interviews for this study across the range mentioned internally and externally but also across a good range of job positions, both junior and senior to the researcher. All participants work within an NHS organisation.

Interviews

Interviews were conducted using a semi-structured technique with sixteen set questions and a final question which was asking if they had anything else to say on the subject. This allowed for specific questions on the research subject covering all the areas the researcher wanted to look at but also gave the interviewee the opportunity to give opinions on anything not covered or of interest. This structure suits this study and was very useful.

The researcher interviewed each participant on a 1:1 basis and each interview lasted no more than an hour. Microsoft Teams was the chosen platform due to the ease of recording the conversation with the transcript automatically being produced.

Data Analysis

Analysis of the interview data is discussed in the next chapter.

Ethics

Ethics approval was sort and approved by Swansea University's Ethics Committee for Human and Social Sciences in July 2024 reference 10923. Prior to this it was determined NHS Research Ethics Committee approval was not necessary for this study.

Each participant was sent a participant information sheet and consent form to sign prior to interview. Taking part was on a voluntary basis and that they could withdraw approval at any time. Data would be anonymised and records stored confidentially.

Discussion

General Feasibility

The first three questions put to interviewees addressed the general feasibility to whether networking haemodialysis machines could provide predictive maintenance opportunities to RTS. It asked about infrastructure concerns, challenges that may arise with integrating these technologies and the impact to existing operational workflow of RTS staff.

From the discussion it was accepted that RTS and SBUHB are currently in a good place with regards infrastructure and IT support. The Morriston Hospital two on-site renal chronic units are either recently built or refurbished units and have appropriate network points in all dialysis stations. Recent work establishing whether these points are connected to an IT switch/hub has also proved positive. MEMS has a dedicated medical device IT technician also available to RTS, being part of the same overall department. As well as this renal also has an IT developer employed for clinical software modifications. Wi-Fi was mentioned in the context that other medical devices within the SBUHB and under the remit of MEMS are connected in this way and download information to appropriate systems but not for maintenance purposes. In fact, new volumetric pumps are connected in this way but with two-way communication with pump parameters able to be uploaded and changed by staff. This backs the feeling by the cohort interviewed that as connectivity is increasing rapidly so cannot be much of a problem to address with dialysis machines.

However, what has come to light that was largely overlooked in the literature review papers was buy in from the manufacturer of the dialysis machines you would like to extract the data from. Consensus being without this, then the feasibility would not be possible. In fact, one interviewee has seen a trend that the manufacturers have now seen a revenue stream in allowing organisations to download data from their products albeit patient data. This is both encouraging and concerning, encouraging that the possibility should be more than possible but how much will it cost? As this is a novel concept for RTS, the current skill sets within the department are of concern and whether training would address these issues or outsourcing required? Would extending any predictive model to several haemodialysis machine models especially from different manufacturers prove too challenging? Questions coming out of the questions is encouraging for the debate and for further study.

The operational workflow to staff would be disrupted as it would be a totally different type of working regime. Work instructions for processes and procedures would need to be altered and added to the quality management system, and a PDCA cycle for this new technology added to give confidence it does the job it was intended to do and the benefits are perceived. The change from a planned maintenance where services are in predetermined dates allows staff to have routine and set behaviours, this would change with predictive maintenance where staff work life is more unpredictable!

Benefits

The next set of questions addressed the perceived benefits in employing a predictive model to dialysis machines. All agreed that if a successful accurate predictive model could be achieved (which is assumed), then indeed the frequency of breakdowns would reduce. This would reduce the unplanned downtime of the machine and allow for greater availability of haemodialysis machines available for use to renal staff. Also allowing the proactive pull out of a machine at an opportune point to sort an issue or initiate a repair flagged by the PdM system. A seamless continuity of service!

This proactive approach allows for the appropriate replacement of parts in a timely manner before unnecessary strain is placed on other components of the machine and ensuring they are not overworked and life reduced. Effectively looking after a device better over its life, may actually increase the lifespan of a device. This could potentially reduce equipment spending costs across NHS on a large scale, especially if applied to a wide range of medical devices. A point was made that manufacturer recommendations are followed when changing specific parts unless an organisation does a risk assessment against doing so. However, the manufacturer has to submit this information to gain the CE marking of the device and market approval and is usually worst-case scenario, so these intervals could well be stretched out in reality especially if a device is well looked after.

Positive outcomes for patients are of the biggest benefit. Increased machine uptime and increased reliability should prevent failure of haemodialysis machines during a treatment on a patient. A machine would fail safe in a scenario like this, however quite often a patient does lose an extracorporeal blood circuit, effectively losing 200-300ml of blood and compromising their blood counts, this is significant for renal patients. Preventing this happening improves a patient's outcome and confidence in future treatments. If extended to the patients in the community doing home haemodialysis, RTS can pre-empt call outs and rectify problems before they happen. This would save significant amounts of impromptu treatment sessions in-centre having to be arranged for the community patients having to come in.

Cost benefits should be the most obvious outcome. As well as the lifespan of equipment extended, overall maintenance costs should come down due the perceived reduction in unnecessary stress and strain on

otherwise non-failing parts (the failing part putting strain on them). The maintenance costs accounting for parts, time and resource savings, with most planned maintenance eventually falling away. Also costs associated with missed or interrupted treatments and additional treatments sessions arranged for community patients. Medical devices cost a lot of money to buy and maintain, return on investment is crucial moving forward and also to any PdM model brought in. The data driven decisions that can be gained from this model should go some way to ensuring this.

An area of cost that should also be mentioned is potential savings in future contracts or procurement deals. A lot of medical devices are replaced now on deals linked to consumables, which effectively provide the devices free but increase the price of the consumables. In some of these deals' parts can be included for 'free' which usually means that that has also increased the price of consumables within the deal. This could be considerable over the term of the contract (7+1+1+1 years typically). Using PdM prior to renewing or changing a contract could give a better idea of effective parts spend over a contract period and should be far less in value if a department had to buy the parts in than have them 'included as free' in the contract with the loading on the consumable price.

A point mentioned by several participants was the sustainability positives, especially if the life of some parts or devices are extended. Sustainability along with digital transformation are extremely current and needed for a positive future.

Downsides and risks

A fear of staff becoming over reliant on the predictive model and losing their own fault-finding skills especially as time moves on. If there is a failure or interruption to the PdM does this then pose a risk with increased unplanned breakdowns especially if you have already moved away from planned maintenance events? Also, total reliance on the data is a concern, however these assurances should be in place when giving the AI the dataset guidance and parameters and checking on regular audits to the system. Data quality and accuracy is key to the success of this type of idea. Early resources within the RTS team in determining the right data to access and the way AI should interpret it may be significant.

Underlying concerns relating to data privacy are declared but in the context of patient/treatment data. This project has no intention or see's any need for the capture of patient data for the purposes of PdM. However, data protection laws and regulations do need to be assessed prior to any implementation and not blindly dismissed as not applicable. Cybersecurity and general IT security again was a concern for some but not to others. Regulations need to be followed again but initial scoping is for a one-way data out networked system not pushing data to the machine for upload by it. Devious individuals should not be interested in system data which would have low value to them in acquiring or disrupting it in some way. NHS IT departments have vastly improved their cybersecurity however have still been susceptible to highly disruptive attacks like the recent NHS England Synnovis attack in June 2024. As well as connectivity concerns, technical failures across the range of connected devices would interrupt the predictive model. Although this should not concern too much, it could present a problem if prolonged especially if RTS has adjusted its resources in line with a smooth running PdM system.

Mixed concerns over the RTS workforce workload increasing, particularly in monitoring and managing the data. This is dependent on how they saw the system working. Initially the workload would be placed on them or certain individuals to set the data parameters for the system, however you would want the system to be automated with regular assurance checks after that. The PdM model would push its output to a dashboard system and even texts or email to make life easier for staff. The idea is to work smarter not harder and add value to the process not waste.

One participant raised the issue of integration with other NHS systems, which is a theme that came out of the literature review as well as the legislation documents listed in Table 1.2. This may be down to the participants being focused internally on the novel approach to maintenance or not being able to see how something like PdM can be linked to existing systems. However, this should be linked to any existing equipment/asset and maintenance databases as a minimum, which all MEMS/RTS departments have.

Considerations

Financial considerations are always the first that spring to mind. A consensus that the initial investment of such an undertaking would be fairly significant and a possible challenge to Health Boards at this time, certainly a robust business case would be needed to persuade organisations to back this innovation.

Maintenance costs should significantly reduce especially taken over the lifetime of the equipment. Alongside this, considerable workforce resource cost in terms of time and potential manpower could be saved. Extending the lifespan of equipment mentioned early also accumulates the long-term savings available. This is not mentioning the sustainability gains with reduction in parts shipped out. Caution needs to be had though here, a good point made, that in general finance within Health Boards especially during difficult times take savings away from a budget holder and that does not necessarily add up especially if you've introduced a more flexible service where from month-to-month maintenance for parts differ. Once the money is taken it almost always never comes back.

Consideration of the relationship between patient, clinical and technical staff is discussed. All agreeing it should certainly improve for the better as long as there is transparency of the project from the start, all should see the benefits quickly. In fact, all stakeholders should be engaged at the appropriate time. The proactive nature of pulling Pdm machines out for remedial works outside of it being available for treatment, should prevent the unplanned breakdowns especially the ones during a treatment session. As said early this prevention of breakdown during treatment prevents adverse incidents from happening assuring a better long-term outcome for patients. Patient's confidence in the machines that they are getting hooked up to increases along with the nurse looking after them who also takes the stress if a machine fails on a patient. They are the ones returning blood circuits if possible and swapping machines out to put a patient back on treatment. The stress can be high and can affect the relationship with technical staff on times. This should dramatically improve under PdM. Interesting one point of view also pointed out that they could also worsen if the PdM was not accurate enough.

A key consideration mentioned was to not let the PdM be the overriding factor when replacing machines at the end of life. Always keep focus on the best machine available for your organisations needs even if it doesn't necessarily offer or want to cooperate over a PdM model. The manufacturer that offers the PdM may not necessarily be the one that is best for patients, staff or the purse strings and may charge a premium for that make do product. Costs were mentioned earlier but it's the value for money you're getting from your system that also needs to be assessed, is it doing what it was set out to do?

A real mix of opinion came with regards establishing a smaller pilot scheme first to prove the concept or go large from the off with a full implementation. Cautious approach taking longer with limited data available, or all out approach with big data available and faster to perfect. The key is in the datasets and parameters assigned to the ML, if these are accurate and of quality then doing them on a larger scale from the start should prove beneficial. If those assurances cannot be guaranteed and there are doubts on what data to include for accuracy, then a smaller pilot should be the approach.

Staff training for effective utilisation of a PdM model needs to be considered. It was accepted that RTS staff would require further network/IT training to compliment the project, but ML training could be too complex depending on the model adopted. Outsourcing the ML implementation and maintaining this system was the thoughts of most. Interestingly, this wasn't the view of one, who has experience of staff in one workplace he has been in, who would be able to do this and with training could not see a problem for RTS.

Further Insights

The potential for PdM to drive technical to clinical training events in prevention of some alarm's conditions occurring on a haemodialysis machine. Alarms are the bane of a patient's life on treatment and if these can be reduced by a better understanding of why they have occurred, is a positive for all. As an offshoot of PdM, it may also make technical staff aware of certain reoccurring alarms in which it becomes obvious to the technical staff why they are occurring. Set patterns of behaviour can be highlighted and identify practices that attribute to higher alarm frequency. This insight was through a personal experience of a participant on other medical device data extractions being used to better training protocols.

Another hinted that the industry has gone backward overtime and maybe it's not in the manufacturer's interest as they want to sell us parts at an inflated premium for medical devices. A manufacturer of dialysis machines in the 1990's had a technical feature that you could connect up to the device that could monitor all facets of the hydraulic circuit. Pressures, fluid levels, flows, conductivity, temperatures, that helped diagnose a fault in a machine. This sort of thing is still available on machines but has not progressed any further over time, why would a manufacturer not want to predict a failure of a part and therefore approximate lifespan of part? It is suspected they actually do have PdM software but only for internal use.

Conclusions

Purpose

The intention of this chapter is to pull together the key findings covered in the report.

Findings

Predictive maintenance has emerged and been part of various industries strategy to pre-emptively address equipment failures and optimise operational equipment efficiency. The healthcare sector is increasingly seeing medical devices become more connected to achieve better outcomes for patients. Machine learning has also been adopted and integrated with medical devices for prediction purposes and with very high accuracy. The literature review has seen this deployed in several other countries for the purpose of predictive maintenance in medical devices. This offers a proactive approach to maintenance by continuous monitoring of devices predicting failures before they occur.

This presents a great opportunity to enhance medical device reliability and patient safety as key drivers. Whilst there are challenges that remain, technology also advances at pace and drives continuous improvements to overcome the challenges.

Expert knowledge interviews are behind the promising potential but are also wary of the need to take the workforce in the same direction, through transparency and training. Manufacturers are also key and collaboration with this key stakeholder is of upmost importance, without losing focus on what's best for the organisation, patient and service.

Cost savings are suggested without losing sight of how important data and cybersecurity regulations and protocols are. Data quality is a key driver in making any potential PdM model a success and resources need to be used wisely during the initial setup phase of any further project.

The positivity toward this initiative is testament to NHS staff that they are behind digital change as long as they can see it is for a better future and improves outcomes for all. These staff are the crucial element to success.

Recommendations

The key recommendations related to this innovative study which would transform current approaches and add significant value to the organisation are as follows:

- Initial investment to progress the project.
- Collaborate with manufacturers to achieve extraction of system and subsystem data.
- Identify which datasets are important to download and the parameters within them.
- Understand which ML algorithms or modes would be useful matched to the datasets.
- Identify the ML software that matches your requirements.
- Put data quality and accuracy checks in place.
- Audit ML results on a regular basis.
- Train staff to be able to maintain the network and system needs.

Relevance to the Question

The recommendations are relevant to the researchers question and demonstrate an answering of that question in a positive way. Networking haemodialysis machines currently happens in very large numbers in dialysis clinics throughout the UK. Although this downloaded data is patient treatment specific and feeds into clinical information systems it proves that it is a relatively error free easy process to achieve. Taking it a step further and downloading machine system data should also be the same easy process in theory. Accepting it has not been done to date in the respect of machine system, calibration and error log data combined, there may be some hurdles. As indicated manufacturer collaboration is needed and accessing this data should not be problematic to them. Are they willing to share?

Predictive ML models are used in healthcare diagnostic and therapy services, so why not engineering applications as well. For them to be introduced more and more follows the digital transformation pathway

suggested by governments and organisations, however they must also show value. This value added should also be of interest to engineering leaders and the organisational hierarchy to attract investment in applying this to the huge range of medical devices within the organisation.

Future Development

After initial implementation to Morriston Hospital's renal chronic unit's machines, then a natural roll out to home patient machines should almost be seamless albeit with greater awareness of cybersecurity. Extending further to incorporate other manufacturers models of dialysis machines would be a test but achievable with adaption of datasets. And, as suggested above the concept applied to a wider range of medical devices which would probably make use of the wider ML models available.

The carbon footprint of parts is hard to conceive but this is an unperceived benefit to the organisations and the wider NHS sustainability plans.

The data can drive further maintenance decisions on lower risk items or devices that have few moving parts. Usage figures also drive inventory assessments and whether to replace as many devices as possible or buy more. Devices can be used in the right areas and not sit idle.

Patterns can be assessed and inform training teams to direct training toward certain tasks to reduce errors or alarms.

Incorporate a two-way communication to devices that allow presets to be changed or calibrations to be remotely initiated.

It is hard to understand the real potential in the future applications to this integrated technology without it currently being in place. Additionally, as mentioned earlier, technology moves at a fast pace which tends toward endless potential of these technologies in the future.

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Appendix A: Interview Questions

Research Questions

General Feasibility

1. Do you think networking haemodialysis machines for predictive maintenance is feasible within our current infrastructure? Why or why not?
2. What challenges might arise in integrating haemodialysis machines into a predictive maintenance system?
3. In your experience, how would the operational workflow of MEMS/RTS staff be impacted by implementing such a system? Benefits
4. What benefits do you see in introducing predictive maintenance for haemodialysis machines?
5. How could predictive maintenance impact patient safety and machine uptime?
6. Do you think predictive maintenance would reduce unplanned downtime or lower the frequency of breakdowns?
7. Could predictive maintenance increase the lifespan of haemodialysis machines?

Downsides & Risks

8. What potential downsides or risks do you anticipate in adopting predictive maintenance for haemodialysis machines?
9. Do you see any concerns related to data privacy, security, or technical failures in a networked system?
10. Could predictive maintenance increase the workload for MEMS/RTS staff, particularly in monitoring and managing the data?

Considerations

11. What financial considerations should be taken into account, such as initial investment, maintenance costs, or long-term savings?
12. How do you think predictive maintenance could affect the relationship between MEMS/RTS and clinical staff?
13. What key factors should be considered when deciding whether to implement predictive maintenance in our haemodialysis equipment?
14. Would you recommend piloting the system on a smaller scale before full implementation? If so, why?

Other Insights

15. Do you have any insights from previous experiences with other medical equipment that could be applicable here?
16. What training or support would MEMS/RTS staff need to effectively utilise a predictive maintenance system?
17. Is there anything else you would like to say on this subject?

Appendix B: Participant Information Sheet

PARTICIPANT INFORMATION SHEET

Research Question: Can Networked Enabled Haemodialysis Machines Provide a Predictive Maintenance Opportunity?

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully. What is the purpose of the research?

The researcher is conducting a study to explore whether networking haemodialysis machines can provide the opportunity to interpret the relevant data for predictive maintenance purposes. This would include methods of interpretation, what data to include, benefits and limitations in doing this and is it within current skill sets of the workforce. The study is part of a MSc in Advanced Health and Care Management (Innovation and Transformation). The research will include undertaking qualitative research with members who have a medical engineering background internal to Swansea Bay University Health Board and externally with members involved with national profession groups (Association of Renal Technologists). Andrew Cooper will undertake the interviews. The results will be published in support of further work in this field of research. Your participation in this study will take approximately 45 minutes.

Who is carrying out this research?

Data will be collected and analysed by Andrew Cooper, MSc student at Swansea University's School of Management. Andrew can be contacted at 2232346@swansea.ac.uk. The research has been approved by Swansea University's Research Ethics Committee. What happens if I agree to take part?

By agreeing to take part you will be asked a series of questions about predictive maintenance and whether this is something that would be useful to pursue further with Swansea University Health Board, Renal Technical Services. The approach taken will seek to gain insights into proposed benefits, challenges and the way forward for the research question.

Are there any risks associated in taking part?

The research has been approved by Swansea University's Research Ethics Committee, there are no significant risks associated with participation in this study.

Data Protection and Confidentiality

All data collected as part of this study will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulations (GDPR). All information about you will be kept strictly confidential. Your personal data will only be viewed by the researcher.

All electronic data will be stored in a password protected file/folder on a multi-password computer. Any paper records will be scanned and kept electronically within the relevant research folder and paper record shredded. Consent information will be stored separately from responses to minimize risk in a security breach.

Please note that the data collected in this study using a voice recording device will be made anonymous, following a 24-hour settling period. Thus it will not be possible to identify and remove your data later, should you withdraw from the study. Therefore, at the end of the research you decide to have your data withdrawn, please let us know before completing the interview, or within 24-hours of the interview.

Should you wish your data to be destroyed prior to anonymisation during the 24-hour settling period – please contact the researcher by email at 2232346@swansea.ac.uk What will happen to the information I provide?

An analysis of the information will form part of the report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I want to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. If you decide to participate, but later wish to withdraw from the study, then you are free to withdraw at any time, without giving a reason and without penalty.

Data protection privacy notice

The data controller for this process will be Swansea University. The University data protection officer provides oversight of university activities including the processing of personal data and can be contacted at the Vice Chancellors Office.

Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you.

The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the College of Human and Health Sciences Research Ethics Committee, Swansea University.

The legal basis that we rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will you information be held?

We will hold any personal data and special categories of data for no longer than is necessary for purposes stated above.

Automated decision making and profiling (only required if applicable) No

automated decision making, or profiling will be used for this study.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights.

Any requests or objections should be made in writing to the University Data Protection Officer:-

University Compliance Officer (FOI/DP)

Vice Chancellor's Office

Swansea University

Singleton Park

Swansea

SA2 8PP

Email: dataprotection@swansea.ac.uk

How to make a complaint

If you are unhappy with the way in which your personal data has been processed you may in the first instance contact the University Data Protection Officer using the contact details above.

If you remain dissatisfied then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:-

Information Commissioner's Office

Wycliffe House

Water Lane

Wilmslow

Cheshire

SK9 5AF www.ico.org.uk

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Andrew Cooper
School of Management
Swansea University
2232346@swansea.ac.uk
Daniel Rees
School of Management
Swansea University
Daniel.Rees@swansea.ac.uk

Appendix C: Consent Form

IRAS Reference Number:

Participant Identification Number for this project :

CONSENT FORM

Can Networked Enabled Haemodialysis Machines provide a Predictive Maintenance Opportunity?:

Relevant to Interview Participants:

Name of Researcher: Andrew Cooper, MSc Student, Swansea University, 2232346@swansea.ac.uk

	Please INITIAL each statement if it applies to you
1. I confirm that I have read the information sheet dated 20/08/2024 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2. I understand that my participation in this study is voluntary.	
3. I agree to take part in an interview to discuss my views on **Predictive Maintenance**. I understand that the interview will be audio recorded and notes will be taken. I understand that the interview will be transcribed and anonymised to provide an accurate record of the conversation.	
4. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified in any reports or teaching material that result from the research	
5. I understand that, under the General Data Protection Regulation, I can at any time ask for access to the information I provide, and I can also request the destruction of that information if I wish.	
6. I have received enough information about the study.	
7. I understand that I am free to withdraw from the study at any time, without having to give a reason for withdrawing and without affecting my medical care and legal rights.	
8. I agree to take part in the above study.	

Thank you for taking part in this study, your help is very much appreciated.

Name of Participant Date Signature

Name of Researcher Date Signature

This study is being conducted by Swansea University, School of Management.

When complete: Original copy for participant, one copy to be retained by researcher.

Appendix D: Example of Participant Transcript

The people who have the expertise in that field.

Whether it's the IT department within a trust or a health board, or whether it's IT specialists working within clinical engineering renal technology.

So I would, I would expect that all the cheques are done prior to any implementation.



Andrew Cooper (Swansea Bay UHB - Renal Technical Services) 6:15

And you're inside. You're inside it, right with whether the manufacturer gets on board or not, whether they you know that that's obviously the the deal breaker, isn't it?

6:26

MR

Maybe it's one of these things that if one of them steals a March and says this is now on our machines, this is what you can do. I guess the others are likely to follow suit, particularly if it becomes a factor in evaluation when making a purchase.

Andrew Cooper (Swansea Bay UHB - Renal Technical Services) 6:42 Yeah.



Yeah. OK.

In your experience, how would the operational workflow of MEM staff be impacted by implementing such a system?

6:54

That's a very, very good question.

MR

I would guess the current model where you serve is based on a schedule.

Allows you to plan your workflows better because you know how many machines in any given month you'll be expected to to service.

Andrew Cooper (Swansea Bay UHB - Renal Technical Services) 7:11

Hmm.



7:17

Having a predictive, if I'm understanding how the predictive could work is you wouldn't know whether that machine might flag for a service at 12/13/14, maybe 18 months. So we could make the scheduling more challenging.

MR

Appendix E: Ethics Approval

Welcome Research Integrity IMPORTANT before proceeding

Title
MR
First Name
Andy
Surname COOPER
Email
2232346@swansea.ac.uk
Student ID 2232346
Main Applicant

1.1 Main Applicant

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1.1.2. Faculty / Service
Humanities and Social Sciences
1.1.3b Department/Subject Area
Business
1.1.4 Are you completing this application as a?
Post Graduate Taught Masters Student (e.g. MSc,MA)
Title
DR
First Name
Daniel
Surname Rees
Email
D.J.Rees@Swansea.ac.uk Supervisor

If your supervisor is not available in the search box then please get in touch with your supervisor and ask them to log into their account on the ethics system first before contacting the ethics admin team. If this does not work then contact your ethics admin for support.

Note: Searching for the supervisor using their email address may provide better results to find your supervisor.

2.1 Project Information

Page 2 of 8

2.1.1 Project Title Can network-enabled dialysis machines provide predictive maintenance opportunities?

Please give a full description of your project in **no more than** 300 words.
The project description must give a clear indication of the rationale, research question(s) or project aims, and methodology, which should be clear to either a subject specialist or someone outside of your subject area.

NHS services are increasingly under pressure to deliver better outcomes and value for patients and stakeholders. Applying Prudent and Value-Based Healthcare principles to help innovations in our medical engineering field is paramount in achieving this aim. The area for this research project is, can network-enabled dialysis machines provide reliable data which can be interpreted into predictive maintenance opportunities? Increasingly the present and certainly future medical devices will be interconnected, with the drive toward monitoring patients in their own homes and the virtual ward. Focus is on capturing patient data and interpreting it for better outcomes but can we as a medical engineering department also benefit from these data transfers?
Downloading the data of device components and sub-systems like hours run, temperature, conductivity, voltages, resistances, pressures, etc. This along with error logs (error history) can provide useful information to determine imminent component failure. This is with a view to:

- Improve machine reliability and downtime
- Achieve less treatment interruptions/terminations
- Reduce servicing/repair times overall with proactive approach rather than reactive
- Identify problematic components that can then be modified via feedback to supplier
- Capture a device specific database of predictive component failure/replacement period
- Possibly spark a review of future planned preventative maintenance (PPM) frequency
- Improve sustainability of medical devices through less unnecessary interventions
- Improve the understanding of IT security on medical devices

You can upload a Project Brief (Note: This is optional) Any documents uploaded should be in Word or pdf format.
Documents
Type Document Name File Name
Version
Date Version Size
Project

Brief
First Stage Ethics Review RIHCC MSc AHCM
Project 24.02.2023 V2_2232346
First Stage Ethics Review RIHCC MSc AHCM Project
24.02.2023 V2_2232346.docx
05/07/2024 1
83.9
KB

2.1.1.1 **Project Description**

What is the expected start date for your project? 05/07/2024

What is the expected end date for your project?

30/09/2024 Page

3 of 8

2.1.1.2 Does your research involve Pedagogic, Covid, or Artificial Intelligence research? Tick the relevant boxes. If not applicable, please select "N/A".

Pedagogic Research

Covid Research

Artificial Intelligence N/A

2.1.2 Is another organisation/institution leading the research and undertaking the ethical review. Yes

No

2.1.3 Does the study make use of **and / or** generate data?

Yes No

2.1.4 Does the study **only** make use of data which is already in the public domain? (i.e. has it been published? Is it available in a data

repository that is publicly available?)

Yes No

2.1.4.1 Does the study use secondary data not available in the public domain?

Yes No

2.1.5 Does the research involve sensitive objects, artifacts, or topics?

Yes

No

2.1.6 Does your research involve **security-sensitive** data or materials?

Yes

No

2.1.7 Environmental Risks

Could your study pose a detrimental impact upon the physical environment, above and beyond that which might be expected to occur during the course of day-to-day life?

Yes No

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2.1.8 Does your study involve a living non-human vertebrate, cephalopod, or decapod crustacean?

Yes No

2.1.9 Does your study involve humans as the focus of research or make use of data collected from human subjects?

Yes No

2.1.10 Are there any conflicts of interest to be declared relevant to this project? Yes

No

2.2.1 Tick all that apply **or**

the box " none of the above."

Vulnerable people or participants unable to give informed consent.

Vulnerable populations could include children and young people under the age of 16, those with a learning disability, cognitive impairment (outside of normal age-related decline), those who lack the capacity to give informed consent, refugees and asylum seekers, victimised groups, those who have significantly limited capacity to understand the language in which the consent information is provided.

The official definition from the NHS of vulnerable adult is “unable to take of themselves or protect themselves from exploitation”

Please note if you are dealing with people with learning disabilities, in particular people who lack capacity, falling under the Mental Capacity Act 2005, they

must be reviewed by the NHS ethics review. Please do not continue as you need to complete an NHS ethics review.

If you are collecting personal data the following link provides further guidance regarding relying on consent as a lawful basis to process personal data under the UK GDPR.

Deception, misrepresentation, or covert research.

Will your research involve the use of deception, the withholding of any information about the aims of the research or anything other than total transparency over your role as a researcher.

Deception, misrepresentation, and/or covert research may not pose significant ethical concerns if **all** the following apply:

The true nature of the research is disclosed to participants immediately after data collection.

The researcher is confident that no participant would have declined to take part had they known the true nature of the research at the outset (i.e. deception, misrepresentation and/or covert research must never be used as means to avoid securing informed consent).

The retrospective consent of research participants is secured. All participants will have the right to withdraw from the study without sanction. All participants will have the right to withdraw from the study without sanction.

Any risk of harm, damage, or distress to anyone.
This would include non-trivial harm, distress, or damage.
Including harm to the researchers, the research participants and other people including groups, communities, and institutions.

2.2 Does the proposed research involve any of the following?

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Consider the natural or built environment.
Consider the reputations of people or organisations.

Collection of personal or sensitive personal data as defined by GDPR.
The data controller is Swansea University. The lawful basis under which we will process your personal data for research is called 'task in the public interest' (Article 6 of
the GDPR). In the cases of 'special category data', in addition to Article 6, the lawful basis is for 'archiving purposes, scientific or historical research purposes or statistical purposes in the public interest' (Article 9 of the GDPR).
The University Data Protection Officer oversees university activities involving personal data processing and may be contacted using dataprotection@swansea.ac.uk.
Note: **Personal and special categories of personal data**
Personal data is information relating to an "identified or identifiable natural person" Examples include:
Name and surname.
Email address.
Internet Protocol (IP) address.
Photograph.
Location data.
Sensitive personal data includes:
Racial or ethnic origin.
Political opinions.
Religious beliefs or similar beliefs.
Trade Union membership.
Genetic data.
Biometric data (where this is used for identification purposes).
Physical or mental health condition.
Health
Sexual life or sexual orientation.
Commission or alleged commission of any offence.
Any proceedings for any offence committed or alleged to have been committed, the disposal of such proceedings or the sentence of any court in such proceedings.
Where appropriate, it is strongly recommended that data is anonymised at the time of collection so that researchers neither hold nor process (sensitive) personal data.
Student researchers should only possess and process (sensitive) personal data in exceptional circumstances.
For information relating to the University's obligations under the UK GDPR, and specific information regarding Swansea University processes and policies in relation to data protection legislation, please follow the link provided here.

Data collection from participants without prior, recorded, informed consent
Most human research would require informed consent.
Tick this box if your research is only using **secondary data not available in the public domain.**
Selecting this option is confirming your research does not require informed consent.

The sharing of data or confidential information beyond the initial consent given.
The information sheet should provide details about any plans for sharing the data

A lack of anonymity for research participants.(i.e. it will identify participants)
If you are meeting participants in person or remotely and can know their identity, anonymity cannot be ensured. Not ensuring the anonymity of research participants and/or the confidentiality of their data is acceptable if it is done with the informed and expressed consent of the participants.

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Interventions and therapies, including clinical and non-clinical trials. This would include administering drugs, placebos, or other substances or invasive or harmful procedures.

Study or exposure of illegal activity, or research that is likely to discover illegal activity.

Financial inducements offered to participants. Recovery of expenses is not classed as a financial inducement.

Collection or purchase of human samples including bodily fluids e.g., blood, saliva
The collection or purchase of human samples may fall under the terms of the Human Tissue Act 2004.
Do you need to do an NHS Review? Have you checked to see if you need to undertake an NHS review **here**?
If you require help the HTA contacts can be found **here**.
Researchers working on human tissue are expected to follow best practices on handling, transport, storage, and consent. The compliance and codes of practice and standards for research can be found here. The HTA defines human tissue as "material that has come from a human body and consists of or includes human cells" and is frequently referred to in the Act as "relevant material." Refer HTA site for more information on **relevant materials**. Relevant material must be stored on licensed premises. Only 3 areas on the Singleton campus are licensed to store materials currently (ILS1, CNH ILS 2, and Grove building). The Bay Campus is not a licensed premise at present for the storage of materials.
You can complete an NHS ethics review which will cover you for the storage of HTA samples under HTA rules even if one is technically not required, but you will still need to arrange storage with the university.

Other aspects that pose significant concerns
Note:
Coercion.
Conflicts of interest.
Research in countries where research integrity cannot be ensured.
Data security.
Use of administrative or secure data.
Inappropriate inducements.
Poor practice.

None of the above
6.1. Does your project need ethical scrutiny or raise ethical concerns due to the nature, content, or framing of your research (e.g. in connection with culturally sensitive or security-sensitive data or materials; risks to the environment; because it involves humans, non-human vertebrates, or cephalopods; or because of any conflict of interest)? Yes
No

6.0 Ethical Concerns Statement

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I confirm I will comply with Health and Safety guidelines and undertake risk assessment of the research as required. I declare that all the answers to questions given above are true and accurate to the best of my knowledge and belief. I also
confirm that I am aware of the content and relevant sections applicable form the University's Policy Framework on Research
Integrity and will abide by its ethical guidelines and the ethical principles underlying good practice appropriate to my discipline.
I also confirm that I understand that all projects and activities will be undertaken in accordance with relevant external and
internal policies, regulations, codes of practice and other requirements, and that further information on these is available from
University and Faculty research and teaching support services
Declarations
Click the "sign" button below to complete your application.
It is important that you click the "sign" button as your application cannot be submitted unless you have signed the form. Clicking this button locks the form.
Note: For students with supervisors.
The supervisor needs to sign after you have signed. **Please request the supervisor's signature on the next page.**
Students- Do not attempt to unlock the form unless you have communicated with your supervisor. Unlocking the form may cause significant delays.
S igned : Th is fo rm was s igned by MR Andy COOPER (2232346@swansea .ac .uk) on 05 /07 /2024 12 :02 **For Reviewers ONLY**

9.0 Declaration & Signature

Important:
As the applicant, you must sign the form on the previous page **first.**
Then, click on the **'Request'** button below, to ask your supervisor to review and submit your application.
S igned : Th is fo rm was s igned by DR Dan ie l Rees (D .J .Rees@Swansea .ac .uk) on 05 /07 /2024 16 :04

Supervisor Signature

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XR in Interventional Radiology; current attitudes and opportunities

Brenna McInerney
Clinical Radiology Registrar
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Abstract:

This study explores the current landscape of wearable Extended Reality (XR) technologies in interventional radiology (IR) and assesses the attitudes of healthcare professionals toward adopting these technologies within the National Health Service (NHS) in Wales. Through a literature review, we identify the potential benefits of wearable XR devices—such as head-mounted displays and smart glasses—in enhancing procedural precision, improving visualisation, and reducing radiation exposure during IR procedures. Despite these advantages, significant barriers to adoption exist, including high costs, technical integration challenges, and the need for specialised training.

To gain insight into clinicians' perspectives, we conducted a survey among specialist registrar interventional radiologists in South Wales. The survey results indicate that while there is a general optimism about the potential benefits of wearable XR technologies and a high willingness to adopt them, practical barriers such as cost, integration with existing workflows, lack of training opportunities, and insufficient institutional support hinder widespread implementation.

Based on our findings, we recommend strategic initiatives to address these barriers, including exploring funding mechanisms, developing comprehensive training programs, ensuring seamless system integration, and fostering institutional commitment to innovation. With strategic planning and investment, wearable XR technologies could play a transformative role in the future of interventional radiology within the NHS, ultimately enhancing patient care and clinical outcomes.

Keywords: Wearable Extended Reality, Interventional Radiology, Head-Mounted Displays, Smart Glasses, Healthcare Technology Adoption, Clinical Innovation, NHS Wales, Clinician Attitudes, Survey Study, Healthcare Policy.

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Introduction

As Extended Reality (XR) technologies rapidly advance, their potential applications in healthcare are becoming increasingly apparent. XR encompasses a spectrum of immersive technologies, including Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), all of which blend the physical and digital worlds in different ways. These innovations hold particular promise in fields requiring high precision and visualisation, such as interventional radiology (IR).

Interventional radiology is a specialised field of medicine that uses minimally invasive, image-guided procedures to diagnose and treat diseases. Rather than relying on open surgeries, interventional radiologists use techniques such as X-rays, MRI, CT scans, or ultrasound to guide instruments through small incisions or via blood vessels. Common IR procedures include angioplasty, biopsies, tumour ablations, and the placement of stents or catheters. These procedures offer patients faster recovery times, less pain, and reduced risks compared to traditional surgery, making IR a vital part of modern healthcare. The growing demand for precision, efficiency, and safety in IR makes it an ideal area for the integration of cutting-edge XR technologies.

Within this evolving landscape, wearable XR technologies, such as head-mounted displays (HMDs), smart glasses, and other devices that integrate immersive elements into a practitioner's field of vision, represent a pivotal shift in how interventional procedures are performed. Wearable XR technology in IR is particularly noteworthy due to its capacity to enhance procedural precision, reduce radiation exposure, and offer real-time guidance through three-dimensional imaging superimposed on the real-world anatomy of patients. For instance, AR-enabled smart glasses, like the Microsoft HoloLens or Google Glass, can display patient data, images, and instructions directly in the operator's line of sight, reducing the need to look away from the sterile field or rely solely on traditional monitors. This seamless integration of imaging with the physical procedure has the potential to improve efficiency and reduce error rates in complex, image-guided interventions, such as biopsies, vascular procedures, or ablations.

Moreover, wearable XR technologies offer an immersive training platform for healthcare professionals, allowing them to simulate real-life procedures without the associated risks. This is particularly valuable in IR, where hands-on experience is crucial to mastering the intricate techniques required. The integration of haptic feedback into these systems further enhances the training experience, allowing practitioners to practise skills in a highly realistic environment that mimics the tactile sensations of performing actual procedures.

In the context of healthcare systems like the National Health Service (NHS) in Wales, where efficiency, cost-effectiveness, and patient safety are paramount, wearable XR technologies offer several advantages. For one, the real-time guidance provided by AR-enabled devices can streamline workflows, leading to shorter procedure times and potentially reducing the length of hospital stays. Additionally, the use of wearable XR may contribute to reducing the reliance on ionising radiation for guidance, as 3D visualisation and navigation can minimise the need for frequent fluoroscopy. This reduction in radiation exposure is a significant benefit for both patients and healthcare workers.

Despite the clear advantages, the adoption of wearable XR technology in interventional radiology remains in its nascent stages. Challenges such as device affordability, integration with existing systems, and clinician acceptance must be addressed to realise the full potential of these technologies. There is also a need for further empirical evidence demonstrating the clinical effectiveness of wearable XR in IR settings. Studies focusing on user experience, the learning curve for new users, and long-term outcomes are essential for understanding how wearable XR can be optimally utilised in everyday practice.

Research Objectives and Questions

This study aims to assess the current landscape of wearable XR technologies in interventional radiology and to explore the attitudes and perceptions of interventional radiologists in South Wales toward adopting these technologies. The research questions guiding this study are:

What are the current wearable XR technologies used in interventional radiology, and how are they being integrated into clinical workflows?

What are the attitudes of healthcare professionals toward wearable XR technologies, and what are the perceived benefits and challenges associated with their adoption?

What opportunities exist for the future adoption of wearable XR technologies in interventional radiology within the NHS, particularly in Wales?

By addressing these questions, the study seeks to provide insights into the potential for wearable XR technologies to transform IR practice and to identify strategies for overcoming barriers to adoption.

Literature Review

The integration of wearable XR technology into interventional radiology (IR) represents a growing area of interest within the medical community. Over the past few years, there has been increasing recognition of the potential of wearable XR devices—such as smart glasses and head-mounted displays (HMDs)—to improve the precision, efficiency, and safety of image-guided procedures. These technologies offer interventional radiologists the ability to access real-time visual information directly in their field of view, enhancing procedural accuracy and minimising the need to shift focus between monitors and patients. Moreover, wearable XR is gaining traction as a powerful tool for education and training, enabling healthcare professionals to rehearse procedures in immersive, risk-free environments.

Despite these promising advancements, the adoption of wearable XR technology within IR is still in its early stages, and the available literature reflects a field in transition. Existing studies explore a range of applications, from the enhancement of procedural navigation to the reduction of radiation exposure, but significant gaps remain in understanding how wearable XR can be optimally implemented in clinical practice. Additionally, the attitudes of healthcare professionals, including their readiness to adopt and adapt to these new technologies, play a crucial role in shaping the future of wearable XR in IR.

This literature review critically examines the current body of research on wearable XR technology in interventional radiology, focusing on clinical applications, benefits, challenges, and the perspectives of healthcare professionals. By identifying inconsistencies, gaps, and areas of consensus within the literature, this review aims to provide a comprehensive understanding of the role of wearable XR in IR and to highlight directions for future research.

Methodology

This literature review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021) to ensure a systematic and transparent approach in identifying and evaluating relevant studies. The review covers existing research on the use of wearable XR technologies in interventional radiology, with a specific focus on clinical applications, attitudes of healthcare professionals, and opportunities for integration in healthcare systems such as the NHS.

The primary research question guiding this review is:

RQ1: **What are the current wearable XR technologies used in interventional radiology, and what are the associated attitudes and opportunities for their adoption in clinical practice?**

Search strategy

A comprehensive search of two major academic databases, PubMed and Scopus, was conducted to capture studies published between January 2021 and September 2024, reflecting the latest advancements in wearable XR technologies within IR. The following keywords and combinations were used to identify relevant studies in both titles and abstracts:

- "Wearable XR" OR "Wearable Virtual Reality" OR "Wearable Augmented Reality" OR "Wearable Mixed Reality" OR "Smart Glasses" OR "Head-Mounted Displays" AND "Interventional Radiology"
- "Wearable XR Technologies" AND "Image-Guided Interventions"
- "Wearable Extended Reality" AND "NHS" OR "Healthcare"

These searches were filtered to focus on:

- Studies involving human subjects
- Peer-reviewed journal articles
- Research within the subject areas of medicine, healthcare, and health professions

Inclusion and exclusion criteria

To ensure the relevance and rigor of the included studies, the following criteria were established:

Inclusion Criteria:

- **Peer-reviewed journal articles:** Only peer-reviewed research articles, case studies, and systematic reviews were considered. Studies discussing wearable XR technologies specifically within the context of interventional radiology were prioritised.
- **Studies involving wearable XR technologies:** Papers were included if they focused on the use of wearable XR devices, such as smart glasses or head-mounted displays, in interventional radiology procedures or image-guided interventions.
- **Implementation in healthcare settings:** Studies that explored the practical applications, benefits, challenges, or attitudes of healthcare professionals regarding wearable XR technology, particularly in similar healthcare systems like the NHS, were included.
- **Educational and training applications:** Papers that focused on the role of wearable XR in IR training and education were also included, provided they were directly related to clinical procedures.

Exclusion Criteria:

- **Non-peer-reviewed articles:** Grey literature, opinion pieces, and non-peer-reviewed sources were excluded to maintain the quality of the review.
- **Non-healthcare-related studies:** Papers not related to wearable XR technologies in healthcare, or those focused on other medical specialties without relevance to IR, were excluded.
- **Abstract-only studies:** Conference abstracts or papers without full-text availability were excluded from the review.

Data extraction and analysis

Relevant articles were initially identified through the screening of titles and abstracts, followed by a full-text review to ensure they met the inclusion criteria. Data were extracted from each study on key variables such as:

- Type of wearable XR device used
- Specific application in interventional radiology
- User feedback or attitudes
- Reported benefits or challenges in clinical implementation
- Empirical evidence regarding patient outcomes, procedural efficiency, and training effectiveness

After the search process, a total of 108 studies were identified. These articles were then screened, and 84 were excluded as they did not meet the inclusion criteria. This left 24 eligible studies. A table of included studies is provided in Appendix 1.

PRISMA 2020 flow diagram

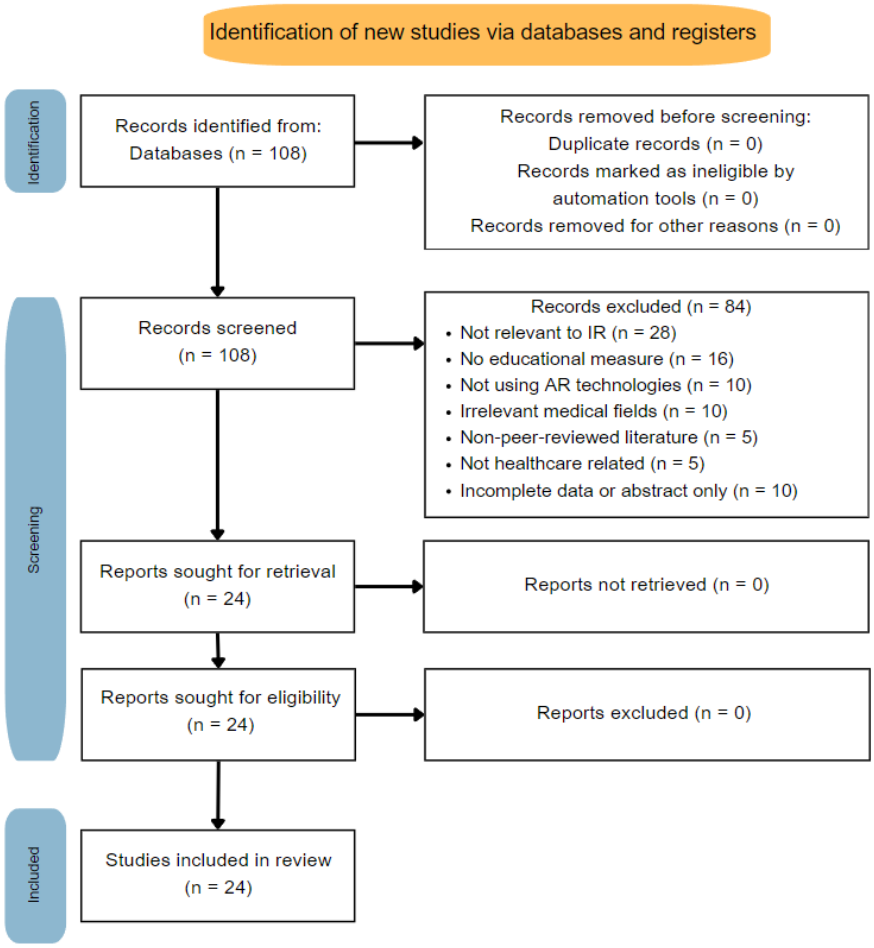


Figure 1. PRISMA 2020 flow diagram (Haddaway et al., 2022)

Findings

Current Wearable XR Technologies in Interventional Radiology

The 24 studies reviewed provide a detailed overview of the current state of wearable XR technologies in interventional radiology, reflecting the emerging role these devices are playing in enhancing procedural precision, real-time guidance, and overall patient safety. The most commonly discussed technologies are the Microsoft HoloLens, general head-mounted displays (HMDs), and smart glasses, all of which offer clinicians advanced visualisation tools that integrate seamlessly into minimally invasive procedures.

Of the 24 papers, 8 focused specifically on the Microsoft HoloLens. This device enables clinicians to overlay detailed 3D anatomical models onto the patient's body, allowing for a more immersive understanding of complex anatomy during procedures. For instance, during a tumour ablation, the HoloLens projects real-time imaging data directly into the clinician's field of view, helping guide the ablation catheter with greater precision. The HoloLens is particularly praised for its ability to enhance procedural planning and execution, reducing reliance on traditional 2D imaging systems, which often require clinicians to shift their attention between the patient and external monitors.

General head-mounted displays were mentioned in four studies, offering a broader category of devices that deliver similar augmented reality or virtual reality experiences. HMDs assist clinicians by providing real-time overlays of vascular structures during image-guided biopsies or catheter-based interventions. These devices can project 3D visualisations of blood vessels, guiding clinicians in precise needle placement or catheter navigation, and are particularly valuable in procedures where maintaining a clear view of anatomical pathways is essential.

Smart glasses, such as Google Glass, were discussed in one study. While not as widely adopted as HMDs or the HoloLens, they offer a compact and mobile alternative for XR integration. Smart glasses can project imaging data and procedural instructions into the clinician's peripheral vision, ensuring that important information is always within view without disrupting the workflow. However, these devices are generally considered less immersive and may lack the full 3D visualisation capabilities of more advanced headsets.

Across all studies, the primary use cases for wearable XR technologies were in image-guided biopsies, vascular interventions, and tumour ablations. The ability to integrate real-time 3D imaging with physical anatomy was frequently cited as the most valuable feature of XR devices. In particular, the use of XR to reduce reliance on fluoroscopic imaging—and thereby limit radiation exposure—was a significant advantage mentioned in multiple studies. Clinicians found that XR technologies enabled them to perform more precise interventions while minimising the need for repeated fluoroscopy, improving patient safety and reducing long-term radiation risks for healthcare providers.

Attitudes Toward Wearable XR in Clinical Practice

The attitudes of clinicians toward wearable XR technologies in interventional radiology are varied, with cautious optimism being the dominant sentiment across the 24 papers. Many clinicians recognise the potential for XR to transform IR practice by offering enhanced precision, improved safety, and greater procedural efficiency. However, several significant barriers to adoption were noted in the literature, including concerns about cost, training, and integration into existing workflows.

Positive attitudes are driven by the potential for improved procedural accuracy and patient outcomes. Clinicians involved in procedures such as biopsies, tumour ablations, and vascular interventions highlighted the benefit of real-time 3D visualisation. XR technologies help overcome challenges associated with traditional imaging systems, which rely on 2D displays and may require clinicians to shift focus between the patient and external monitors.

Reduced radiation exposure was also frequently cited as a significant benefit. In procedures requiring fluoroscopic guidance, both patients and clinicians are exposed to ionizing radiation. XR devices, particularly those that overlay 3D anatomical data onto the patient's body, allow for more efficient procedures that rely less on continuous imaging.

Despite these positive attitudes, challenges to adoption include:

- **Learning Curve and Training Requirements:** Many clinicians expressed concerns about the time and effort required to learn and adapt to XR systems. The need for specialised training was frequently mentioned, with some suggesting that the complexity of XR devices could lead to slower procedural times during the initial adoption phase.
- **Cost of Technology:** High upfront costs for purchasing XR devices and ongoing expenses related to software updates, hardware maintenance, and training programs were significant concerns. In public healthcare systems like the NHS, budget constraints limit the ability to invest in new technologies.
- **Workflow Integration:** Difficulties in ensuring that XR devices can interface with existing imaging systems, such as CT, MRI, and ultrasound machines, were identified as major hurdles. Technical challenges related to interoperability and potential disruptions to established workflows were common themes.

Opportunities for Future Adoption

The potential for future adoption of wearable XR technologies in interventional radiology is promising, with several studies pointing to opportunities for further development:

- **Integration with Artificial Intelligence:** Combining XR with AI could enhance procedural guidance by providing real-time data analysis and predictive insights. AI could assist in identifying optimal pathways or predicting potential complications, thereby improving patient outcomes.
- **Advancements in 3D Visualisation:** As XR devices become more sophisticated, they are expected to offer finer control over imaging data, allowing clinicians to manipulate 3D images in real-time to suit specific procedural needs.

- **Incorporation of Haptic Feedback:** The development of haptic feedback mechanisms could enhance the tactile experience, making it easier for clinicians to interact with virtual models during procedures.
- **Educational Applications:** XR technologies have significant potential in medical education and training, providing immersive environments for clinicians to practice and refine their skills without risk to patients.

Gaps in the Literature

While the literature provides valuable insights, noticeable gaps remain:

- **Limited Research on Clinician Attitudes:** Few studies explore the practical concerns of healthcare professionals regarding the adoption of XR technologies, particularly in public healthcare systems like the NHS.
- **Lack of Empirical Evidence on Cost-Effectiveness:** Limited empirical data support claims of cost-effectiveness, making it challenging for decision-makers to justify investment in XR technologies.
- **Need for Longitudinal Studies:** Most studies are short-term and do not provide data on long-term outcomes, user experience over time, or the sustainability of XR integration in clinical practice.

Discussion

The literature review highlights the significant potential of wearable XR technologies in interventional radiology, demonstrating their ability to enhance precision, improve visualisation, and reduce radiation exposure during complex procedures. However, the research also reveals several challenges, including cost, technical integration, and the steep learning curve associated with these technologies. In the context of healthcare systems such as the NHS in Wales, where XR is not yet in use, these insights offer valuable guidance for understanding the feasibility and future potential of XR technology in IR.

Key Insights from the Literature

The findings from the 24 selected papers demonstrate that while wearable XR technologies offer promising benefits, significant barriers must be addressed before widespread adoption can occur. The high cost and complex integration requirements pose serious challenges. Additionally, the lack of extensive empirical evidence on long-term outcomes and cost-effectiveness makes it difficult for decision-makers to justify investment, especially within the NHS where the budget is limited.

Implications for the NHS

In NHS Wales, the introduction of XR technologies could offer substantial benefits in terms of patient safety, workflow efficiency, and procedural outcomes. However, addressing the barriers identified is crucial:

- **Financial Constraints:** Strategic planning is needed to explore funding opportunities, such as grants or partnerships with technology providers, to combat the high upfront costs.
- **Training and Support:** Developing comprehensive training programs will help clinicians overcome the learning curve associated with XR technologies.
- **Technical Integration:** Investing in technical solutions that ensure compatibility with existing imaging systems and workflows is essential to prevent disruptions in clinical practice.
- **Institutional Commitment:** Organisational support is critical. Leadership within the NHS must prioritise innovation and provide the necessary resources to facilitate adoption.

Future Directions

The future of XR technologies in interventional radiology is promising, especially with advancements in AI integration and 3D visualisation. To capitalise on these developments, the NHS should consider:

- **Pilot Programs:** Implementing pilot studies to evaluate the effectiveness, cost-benefit, and practicality of XR technologies in clinical settings.
- **Interdisciplinary Collaboration:** Encouraging collaboration between technologists, clinicians, and policymakers to address technical and logistical challenges.

- **Policy Development:** Developing policies that support the integration of innovative technologies in healthcare, aligning with broader NHS goals of improving patient care and operational efficiency.

Survey

Introduction

The adoption of Extended Reality technologies, such as wearable devices, in interventional radiology has the potential to transform clinical practice by improving procedural accuracy, enhancing visualisation, and reducing radiation exposure. Despite these potential benefits, XR technologies have yet to be introduced within NHS Wales, particularly in interventional radiology departments. Given this context, understanding the attitudes of healthcare professionals toward adopting such technologies is crucial. The next step in this research is to gather first-hand data from clinicians in South Wales who would be directly impacted by the introduction of wearable XR devices in their daily practice.

Research objectives

The study aims to:

- Assess the familiarity of interventional radiologists in South Wales with wearable XR technologies.
- Explore their perceptions of the potential benefits and challenges associated with these technologies.
- Determine their willingness to adopt XR technologies and identify the main barriers to adoption.

By engaging directly with the potential end-users, the study seeks to provide valuable insights that can inform future decisions about the adoption of XR technology within the NHS.

Justification

Rationale for Using a Survey

Given the absence of wearable XR technologies in NHS Wales, particularly within interventional radiology, gathering first-hand insights from clinicians is critical to understanding the feasibility of adopting these technologies in the field. A survey is an ideal tool for this purpose, as it allows for the collection of quantitative and qualitative data directly from a targeted group of professionals—interventional radiologists in South Wales—who are best positioned to provide relevant insights.

The survey format offers several advantages. First, it is a flexible method of data collection that can accommodate busy professionals by providing them with a simple and efficient way to share their perspectives. Surveys can be distributed electronically, making them easily accessible and less time-consuming than alternative methods such as in-depth interviews or focus groups. In this case, a brief survey with 5 questions is planned to be used, designed to take no more than one minute to complete. This brevity is necessary due to the high workload and time pressures faced by clinicians, especially in a public healthcare system like the NHS.

Furthermore, a survey allows for the quantification of attitudes, preferences, and concerns. By using structured questions, it is possible to collect data that can be analysed statistically, identifying trends and patterns across the responses. At the same time, open-ended questions can provide deeper insights into specific concerns or suggestions that clinicians may have however it is difficult to compile this data and can be time consuming.

Target Population

The decision to focus on speciality registrar interventional radiologists in South Wales is based on the recognition that these clinicians are the most likely end-users of wearable XR technologies within NHS Wales. Specialist registrars are targeted as they are embarking on consultant careers in the near future and are more likely to influence the department and environment they are working with, especially with regards to technological equipment necessary for their daily practice. Interventional radiology is a field that relies heavily on imaging and real-time guidance, making it a prime candidate for XR integration. By targeting this

specific group, the survey will gather feedback from those who would be directly impacted by the introduction of XR technologies in their practice.

South Wales is a key geographic area for this survey due to its representation of typical NHS Wales healthcare structures. The region encompasses a range of hospitals and healthcare facilities that provide interventional radiology services, and it is where the vast majority of interventional radiology doctors are located in Wales. Focusing on this area ensures that the data collected will be relevant to the realities of working within the NHS, particularly in relation to resource constraints, training challenges, and technology integration.

Short Survey Format

The short format of the survey is crucial to ensuring high response rates from busy clinicians. With only 5 succinct questions, the survey aims to strike a balance between gathering meaningful data and minimising the time commitment required from respondents. Each question has been designed to address a specific aspect of XR adoption, including:

- Familiarity with XR technologies.
- Perceived benefits of XR in IR.
- Opinions on challenges such as cost, training, and workflow integration.
- Willingness to adopt XR if made available.
- Necessary resources for successful adoption.

By keeping the survey focused and brief, the likelihood of participation increases, as clinicians are more likely to engage with a task that takes a minimal amount of their time. Moreover, the structured nature of the questions ensures that the responses can be easily analysed and interpreted, providing actionable insights for decision-makers within the NHS.

Survey design

Question Development

The survey has been carefully designed to address the key objectives of understanding interventional radiologists' attitudes toward the adoption of wearable XR technologies. Given the need for brevity due to time constraints on clinicians, the survey consists of 5 questions, each tailored to gather critical information without overwhelming the respondents. The questions aim to balance closed-ended responses, which facilitate quick and straightforward answers, and open-ended responses that allow for deeper insights into individual perspectives.

The questions are designed to explore several core areas:

- Familiarity with XR technologies
- Understanding how well clinicians are acquainted with wearable XR technologies, which will help contextualise their responses regarding adoption.
- Perceived benefits
- Gauging whether clinicians believe XR technologies can enhance the precision, visualisation, and safety of interventional procedures.
- Perceived challenges
- Identifying the main barriers to adoption, such as cost, training, or integration with existing workflows.
- Willingness to adopt XR
- Understanding the extent to which clinicians would be willing to adopt these technologies if they were made available.
- Support and resources
- Gathering insights into what additional support, resources, or changes would be necessary for successful implementation.

Survey Questions

The survey includes the following 5 questions, designed to be clear, concise, and focused on key aspects of XR technology adoption:

SQ1: Are you familiar with wearable XR technologies (such as Microsoft HoloLens or Google Glasses)?

Response type: Yes/No

Purpose: To assess the baseline level of awareness among interventional radiologists regarding XR technologies.

SQ2: What words come to mind when you think about wearable XR technology? (Circle all that apply)

Response type: Word selection (positive and negative options available)

- Exciting
- Innovative
- Expensive
- Complicated
- Useful
- Unnecessary
- Promising
- Distracting
- Efficient
- Time-consuming
- Cutting-edge
- Risky
- Other (specify)

Purpose: To capture clinicians' immediate reactions and attitudes toward XR technology, including both positive and negative associations.

SQ3: Do you believe wearable XR technologies could improve clinical outcomes in interventional radiology (e.g., better visualisation or precision during procedures)?

Response type: Likert scale (1 = strongly disagree, 5 = strongly agree)

Purpose: To gauge perceptions of the potential benefits of XR in improving procedural accuracy and outcomes.

SQ4: If wearable XR technology were available, would you be willing to undergo training to use it in your clinical practice?

Response type: Likert scale (1 = very unwilling, 5 = very willing)

Purpose: To assess the willingness of clinicians to invest time in learning to use XR technologies.

SQ5: What do you see as the main barriers to adopting wearable XR technologies in your practice?

Response type: Multiple choice (select all that apply)

- Cost of technology
- Lack of training opportunities
- Complexity of technology
- Integration with existing workflows or imaging systems
- Time constraints for implementation

- Unclear benefits for clinical outcomes
- Resistance to adopting new technologies
- Lack of interest
- Lack of institutional support
- Other (specify)

Purpose: To identify the most significant challenges perceived by clinicians when considering the adoption of XR technologies.

Survey Structure and Question Types

The survey consists of yes/no, Likert scale, and multiple-choice questions designed to capture a broad understanding of interventional radiologists' familiarity with and attitudes toward wearable XR technologies. The yes/no questions are used to gather basic information quickly, such as the clinicians' familiarity with XR technologies. The Likert scale questions will provide measurable data on clinicians' attitudes and willingness to adopt these technologies, enabling the identification of trends in perceptions about the potential benefits and challenges.

The multiple-choice questions will allow clinicians to select multiple options from a pre-defined list, providing insights into perceived barriers to adoption (e.g., cost, training, workflow integration) and capturing specific attitudes toward XR technology by offering a mix of positive and negative descriptors. These questions are quick to complete while still allowing for meaningful data collection.

The survey format is designed to ensure that responses can be easily analysed quantitatively to identify common themes, while still allowing for flexibility in interpretation by including comprehensive answer options that cover both challenges and benefits. This structure will enable a clear understanding of clinicians' readiness for XR adoption and the key concerns that need to be addressed.

Methodology

Ethical considerations

The ethical considerations for this survey are minimal but essential to uphold best practices in research involving human participants. The survey will comply with the ethical guidelines set out by NHS Wales and the General Data Protection Regulation (GDPR) to ensure the rights and privacy of participants are protected.

- Informed Consent: Each participant will be presented with an informed consent form at the start of the survey. This will clearly explain the purpose of the survey, the voluntary nature of participation, and the anonymity of the responses. Participants will be made aware that they can opt out at any time before submitting their responses. No personal identifiers, such as names or contact details, will be collected.
- Anonymity and Confidentiality: To encourage candid feedback, the survey will be conducted anonymously. Participants will not be required to provide any identifying information, and no individual responses will be traceable. All data will be stored securely on the survey platform, with restricted access for authorised research personnel only. The analysis will be conducted on aggregated data, ensuring that individual responses cannot be linked to specific participants.
- Data Protection: All data will be collected, stored, and processed in line with GDPR requirements within NHS Wales intranet environment. The survey platform used for data collection will ensure that the data is securely stored and encrypted. Once the data collection period is complete, the responses will be anonymised and stored on a secure server, with access restricted to the author only. The data will be retained only for the duration of the study and securely deleted thereafter as per NHS data handling policy.
- Ethical Approval: Ethical approval for the survey will be sought from the relevant parties. This approval ensures that the study meets the necessary ethical standards for conducting research within the healthcare system. Given that the survey does not involve vulnerable populations and is focused on professional attitudes, the ethical risks are low. However, the approval process is an important step to ensure transparency and adherence to guidelines.

Survey administration

The survey will be administered to interventional radiologists in South Wales through an online questionnaire platform. This approach ensures accessibility and convenience for busy clinicians. By distributing the survey electronically, clinicians can complete it at their convenience without interrupting their clinical duties. The survey platform will enable the collection of both quantitative and qualitative data efficiently while providing tools to monitor response rates and times.

The brief nature of the survey, with only 5 questions, is designed to take approximately one minute to complete. This is crucial to ensure a high response rate, as clinicians typically have limited time. The invitation to participate will highlight the brevity of the survey, and the importance of clinician input in shaping decisions regarding the future adoption of wearable XR technology in the NHS. This may motivate respondents by emphasising the potential impact their feedback could have on improving clinical outcomes and workflow efficiency in interventional radiology.

The survey will be distributed via hospital email systems. Invitations will contain a short description of the survey's purpose along with the survey link. A reminder email will be sent one week after the initial distribution to increase response rates, and the survey will remain open for two weeks.

Sampling strategy

The survey is specifically targeting speciality registrar interventional radiologists working in NHS hospitals across South Wales, as these professionals would be the primary users of wearable XR technologies in their clinical practice in the near future. The population is chosen based on its relevance to the study, as interventional radiologists rely heavily on imaging and precision-guided procedures—areas where XR technologies have the potential to offer the most value. Specialist registrars training in interventional radiology are the selected targeted group as this population is the future cohort of consultants in the field and will have a large influence in the methodology and technology of their near future consultant practice.

A purposive sampling strategy will be employed, focusing on interventional radiologists within NHS Wales. This will ensure that only relevant participants who are involved in or familiar with procedures where XR technology could be applied are included in the survey. The expected sample is between 80-100% of specialist registrar interventional radiologists in South Wales.

To maximise participation, emails will be sent to all specialist registrars in the speciality with a link to a voluntary anonymous survey. Participation will be voluntary, and no incentives will be offered.

Data collection process

The data collection process will span a period of two weeks, giving participants ample time to complete the survey. The initial invitation will clearly outline the objectives of the survey, the importance of their feedback, and an assurance of anonymity and confidentiality. The survey link will direct participants to an online platform, where they will be presented with a consent form explaining their rights as participants and the voluntary nature of their involvement.

The two-week data collection window allows for initial responses as well as follow-up reminders. A reminder email will be sent midway through the collection period to encourage participation. The anonymity of responses will be emphasised, as it is essential to encourage candid feedback, particularly in terms of perceived barriers or concerns regarding XR technology adoption. Anonymity ensures that clinicians feel comfortable providing honest responses without fear of professional judgement or repercussion.

During this period, the survey software will monitor completion rates and flag any potential technical issues that may arise. Real-time tracking will allow the research team to monitor the response rate and determine whether additional follow-ups are necessary.

Survey limitations

Despite the strengths of this methodology, there are several limitations to consider. One potential limitation is the relatively small sample size. Given the specialised nature of interventional radiology and the focus on a specific geographic area, the total number of potential participants is limited. While the sample size is

expected to provide meaningful insights into the attitudes of interventional radiologists in South Wales, the findings may not be fully generalisable to other regions or healthcare systems.

Another limitation relates to self-reported data. As with any survey, there is a risk that respondents may provide socially desirable answers, particularly in a professional setting. This is especially relevant when assessing attitudes toward adopting new technologies, where respondents may feel pressure to appear more open or competent in adopting cutting-edge innovations. However, the survey's anonymous nature and the inclusion of a wide range of response options should help mitigate this issue, encouraging honest feedback.

Finally, response bias is a potential concern. Those who choose to respond may be more likely to have strong opinions—positive or negative—about XR technology, leading to skewed results. To counteract this, efforts will be made to ensure that the survey reaches a broad audience within the target population, and follow-up reminders will be sent to maximise participation.

Results

Introduction

This section presents the findings from the survey conducted among specialist registrar interventional radiologists in South Wales. The survey aimed to assess clinicians' familiarity with wearable Extended Reality technologies, their perceptions of these technologies, their willingness to adopt XR in clinical practice, and the perceived barriers to adoption. The results are analysed both quantitatively and qualitatively and are discussed in the context of the literature reviewed earlier.

Survey response rate

The survey was distributed to interventional radiologists across South Wales, targeting the specific group of all 6 specialist registrars. Five responses were received, resulting in a response rate of approximately 83%. This high response rate indicates a strong interest in the subject matter among the target population. The brevity of the survey and the convenience of online access likely contributed to the satisfactory participation rate.

Familiarity with Wearable XR Technologies

The first question assessed the respondents' familiarity with wearable XR technologies, such as Microsoft HoloLens or Google Glasses. The responses were as follows:

- Familiar with these devices: 3 respondents (60%)
- Heard of them but not sure what they are: 1 respondent (20%)
- Never heard of them: 1 respondent (20%)

These results indicate that a majority (60%) of the respondents are familiar with wearable XR technologies, suggesting a reasonable level of awareness within the interventional radiology community in South Wales. However, 40% have limited or no familiarity, highlighting a potential need for educational initiatives to increase awareness and understanding of XR technologies and their applications in interventional radiology.

Perceptions of Wearable XR Technologies

Respondents were asked to select words that come to mind when they think about wearable XR technology, choosing all that apply from a list of both positive and negative descriptors. The frequency of each selected word is presented below:

- **Innovative**: 5 respondents (100%)
- **Exciting**: 4 respondents (80%)
- **Expensive**: 3 respondents (60%)
- **Interesting**: 2 respondents (40%)
- **Cutting-edge**: 2 respondents (40%)
- **Useful**: 2 respondents (40%)
- **Promising**: 2 respondents (40%)

- **Complicated**: 1 respondent (20%)

The most commonly selected descriptors were "Innovative" (100%) and "Exciting" (80%), indicating a predominantly positive perception of wearable XR technologies among the respondents. The selection of "Expensive" by 60% reflects concerns about the cost associated with these technologies. The combination of positive descriptors (e.g., "Innovative," "Exciting," "Promising") alongside concerns (e.g., "Expensive," "Complicated") suggests that while clinicians are optimistic about the potential of XR technologies, they are also mindful of the challenges involved.

Belief in Clinical Benefits

The third question assessed whether respondents believe that wearable XR technologies could improve clinical outcomes in interventional radiology, such as better visualisation or precision during procedures. The responses were:

- **Agree**: 4 respondents (80%)
- **Neither agree nor disagree**: 1 respondent (20%)

No respondents selected "Disagree" or "Strongly disagree," indicating that none were sceptical of the potential benefits. The majority (80%) agreed that wearable XR technologies could enhance clinical outcomes, suggesting strong confidence in the positive impact of XR technologies on procedural effectiveness and patient care.

Willingness to Adopt XR Technologies

Respondents were asked about their willingness to undergo training to use wearable XR technology in their clinical practice if it were available. The responses were:

- **Very willing**: 4 respondents (80%)
- **Willing**: 1 respondent (20%)

All respondents expressed a willingness to undergo training, with the majority being "Very willing." This indicates a high level of openness among interventional radiologists in South Wales to adopt wearable XR technologies, provided that appropriate training and resources are available.

Perceived Barriers to Adoption

The final question asked respondents to identify the main barriers to adopting wearable XR technologies in their practice, selecting all that apply from a list of potential challenges. The responses are summarised below:

- Cost of technology: 4 respondents (80%)
- Integration with existing workflows or imaging systems: 4 respondents (80%)
- Lack of training opportunities: 3 respondents (60%)
- Resistance to adopting new technologies: 3 respondents (60%)
- Lack of institutional support: 3 respondents (60%)
- Unclear benefits for clinical outcomes: 2 respondents (40%)
- Complexity of technology: 1 respondent (20%)
- Time constraints for implementation: 1 respondent (20%)

The most commonly perceived barriers were "Cost of technology" and "Integration with existing workflows or imaging systems," each selected by 80% of respondents. "Lack of training opportunities," "Resistance to adopting new technologies," and "Lack of institutional support" were also significant concerns, each selected by 60% of respondents.

These findings highlight that while clinicians are generally positive about the potential benefits of wearable XR technologies, they are concerned about practical barriers that could impede adoption. Financial constraints and technical integration challenges are the most significant perceived obstacles.

Discussion of Survey Results

The survey findings are consistent with the challenges identified in the literature review. Both the literature and the survey respondents emphasise "Cost of technology" and "Integration with existing workflows or imaging systems" as major barriers to the adoption of wearable XR technologies in interventional radiology.

In the literature, cost is frequently cited as a significant obstacle, particularly in public healthcare systems like the NHS where budget constraints are a critical factor. The concern about integration reflects the technical challenges of incorporating new technologies into established clinical workflows and ensuring compatibility with existing imaging systems.

The high level of willingness among clinicians to undergo training contrasts with some concerns in the literature about the learning curve associated with XR technologies. While the literature suggests that training requirements could be a barrier, the survey indicates that clinicians are very willing to invest time in learning to use XR technologies, provided that training opportunities are accessible.

Implications for NHS Wales

The survey results suggest that specialist registrar interventional radiologists in South Wales are generally positive about the potential of wearable XR technologies to improve clinical outcomes and are willing to adopt them into their practice. However, significant barriers need to be addressed to facilitate adoption.

The concerns about cost and integration with existing systems are particularly relevant for NHS Wales. To overcome these barriers, strategic investment and planning are required. This may include exploring funding opportunities, negotiating with technology providers for cost-effective solutions, and ensuring that XR technologies are compatible with current imaging systems and workflows.

The need for training opportunities and institutional support indicates that clinicians require backing from their organisations to adopt new technologies successfully. The NHS could consider developing training programs and pilot projects to support clinicians in integrating XR technologies into their practice.

Survey limitations

The survey has several limitations that should be acknowledged:

- **Small Sample Size**: With only five respondents, the sample size is small, which limits the generalisability of the findings, this is a representative sample within the South Wales clinical community, however. The attitudes and perceptions captured may not represent the broader population of interventional radiologists beyond South Wales.
- **Response Bias**: The survey relies on self-reported data, which may be subject to response bias. Clinicians may provide socially desirable answers or may not fully reflect their actual willingness or ability to adopt new technologies.
- **Lack of In-depth Qualitative Data**: The survey did not capture detailed qualitative insights that could provide a deeper understanding of specific concerns or suggestions regarding wearable XR technologies.
- **Geographical Limitation**: The focus on South Wales may limit the applicability of the findings to other regions with different healthcare structures or resource availability.

Recommendations

Based on the findings, several recommendations can be made to facilitate the adoption of wearable XR technologies in interventional radiology within NHS Wales:

- **Address Cost Concerns**: Explore funding mechanisms such as grants, partnerships with technology providers, or government funding to reduce the financial burden of acquiring XR technologies.
- **Enhance Training Opportunities**: Develop comprehensive training programs, possibly in collaboration with technology vendors or academic institutions, to equip clinicians with the necessary skills.
- **Ensure System Integration**: Invest in technical solutions and support that enable seamless integration of XR technologies with existing imaging systems and workflows.

- **Gather Institutional Support**: Encourage organisational commitment by highlighting the potential benefits of XR technologies and providing resources and support for adoption.
- **Pilot Projects**: Implement pilot studies to evaluate the effectiveness, cost-benefit, and practicality of XR technologies in clinical settings, providing empirical data to support broader adoption.
- **Communication and Education**: Increase awareness and understanding of XR technologies among clinicians who are not familiar with them through workshops, seminars, or informational materials.

Conclusions

Summary of findings

This report investigated the current landscape of wearable XR technologies in interventional radiology and assessed the attitudes of healthcare professionals in South Wales toward adopting these technologies. The literature review highlighted the potential benefits of XR technologies in enhancing procedural precision, improving visualisation, and reducing radiation exposure. However, significant barriers such as cost, technical integration, and the learning curve associated with these technologies were identified.

The survey results indicated that while there is a reasonable level of familiarity with wearable XR technologies among interventional radiologists in South Wales, clinicians are generally positive about the potential benefits and are willing to adopt these technologies into their practice. The main barriers identified were cost, integration with existing workflows, lack of training opportunities, resistance to adopting new technologies, and lack of institutional support.

Implications for practice

For successful implementation of wearable XR technologies in NHS Wales, strategic efforts must be made to overcome the identified barriers. Addressing cost concerns may involve seeking funding opportunities, negotiating with technology providers, or demonstrating long-term cost-effectiveness through pilot projects. Providing training and ensuring seamless integration with existing systems will be crucial to facilitate adoption.

Institutional support is essential to encourage clinicians to embrace new technologies. Organisations should develop a culture of innovation and provide the necessary resources and backing to clinicians willing to adopt XR technologies. By addressing these areas, NHS Wales can leverage the potential of XR technologies to enhance patient care and clinical outcomes in interventional radiology.

Limitations

This study has limitations, including a small sample size and potential response bias due to self-reported data. The survey focused on a specific geographic area, which may limit the generalisability of the findings to other regions or healthcare systems. Additionally, the lack of in-depth qualitative data limits the understanding of the nuances behind clinicians' perceptions.

Future research

Further research is needed to explore practical steps required to implement XR technologies in interventional radiology within the NHS. Future studies could focus on:

- **Larger-scale Surveys**: Conduct surveys with a broader and more diverse sample of interventional radiologists to validate and expand upon these findings.
- **Pilot Programs**: Implement and evaluate pilot projects using XR technologies in clinical settings to gather empirical data on effectiveness, patient outcomes, and cost-benefit analyses.
- **Training Program Development**: Research the most effective methods for training clinicians in the use of XR technologies, including curriculum development and assessment of competency.
- **Interdisciplinary Studies**: Explore collaborations between technologists, clinicians, and policymakers to address technical integration challenges and develop solutions.
- **Patient Perspectives**: Investigate patient perceptions and experiences with procedures utilising XR technologies to assess the impact on patient satisfaction and outcomes.

Final thoughts

Wearable XR technologies hold significant promise for advancing interventional radiology by enhancing visualisation, precision, and safety. While challenges exist, particularly in terms of cost and integration, the positive attitudes of clinicians toward these technologies indicate a readiness to embrace innovation. With strategic planning, investment, and institutional support, XR technologies could play a transformative role in the future of interventional radiology within NHS Wales, ultimately improving patient care and clinical outcomes.

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Appendix B: Literature review data extraction

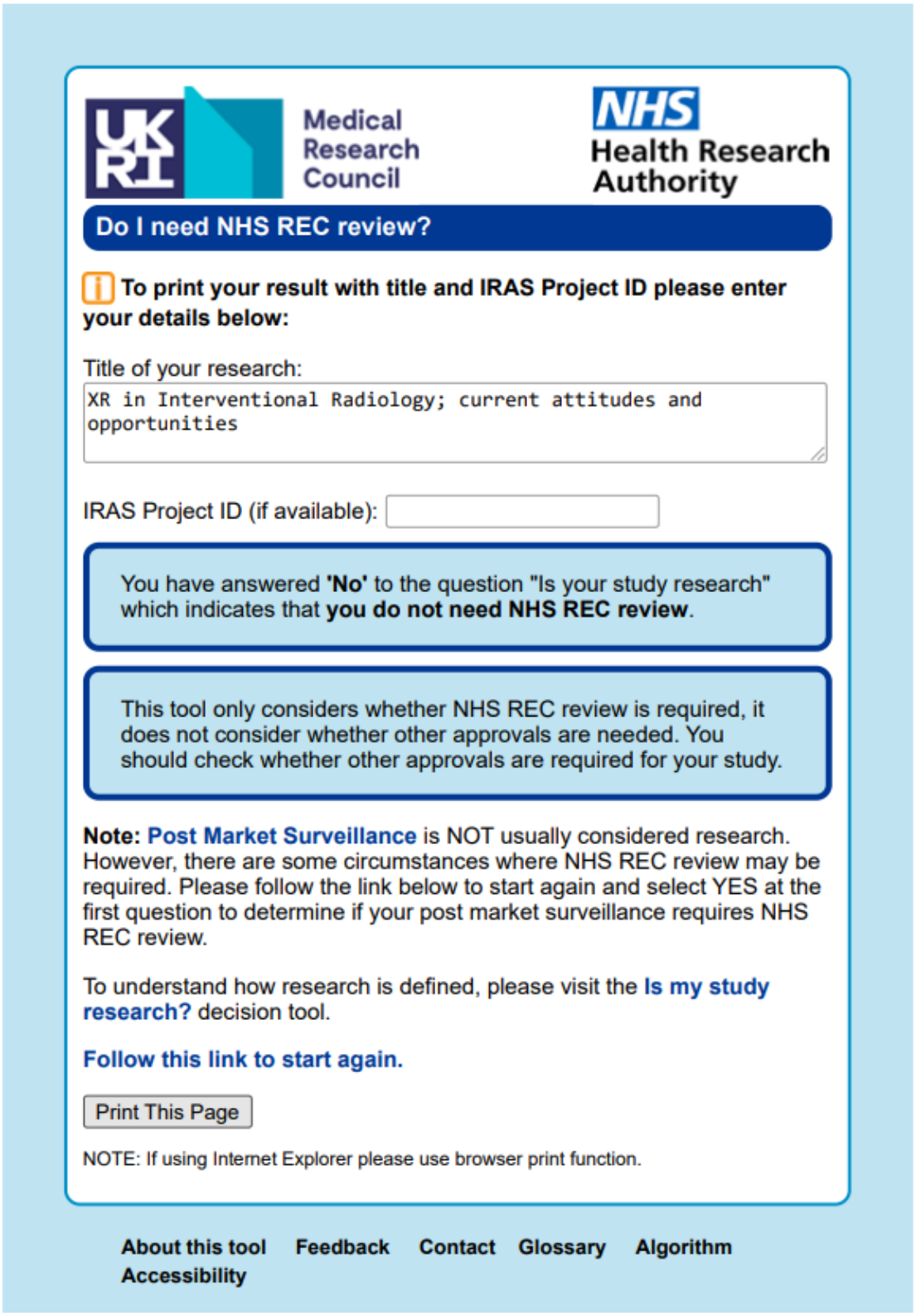
Authors	Title	Year	Source title	DOI	Device
Allen D.R.; Cattari N.; Cambranis J.; Peters T.M.; Chen E.C.S.	Towards Virtual Displays in the Interventional Radiology Suite: A Feasibility Study	2023	Progress in Biomedical Optics and Imaging - Proceedings of SPIE	10.1117/12.2654267	Microsoft HoloLens
Luzzi S.; Simoncelli A.; Galzio R.	Impact of augmented reality fiber tractography on the extent of resection and functional outcome of primary motor area tumors	2024	Neurosurgical Focus	10.3171/2023.10.FOCUS23477	Not Specified
Morita S.; Suzuki K.; Yamamoto T.; Kunihara M.; Hashimoto H.; Ito K.; Fujii S.; Ohya J.; Masamune K.; Sakai S.	Mixed Reality Needle Guidance Application on Smartglasses Without Pre-procedural CT Image Import with Manually Matching Coordinate Systems	2022	CardioVascular and Interventional Radiology	10.1007/s00270-021-03029-3	Microsoft HoloLens
Amiras D.; Hurkxkens T.J.; Figueroa D.; Pratt P.J.; Pitrola B.; Watura C.; Rostampour S.; Shimshon G.J.; Hamady M.	Augmented reality simulator for CT-guided interventions	2021	European Radiology	10.1007/s00330-021-08043-0	Head-Mounted Display (General)
Matsuzaki S.; Moritake T.; Morota K.; Nagamoto K.; Nakagami K.; Kuriyama T.; Kunugita N.	Development and assessment of an educational application for the proper use of ceiling-suspended radiation shielding screens in angiography rooms using augmented reality technology	2021	European Journal of Radiology	10.1016/j.ejrad.2021.109925	Not Specified
Groves L.; Li N.; Peters T.M.; Chen E.C.S.	Towards a First-Person Perspective Mixed Reality Guidance System for Needle Interventions	2022	Journal of Imaging	10.3390/jimaging8010007	Head-Mounted Display (General)
Li H.; Yan W.; Zhao J.; Ji Y.; Qian L.; Ding	Navigate biopsy with ultrasound under augmented reality	2024	Computers in Biology and Medicine	10.1016/j.compbiomed.2024.108453	Microsoft

H.; Zhao Z.; Wang G.	device: Towards higher system performance				HoloLens
Finos K.; Datta S.; Sedrakyan A.; Milsom J.W.; Pua B.B.	Mixed reality in interventional radiology: a focus on first clinical use of XR90 augmented reality-based visualization and navigation platform	2024	Expert Review of Medical Devices	10.1080/17434440.2024.2379925	Not Specified
Li N.; Wakim J.; Koethe Y.; Huber T.; Schenning R.; Gade T.P.; Hunt S.J.; Park B.J.	Multicenter assessment of augmented reality registration methods for image-guided interventions	2022	Radiologia Medica	10.1007/s11547-022-01515-3	Microsoft HoloLens
Zuo G.; Wang R.; Wan C.; Zhang Z.; Zhang S.; Yang W.	Unveiling the Evolution of Virtual Reality in Medicine: A Bibliometric Analysis of Research Hotspots and Trends over the Past 12 Years	2024	Healthcare (Switzerland)	10.3390/healthcare12131266	Not Specified
Mialhe C.; Chaudhuri A.; Raffort J.; Lareyre F.	Feasibility of the Application of Holographic Augmented Reality in Endovascular Surgery Using Microsoft HoloLens Head-Mounted Display	2021	Annals of Vascular Surgery	10.1016/j.avsg.2021.05.010	Microsoft HoloLens
Suzuki K.; Morita S.; Endo K.; Yamamoto T.; Fujii S.; Ohya J.; Masamune K.; Sakai S.	Learning effectiveness of using augmented reality technology in central venous access procedure: an experiment using phantom and head-mounted display	2021	International Journal of Computer Assisted Radiology and Surgery	10.1007/s11548-021-02365-6	Microsoft HoloLens
England A.; Thompson J.; Dorey S.; Al-Islam S.; Long M.; Maiorino C.; McEntee M.F.	A comparison of perceived image quality between computer display monitors and augmented reality smart glasses	2023	Radiography	10.1016/j.radi.2023.04.010	Smart Glasses
Fraser R.; Bettati P.; Young J.; Rathgeb A.; Sirsi S.; Fei B.	A fast and interactive augmented reality system for PET/CT-guided intervention of neuroblastoma	2024	Progress in Biomedical Optics and Imaging - Proceedings of SPIE	10.1117/12.3008663	Not Specified
Morita S.; Suzuki K.; Yamamoto T.;	Out-of-Plane Needle Placements Using 3D Augmented Reality	2023	CardioVascular and	10.1007/s00270-023-03357-6	Not Specified

Endo S.; Yamazaki H.; Sakai S.	Protractor on Smartphone: An Experimental Phantom Study		Interventional Radiology		
Long D.J.; Li M.; De Ruiter Q.M.B.; Hecht R.; Li X.; Varble N.; Blain M.; Kassin M.T.; Sharma K.V.; Sarin S.; Krishnasamy V.P.; Pritchard W.F.; Karanian J.W.; Wood B.J.; Xu S.	Comparison of Smartphone Augmented Reality, Smartglasses Augmented Reality, and 3D CBCT-guided Fluoroscopy Navigation for Percutaneous Needle Insertion: A Phantom Study	2021	CardioVascular and Interventional Radiology	10.1007/s00270-020-02760-7	Microsoft HoloLens
Saccenti L.; Bessy H.; Ben Jedidia B.; Longere B.; Tortolano L.; Derbel H.; Luciani A.; Kobeiter H.; Grandpierre T.; Tacher V.	Performance Comparison of Augmented Reality Versus Ultrasound Guidance for Puncture: A Phantom Study	2024	CardioVascular and Interventional Radiology	10.1007/s00270-024-03727-8	Not Specified
Eves J.; Sudarsanam A.; Shalhoub J.; Amiras D.	Augmented Reality in Vascular and Endovascular Surgery: Scoping Review	2022	JMIR Serious Games	10.2196/34501	Microsoft HoloLens
Al-Naser Y.; Halka F.; Alshadeedi F.; Albahhar M.; Athreya S.	The applications of augmented reality in image-guided tumor ablations: A scoping review	2024	Journal of Medical Imaging and Radiation Sciences	10.1016/j.jmir.2023.12.006	Head-Mounted Display (General)
Gullo G.; Rotzinger D.C.; Colin A.; Frossard P.; Gudmundsson L.; Jouannic A.-M.; Qanadli S.D.	Virtually Augmented Self-Hypnosis in Peripheral Vascular Intervention: A Randomized Controlled Trial	2023	CardioVascular and Interventional Radiology	10.1007/s00270-023-03394-1	Head-Mounted Display (General)
Khan T.; Biehl J.T.; Andrews E.G.; Babichenko D.	A systematic comparison of the accuracy of monocular RGB tracking and LiDAR for neuronavigation	2022	Healthcare Technology Letters	10.1049/htl2.12036	Not Specified
Al-Naser Y.; Halka F.; Alshadeedi F.;	The applications of augmented reality in image-guided tumor	2024	Journal of Medical Imaging and	10.1016/j.jmir.2023.12.006	Head-Mounted

Albahhar M.; Athreya S.	ablations: A scoping review		Radiation Sciences		Display (General)
Gullo G.; Rotzinger D.C.; Colin A.; Frossard P.; Gudmundsson L.; Jouannic A.-M.; Qanadli S.D.	Virtually Augmented Self-Hypnosis in Peripheral Vascular Intervention: A Randomized Controlled Trial	2023	CardioVascular and Interventional Radiology	10.1007/s00270-023-03394-1	Head-Mounted Display (General)
Khan T.; Biehl J.T.; Andrews E.G.; Babichenko D.	A systematic comparison of the accuracy of monocular RGB tracking and LiDAR for neuronavigation	2022	Healthcare Technology Letters	10.1049/htl2.12036	Not Specified

Appendix C – Ethics consideration



Medical Research Council

NHS Health Research Authority

Do I need NHS REC review?

To print your result with title and IRAS Project ID please enter your details below:

Title of your research:

XR in Interventional Radiology; current attitudes and opportunities

IRAS Project ID (if available):

You have answered **'No'** to the question "Is your study research" which indicates that **you do not need NHS REC review**.

This tool only considers whether NHS REC review is required, it does not consider whether other approvals are needed. You should check whether other approvals are required for your study.

Note: Post Market Surveillance is NOT usually considered research. However, there are some circumstances where NHS REC review may be required. Please follow the link below to start again and select YES at the first question to determine if your post market surveillance requires NHS REC review.

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The experiences of General Practice Nurses and the future model for Primary Care Nursing in Wales

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Abstract:

This research project explores the views of General Practitioner Nurses (GPNs) in Wales and their relationship to national strategic priorities and challenges faced by the profession in the Primary care setting. National Programmes, aimed at supporting the development and training for GPNs as a vital role in General Practice have been widely promoted in recent times. These programmes have delivered a much-welcomed injection of funding and frameworks to support the workforce, but financial constraints and a nurse-centric approach has not been embedded in the support package to professionals. In the NHS most funded programmes are limited in longevity by funding that is fixed term, without the support and without recognition of value from local health boards cannot be delivered in the long-term. The Researcher is keen to emphasise with the current urgency in the nursing workforce in Primary Care with over 50% of the GPN workforce due to retire in the next 10 years in Wales.

Keywords: GPN. SPPC. Workforce. Recruitment and Retention. Wales.

Acronyms, Tables, and Figures

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2	Research Design
3	Expert interviewee selection
4	Interview Questions

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Introduction

'A Healthier Wales' Our Plan for Health and Social Care 2019, (WG 2019 Table 1) outlined the strategic vision for system transformation, with an ambition that services are designed and delivered around the needs and preferences of individuals, with a much greater emphasis on keeping people healthy and delivering care closer to home. (Welsh Assembly Gov. 2018),

The Strategic Programme for Primary Care (SPPC) is an All-Wales Health Board-led programme that works in collaboration with Welsh Government and brings together all previous Primary Care strategies and reviews at an accelerated pace and scale, whilst addressing emerging priorities highlighted within 'A Healthier Wales' (The Strategic Programme for Primary Care 2024/25). These reports argue a skilled and sustainable community and primary care workforce will be key in delivering service transformation outlined in the strategic priorities. Nursing a substantial resource in the NHS accounting for up 40% of entire workforce will be a crucial staffing group in service delivery. (Royal College of Nursing (RCN) 2023).

Primary care accounts for 80% of all NHS contacts in Wales and at the heart are General Practice nurses (GPNs) who play a central role in delivering care closer to home, aligned to population health, disease maintenance and disease prevention. However, critical health and care professions, especially nursing staff recruitment has for many years, been challenged by significant recruitment and retention issues in Wales and across the United Kingdom (UK). Universities are reporting a continued decline in applications for nurse degree programmes; there was a 22% reduction reported for pre-registration nursing degrees between 2023 and 2024 in Wales and this is a national trend across the United Kingdom. (Universities and Colleges Admissions Service (UCAS) 2023-2024). With staff vacancies and increased need for time in dealing with continuous backlogs and increasing demand, there are reported feelings of discontent indicated in the nursing literature compounded by the impact of the Covid 19 pandemic as continued numbers of young nurses leave the profession year on year below the UK retirement age. A Nursing and Midwifery Council report in 2022 identified between 2018 and 2022, 32% of leavers (42,756 registrants of the NMC) were aged between 21 and 50 (NMC, 2022).

The Primary Care and Community Nursing Framework 2024-2027 for Wales developed for the nurses by the nurses, outlined the vision for change and urgent priority work streams to support the future of this valuable workforce. This paper explores the views and future role of GPNs in practice and as a key profession in delivering the strategic priorities for NHS Wales.

Identification of the Project Requirements

The World Health Organisation proposes that "Nurses and midwives are central to Primary Health Care and are often the first and sometimes the only health professional that people see and the quality of their initial assessment, care and treatment is vital. They are also part of their local community – sharing its culture, strengths and vulnerabilities – and can shape and deliver effective interventions to meet the needs of patients, families and communities." (WHO 2024).

As such, GPN's are key to the delivery of effective and efficient care but must contribute to and align with:

1. National strategy and intent (Strategic Content).
2. Workforce skills and availability (Workforce)
3. Dynamic developments and external supporting stakeholder offerings (Key Developments).

Strategic content

The "All Wales" Primary Care response and contribution to 'A Healthier Wales'. (WAG 2018) centred on a programme of six key work streams, all designed to develop and deliver an increased pace and scale of previous work and address new, emerging priorities within 6 work streams which aim to deliver care at a cluster level with community and primary care services.



Figure 2.1. Strategic Programme for Primary care 2024.

The programme and its policy document place emphasis on Primary care who provides the first point of care for more than 80% of peoples' contact with the NHS in Wales with primary care nurses well placed to influence and support patients making healthier lifestyle choices for themselves and their families alongside public health. (Strategic Programme for Primary care 2024)

Workforce

GPNs are key members of the multi-professional workforce delivering services across both planned and unscheduled care to the lifespan of the population. The role of general practitioner nurses is pivotal in the development of a 24/7 community workforce, future clinical community pathways, and provision of safe person-centred coordinated care. The Primary and Community nursing Framework 2024-2027 since the launch of the SPPC was developed by community and primary care nurses outlines how the nursing professional group will achieve the ambitions of 'A Healthier Wales and the 'Primary Care Model for Wales' and priorities of the SPPC. The Framework delivered to Health Boards and Welsh Government a future vision for the future nursing model following a staged engagement with 500 Nurses across Wales via a survey, workshops, presentation and various sharing and development events.

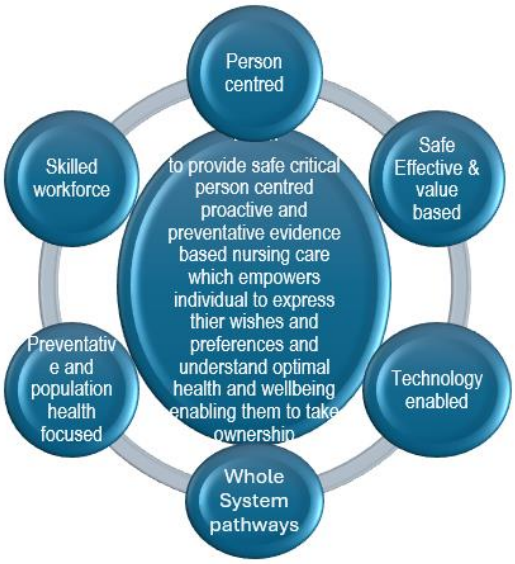


Figure 2.2. Framework for Primary and Community Nursing 2024-2027.

This vision also aligns to the Chief Nursing officer for Wales set out priorities for the Nursing professional group which support the strategic content of A Healthier Wales and the SPPC.

The 5 overarching priorities which have been agreed are:

- Leading the Professions
- Workforce

- Making the Professions Attractive
- Improving Health and Social Care Outcomes
- Professional Equity and Healthcare Equality (CNO S Tranka Wales 2021)

In the literature, there is a common denominator - that of an urgent need to address the workforce issues and Primary care nurses need to evolve taking on additional enhanced and advanced roles across services with nursing leads encouraged to drive the priorities which can be challenging for GPNs who often as they sit outside leadership structures in Local Health Boards. (LHBs). Another stakeholder, Health Education and Improvement Wales are investing in and supporting the Strategic Workforce Plan for Primary care which was launched this year (2024). They have already funded and developed key initiatives to address the current crisis in the profession where over 50% of practicing GPNs will be due to retire in the next 10 years.

Key developments from HEIW for Primary care/GPNs

The key developments and dynamic changes in the GPN operating and professional environment are summarised below:

Table 1: Key Initiatives from Health Education and Improvement Wales.

System Feature	Implications for the workforce
GPN Framework	Outlines key skills and competencies of a GPN. This is the first time in Wales that a clear set of standards has been produced. The framework also supports employers and practice nurses to consider and identify training needs, as well as supporting their career development.
Pre-Registration Practice Education Facilitators	Regional posts funded across the 8 LHBs to support the engagement with Universities and General Practices to increase the uptake and training required to host pre-registration nurse placements in practice HEIW provide a small funding incentive to practices who agree to provide placements.
GPN Foundation Programme	Provides standardised pathway for nurses who want to develop a career as a GPN. The programme was launched in Autumn 2022 with the first cohort of nurses starting in January 2023. Over nurses have completed the programme to date HEIW provided a 50% funding for the training.
Professional Framework for Enhanced, Advanced and Consultant Clinical Practice in Wales	The Professional Framework for Enhanced, Advanced and Consultant Clinical practice in Wales draws on the previous Framework for Advanced Nursing, Midwifery and Allied Health Professional Practice in Wales (NLIAH 2010), and the Guidance for Appointing Nurses, Midwives and Allied Health Care Professionals to Consultant Posts document (Welsh Government, 2014).
Source: The Researcher (2024)	

Many of these initiatives, from HEIW, remain in their infancy and it is difficult to evidence the impact on the recruitment and retention as current nursing workforce data suggests a continued decline. This exposes a gap, which this research seeks to highlight by addressing the views of GPN nurses and how the role can be shaped to contribute to its full potential. It is noted that similar trends in England in Primary care nursing has also led to earlier developments of the GPN role than in Wales and as a means of addressing this workforce challenge. The General Practice Nursing 10 Point Plan (GPN10PP) has helped to create a more formalised structure and subsequent career pathway for primary care nursing. To Lead teams, though many and varied in approach, coming together with funding support from Health Education England (HEE) to train nurses new to primary care and develop them on their way to Advanced Clinical Practitioners (ACP).(NHS England, 2017).

The challenge remains that Local Health Boards (LHB) in Wales must urgently invest to deliver these frameworks and initiatives in primary care and highlight the issue and the role of GPNs to integrate them into the wider system, optimise the workforce and support a sustainability in the future model for Primary care. Emerging themes for priorities from the Strategic documents and framework are directing the future

nursing model and further enablers will be explored in the next sections which provides analysis of the research findings.

The Personal Motivation of the Researcher

The researcher is a qualified nurse and has an experience of nursing, management and senior leadership which spans 30 years and in a variety of roles. The role involves leading and directing nurses on a regional basis in Swansea Bay University Health Board (SBUHB) with professional advocacy for primary care nurses including GPNs and aims to raise the profile of this nursing group, highlighting the contribution they make to patient populations and general practice.

- To inform the research subject area a survey and set of interviews were carried out to supplement the literature review, key research questions that guides the study is what are the views and experiences of General Practice Nurses concerning their role and value for a modern Welsh primary care service?

The literature review shows many gaps in the current 'body of knowledge'. This gap created a research question for the study. The research question was determined to be:

"What are the experiences of General Practice Nurses in LHBs and the future model for Welsh primary care service?"

Research Methodology

This section will present and defend the chosen research methods that were used to investigate the role of the General Practice Nurse in an effective and credible manner. To help the reader understand these decisions, the research used the Saunders et al. (2016) 'Research Onion'. Figure: The Research Onion (Saunders et al., 2016)

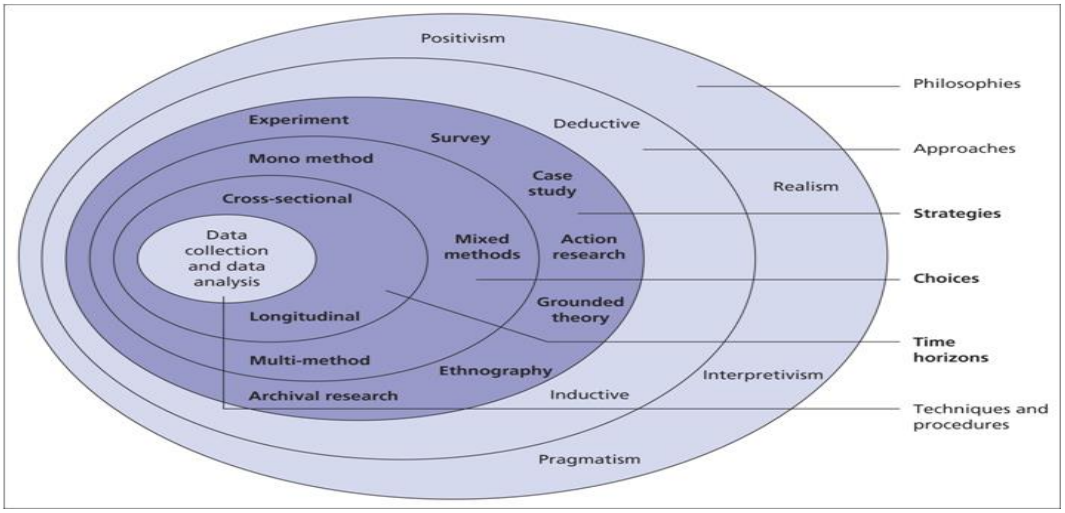


Figure 3.1. The Research Onion Saunders 2014.

Table 2: Research Design.

Design Feature	Commentary
Pragmatist Epistemology	The researcher is interested in professional practice and the role of the General Practice and the view of the General Practice Nurse.
Inductive Approach.	Due to the lack of published works, the researcher decided it was beneficial to look at GPN's in the context of their workplace and this required a 'bottom up' approach to gathering perceptions of the nurses. The approach indicates a theory building approach and therefore an inductive protocol was adopted.
Literature Review	Google scholar iFind and other libraries. She reviewed journals and grey literature from 2014 onwards but placed more on work published after 2015 due to the impact of the pandemic on primary care practice and the most recent introduction of major changes to the structure and processes of NHS Wales.
Case study strategy	The main unit of analysis is the nurse within the general practice. The case study for this study is the Welsh NHS general practices. Each informant represents a case study embedded within the Welsh NHS.

Methodology	Mixed methods. The researcher combined a questionnaire (for practicality and gathering a wide range of feedback) and semi-structured interviews for depth and flexibility of answers (context rich understanding with the ability to explore issues with the interviewees).
Approach	Cross section Approach: General Practice Nurses were drawn from all practices in Wales and informants were drawn from a range of practices in the country.
Instruments	Deep interviews with purposively selected experts combined with online survey for professional GPNs and stakeholders.
Ethical approval	Granted by Swansea University in July 2024. Online checker conducted as well to confirm this study as a 'service review'.

Research Methods Explored

Questionnaire: Employing perceptual questions (Likert Scale) and the following sections.

Access to Informants:

- The questionnaire was created using MS Forms and administered to the practice managers of General practices who a responsible for the line management and for recruitment of the General Practice Nurses.
- The survey was sent to 108 GPNs and ANPs and 41 respondents were received.

The Survey questions were designed to support a number of areas:

- Age demographic
- Time serviced in General practice
- Roles and responsibility
- Access to clinical and restorative supervision
- Knowledge of progression
- Open ended questions were included to capture their personal views of the role and future opportunities for the role in general practice.

Interviews: Semi Structured based on a few questions that allowed the person to explore, in substantial detail, aspects of the GPN role and their views.

Selection wider than practices GPNs to add broader views and more stakeholders of the GPN profession. See the table below for evidence of informant expertise and selection.

Table 3: Expert interviewee selection.

Credibility					
Role	National Educator and Primary care ANP	Professional educator and GPN lead	GPN	GPN	Practice manager
Skill	Academic	Education	Nurse	Nurse	Managerial
Experience (years)	15	20	30	5	15
Length of Interview (Hrs)	1 hour	1hr	1hr	1hr	1hr

Acknowledged Limitations

The researcher experienced a lack of peer-reviewed journal papers due to the contemporary nature of the GPN role and the dynamism of changes to the role. Beyond this she deliberately selected the country of Wales and excluded other regions.

Study Generalisation

The findings can be generalised within Wales but also beyond as nursing practice is relatively similar across the world and nurses face the same challenges (technology, regulation, processes and an ageing population). The next section will present the findings of the researchers own research and National research.

Findings (Context)

The Welsh Challenge

Wales has 374 GP practices in the 8 local Health Boards (2023), which is a decrease of 9 GP practices from the previous year. These practices continue to see increased demand as services shift into a community with an aging population and range of complex health conditions. In a survey carried out by the BMA doctor's union in Wales, 80% of GPs stated they feared they were unable to provide quality and safe care to patients due to their excessive workloads and diminishing workforce. (BMA.org.uk). The demand in Primary care exceeds its shrinking workforce GMS data in 22/23 gave a snapshot of the activity:

- 27 million telephone contacts
- 19 million appointments
- 56 million prescriptions offered
- 3 million referrals to secondary care
- Over half a million fit notes issued (BMA.org.uk 2023)

The RCN Nursing In Numbers Report 2023

- There are 1,023 FTE registered nurses working in general practices in Wales. To put this in perspective, there are 1,445 GPs.
- The age profile of nurses working in GP settings is concerning. Fewer than one in twenty (4.3%) of female nurses are 29 or younger; 41.5% are aged between 30 and 49; while over half (54.2%) are aged 50 or over. In addition, 14.8% of all nurses with known age and gender are aged 60 to 64, and 4.5% are aged 65 or older.
- Nearly all nurses aged over 60 are female.
- RCN Wales estimates that there are at least 2,717 registered nurse vacancies in NHS Wales in 2023. (RCN 2023)

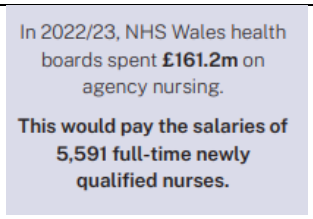


Figure 4.1. Agency Spend.

Table 2: NHS Wales registered nurse vacancies by health board. Source: Freedom of Information requests.

Health board	Vacancies (FTE)
Aneurin Bevan	366.00
Betsi Cadwaladr	882.60
Cardiff and the Vale	314.49
Cwm Taf Morgannwg	283.03
Hywel Dda	311.11
Powys	119.75
Swansea Bay	439.8
All	2,716.78

Figure 4.2. Vacancy Data.

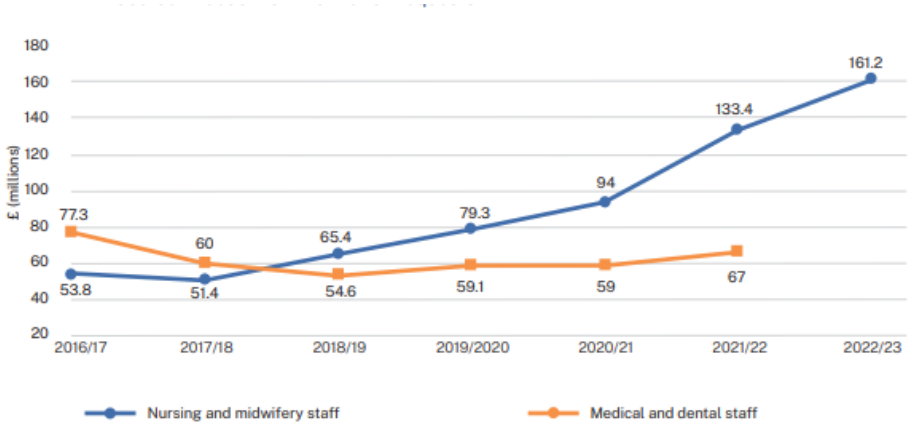


Figure 4.3. Vacancy Data.

Nursing Vacancies not only impact on the financial position in services, but they also impact directly on patient safety and often services are recruiting from the same resource so there is a constant swirl of staff moving between services with no increased capacity created in the system.

There is little evidence in the literature of utilisation of bank and agency staff in general practice as this is such a specialist role and with the aged workforce demographic in Wales with many opting to work part time there is potentially little scope. This will also reduce opportunities to backfill staff for training which would result in further deficits in general practice and inequity.

The Nurse Staffing Levels Act Wales Legislated by Welsh Government (2016) outlines the need to calculate safe nursing numbers in clinical areas however; this only applies to acute wards and Nursing Unions continue to campaign that this calculation should be adopted across Wales for all nursing services. (Welsh Gov 2016)

The impact in nursing vacancies in Primary care will form part of the discussion of this research.

Research Findings

Localised Data to support Survey

The LHB where the survey was undertaken data reported National Workforce Reporting Services (NWRS) provided the following data:

- 42 independent general practices in the region.
- 108 FTE nurses active in practice under the headings of: practice nurses, extended role practice nurses nurse partners and nurse specialists.
- 16.1 Advanced Nurse Practioners.
- Patient population is estimated to be around 390.000 in the region. 1 FTE Nurse to 3,145 of the population.

Survey carried out in 1 Local Health Board (LHB)

Interview questions were constructed and sent to identify the key elements in the literature and strategic priorities from the views of the GPN.

The Survey was sent to all GPNs in the 1 LHB. (Contacts in the region the accuracy of the list of active nurses can be subject to change). 41 responses were received, which is a significant percentage of the GPN population in the region.

- The Survey Questions were themed to address the following areas:
- Workforce demographic
- Level of responsibility
- Access to Restorative and Supervision
- Training and progression
- Recruitment
- Challenges and Opportunities for the workforce

The Study Findings

Question 1: How long have you worked in Primary Care?

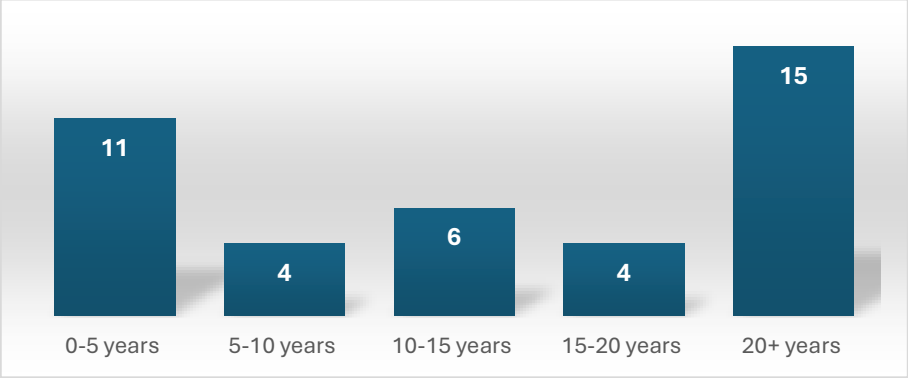


Figure 4.4.

Question 2: Age Group of respondents

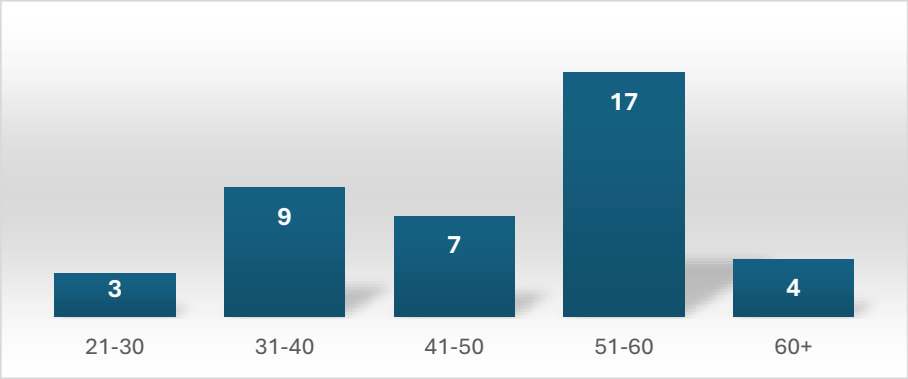


Figure 4.5

From the respondents 52% are over the age of 50. This corresponds with the RCN Nursing National survey in Wales. From literature there are a number of studies which highlight the shortfall and issues in recruitment into general practice for nurses have been a historic problem. (Butler 2022, NHSE 2023). The Queens Nursing Institute (2015) reported that 33% of general practice nurses were due to retire by the end of 2020 and the survey evidences a majority have been in practice over 25 years. The findings confirmed the same demographics as other national studies. The researcher is content that the population of respondents are typical of the Welsh professional demographic.

Question 3: How many days are you in practice and what are your contracted hours?

Part one (Days)

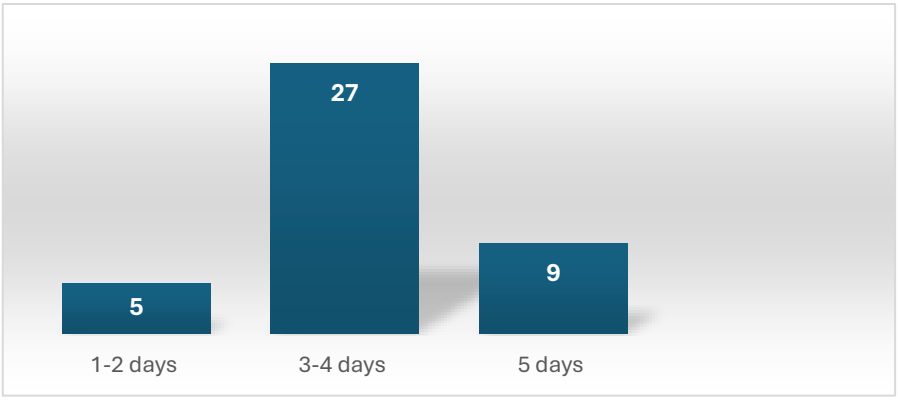


Figure 4.6.

Part 2 (Hours)

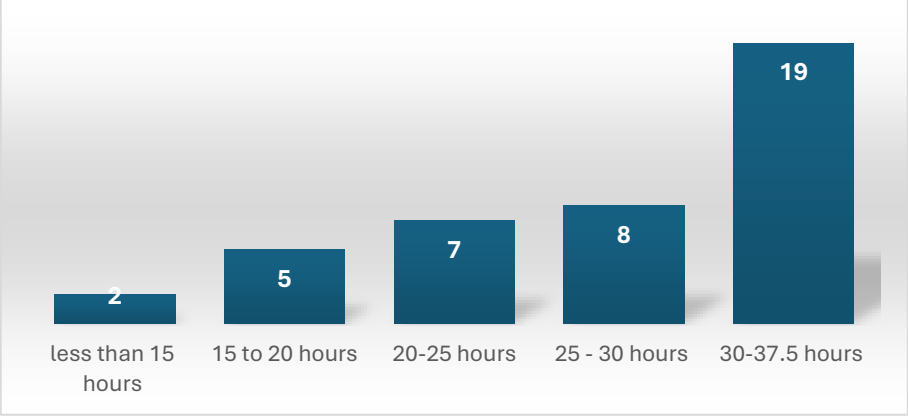


Figure 4.7.

In Comparison to Healthboard contracts where 37.5 hours is a full-time position and less hours are part time. The majority of GNPs are part time (Pie chart below). Part-time hours do reflect an older demographic in the workforce and headcount versus full-time equivalent data.

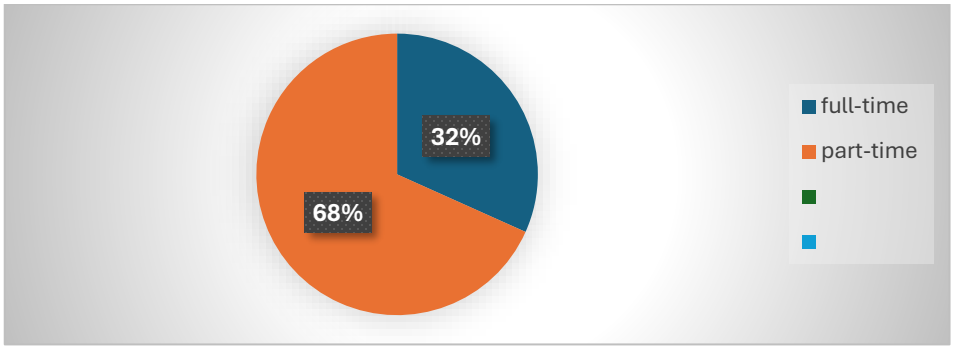


Figure 4.8

Question 4: Do you access training to support your role?

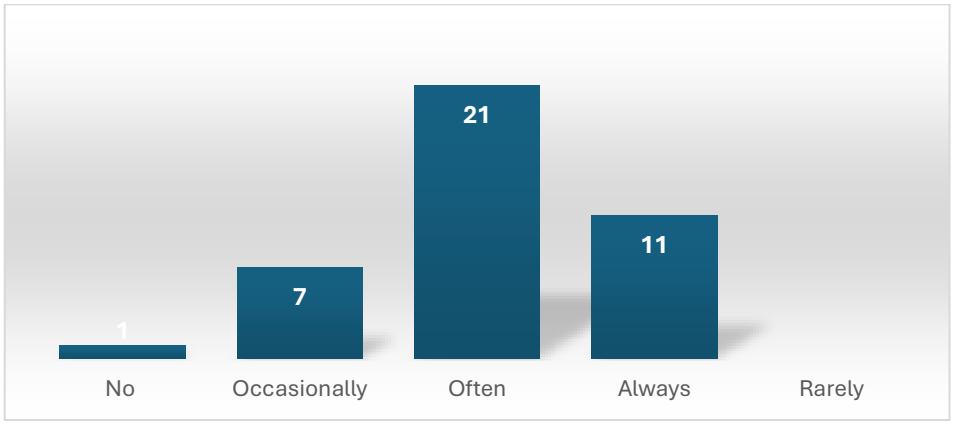


Figure 4.9

Despite being experienced professionals and typically working part-time hours, the majority of staff still accessed courses to support their role with over 70% selecting 'often' as an answer, however those who are struggling to access training are still just under 1/3 of respondents. The funding and effectiveness of training will be down to independent contractors to meet their contractual requirements and professional standards. Clinical Supervision can support assurances in proficiencies and training.

Question 5: Do you access clinical supervision to support your role?

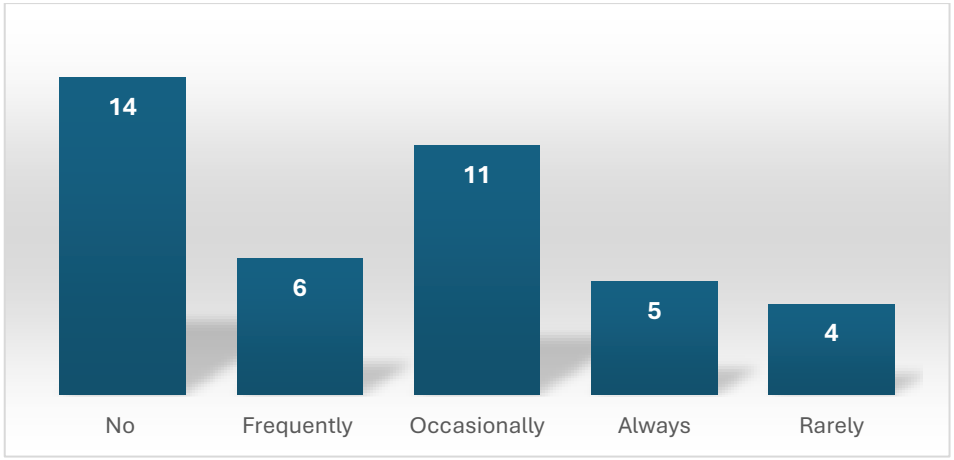


Figure 4.10

As there is no mandate on clinical supervision, it is not acknowledged, as an integral part of professional activity and competency, yet the costs associated with recruitment and retention and issues such as stress-related sick pay outweigh the cost of supporting clinical supervision and building time for it at a strategic level. (Jones 2022).

The majority of GPNs were found to work autonomously within each practice and the finding was reinforced by the lack of direct access to support supervision when needed. The findings suggest GPNs can work independently and have the skills needed to perform an effective role in the practice setting. However, access to supervision may hinder professional development and be attributed to the small number of nurses aligned to each practice and access to a supervisor. These barriers need to be further explored.

Restorative clinical supervision (Wallbank, 2007) is a model of supervision designed to support professionals working within roles where they have a significant emotional demand.

Question 6: Do you access peer support for restorative supervision in your practice?

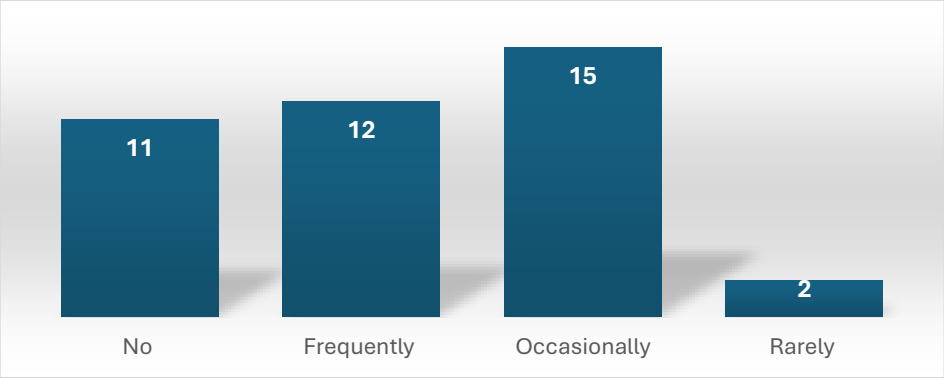


Figure 4.11

Nurses have been in difficulty due to conditions in healthcare which have affected their energy, morale, and physical and mental health, even before the onset of COVID-19 restorative supervision has been considered in wider literature to support resilience and wellbeing of nurses. Staff wellbeing is linked to better patient experience, increased compassion, fewer errors, lower patient mortality rates, lower absence rates, increased morale and reduced staff turnover. (Featherbe 2023).

Question 7: Does your service area promote effective Multidisciplinary team working?

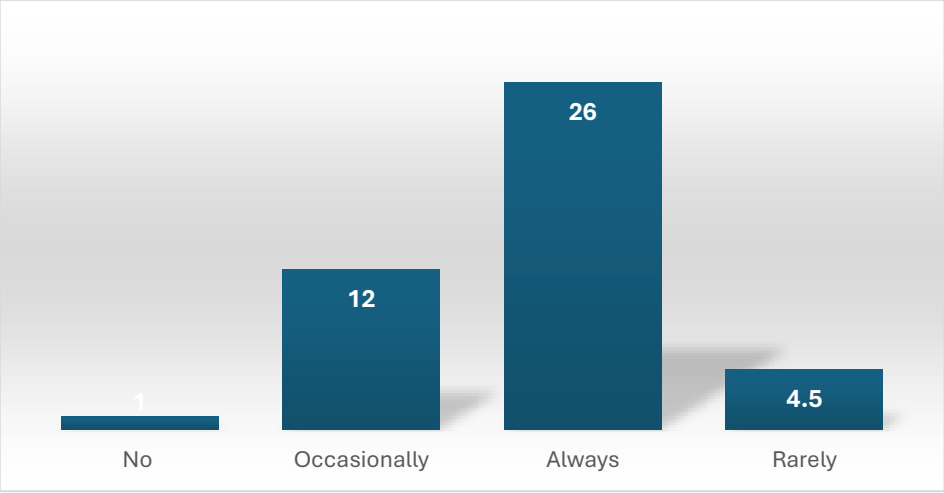


Figure 4.12

GPNs are working autonomously in the modern workplace but this environment requires a team approach, and the survey found that this is also the case. Interpersonal skills are needed to ensure team-based care models for the future; this identified in the various professional studies means that a modern GPN must be skilled, and have the skills to work as part of a multi-professional team

Question 8: Do you supervise junior nurses in your practice? (Applicants tick all applicable)



Figure 4.13

GPNs hold a management, supervisory or governance role with Healthcare Support Workers and this confirms the pivotal role of the GPN as a team member but also as a technical specialist with responsibility to oversee other less-clinical staff groups.

Question 9: Do you work with Health Care Support workers? (Applicants tick all applicable).

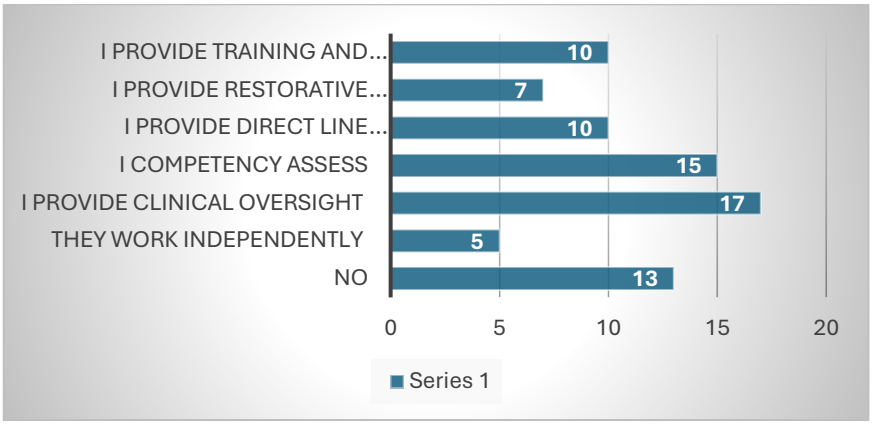


Figure 4.14

Within the modern workplace, the GPN also provides a management role (for junior nurses) which confirmed by the finding that the GPN provides various forms of periodic management and continuous daily management roles especially providing supervision and clinical responsibilities for the benefit of others.

Question 10: Do you have an understanding of the opportunities for career progression and training pathways for General Practice Nursing?

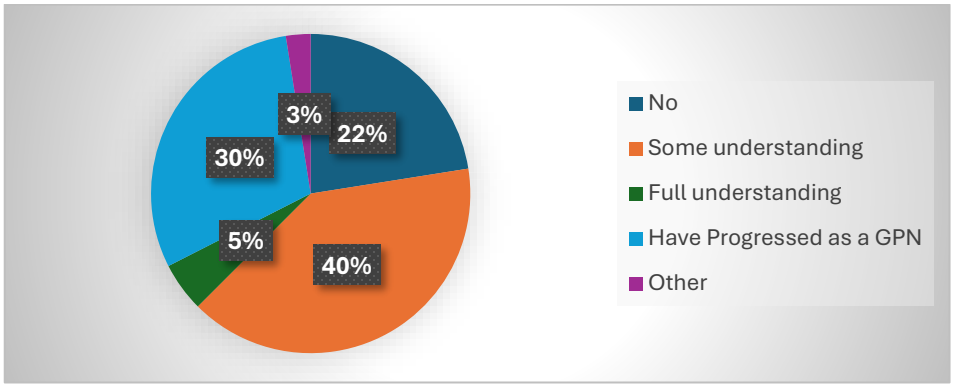


Figure 4.15

Of significant concern and, reflecting the confusion in definitions of the role in literature, the respondents show a significant level of confusion about career progression and where their skills/experience might take them. This may reflect the absence of Nurse Leadership in independent sectors for nursing.

Question 11: Select what areas you believe strongly impact on the future of General practice nursing in Primary care. (Applicant to tick all applicable)

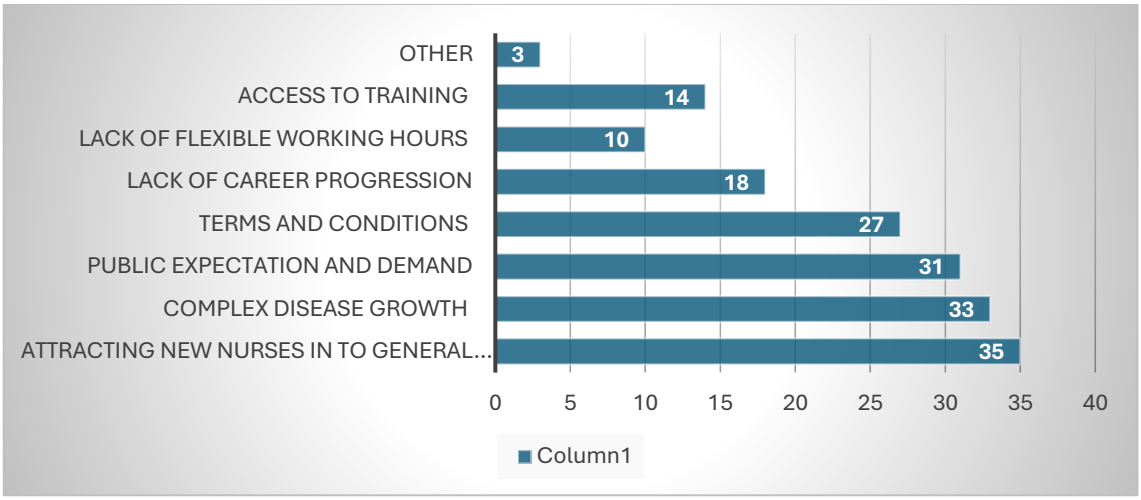


Figure 4.16

The survey posed a question concerning the perceived challenge to the GNP role and this revealed a common belief that the issue of attracting the next generation of nurses poses the biggest single challenge to the profession with 35 selecting this answer. Without exposure to the practice, clarity of the role and equity in career progression the National Initiatives alone will not address this issue without advocacy from LHBs and opportunities for collaborations in Education and Healthboard Strategy.

Complex disease management was the second highest answer from the GPNs, and this was supported in the literature, General practice has seen a steady increase in demand and complexity in an ageing and diverse patient population. A key area of service care delivery for GPNs is managing chronic disease through health prevention, monitoring and promotion. GPNs provide direct patient care. They assist patients in managing long-term conditions such as diabetes and epilepsy, provide respiratory care, carry out vaccinations, and take blood tests across the lifespan of the patient population in Wales.

Public Health Wales published a report in 2018 with the aim to predict trajectories of epidemiology in health determinates across Wales. The report utilised a common currency for health and risk factors, the burden of disease, to assist with consideration of relative priorities including wider determinants of health with a particular focus on children. The report considered international comparisons, focusing on what those countries with the best outcomes achieve, and provides both past and projected future trends to inform strategic planning. Key element of the report will have a direct correlation to Primary care services with the predicted ageing population associate with a larger demographic living with chronic disease. The report indicated by 2035 the proportion of adults (18+ years) living with a limiting long-term condition may increase by 22%, with greatest increases in stroke (33%), and heart condition (31%) and neurological conditions including dementia (72%). (PHW 2017)

Given the demand that modern health and care systems are based on accurate and timely information flow to support the flow of the patient, the survey tested the role of IT as an enabler for higher GPN performance. The results show that, despite the maturity of the GPN and growing up during an era where computers were a novelty, the role makes extensive use of new technologies to support clinical judgement and management routines, and a majority feel they need modifying for nurses in practice.

Question 12: Do you have access to digital systems, which support your role?

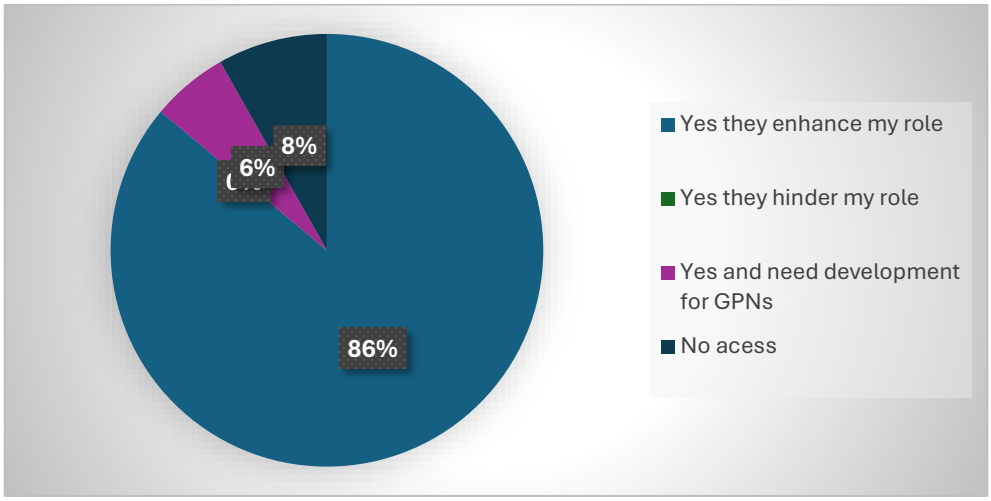


Figure 4.17

Question 13: Are you supportive of having student nurses in general practice?

The current policy documents also call for a new generation of staff to join the profession and that implies the introduction of new staff to practice. These staff need to be taught and mentored so they develop to become employees who can fulfil the clinical, managerial and team roles of the modern GPN job description. The survey found a general positive view of such recruitment and the new mentoring role of the existing GPN.

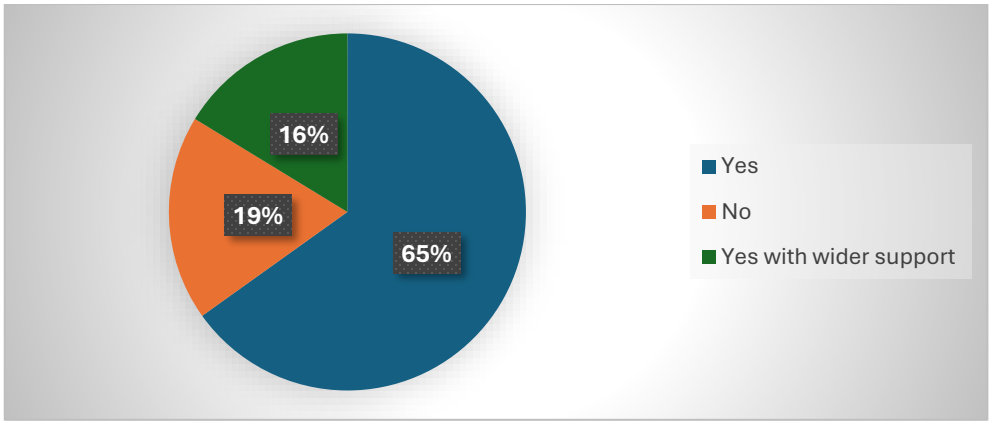


Figure 4.18

However, a significant minority of the existing GPNs expressed negative views or a requirement for support to manage new staff. The survey also explored whether GPNs receive and can access support as part of a wider community of practice and skills development. The response shows that most GNP do receive such support, but this is not a universal result which implies almost 1 in 5 existing GNP operate in a way that are unsupported.

Question 14: Have you had any support or reached out to the Health Boards Primary and Community Academy?

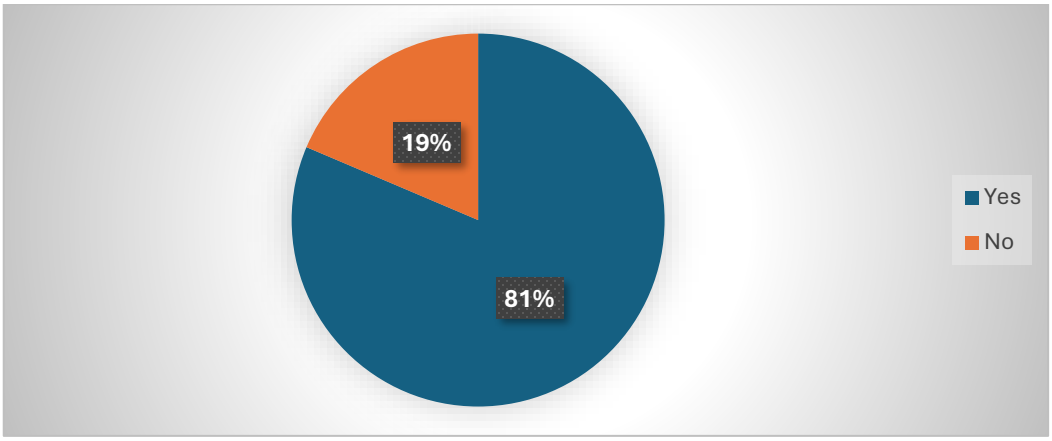


Figure 4.19

The modern workplace and increasing demand for practices means that the manner in which support is provided is very important and must be sympathetic to GNP who cannot always find time to engage in off-site training and development activities.

Question 15: Would you be interested in bite size lunchtime learning events?

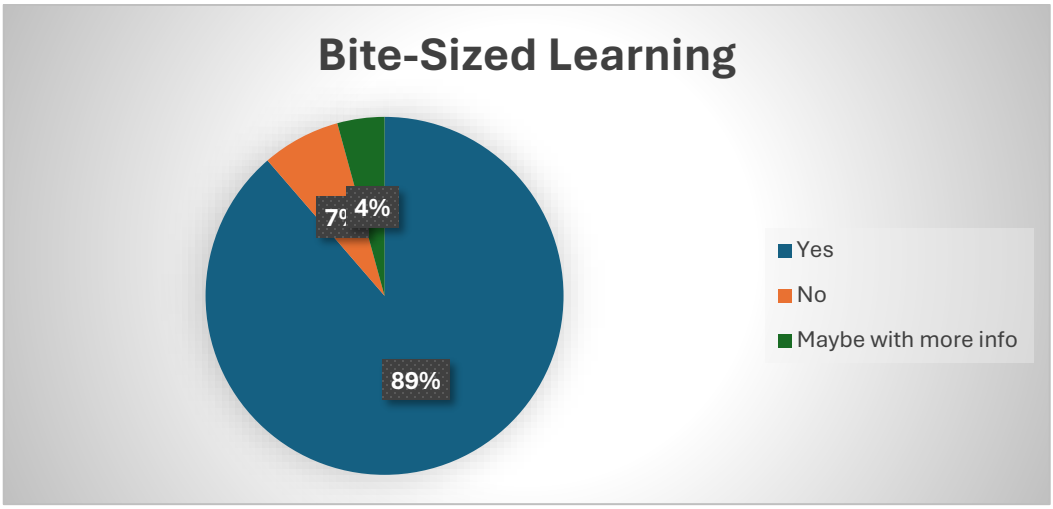


Figure 4.20

The respondents showed overwhelming support for regular and often sessions of smaller amounts of technical skills development (and as a group) rather than traditional forms of training. The result shows that the modern time-pressure workplace is dictating what training skills and modes of delivery are 'right' for GPNs.

A 'lunch and learn' education programme will support training and education in bite size format and support nurses in general practice to network with other GPNs establishing peer support.

The survey also offered open-ended questions to explore messier and less well-defined subjects and pressures on the GPN. Addressing the common problem of all professional policies and previous studies, the researcher explored the issue of attraction to and recruitment of new staff as GPNs.

Question 16: Can you describe 3 things that would help develop and increase recruitment and retention opportunities in General Practice Nursing?

17 respondents (**41**%) answered **pay** for this question.

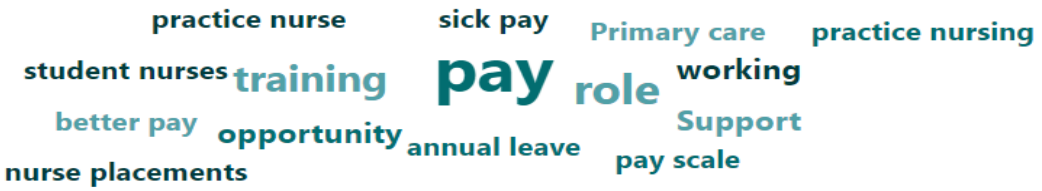


Figure 4.21

The responses show pay, training and role development are the three most significant initiatives that could solve the recruitment shortfall. This reflects the wider literature as the inequity in the profession around pay outside the agenda for change terms and conditions, is not widely understood or aligned in independent contractures but could be a huge barrier in nurses working in Primary care.

Exploring the motivators of the existing GNP role, the researcher sought to find the parts of the role that provide the most job satisfaction and the findings show that patients, families and the continuity of care provided to these people are the most rewarding aspects of the role.

Question 17: What do you enjoy most about being a Nurse or ANP in General Practice?

23 respondents (**56**%) answered **patients** for this question.



Figure 4.22

In summary, the findings support new insights into the GPN role and enablers for the role to develop and provide higher levels of safety, quality and valuable care in the primary care context.

The researcher completed a small number of interviews to support further exploration of the subject area inclusive of wider professionals associated with Primary care to explore the GPN role, its perception and future direction. The purposively selected expert interviewees posed and answered eight questions.

Table 4: Interview Questions.

Interview Questions
Question 1: How do you perceive the role of primary care nursing in the broader healthcare system? Question 2: What do you believe are the key differences between primary care nursing and other nursing specialties? Question 3: How do you think primary care nursing is perceived by other healthcare professionals and the general public? Question 4; How do you envision the future of primary care nursing? What changes would you like to see? (If you could write a 5 year Vision statement)

Question 5:
With over 50% of Primary care nurses aged 50 and over across Wales how do suggest we attract nurses into Primary care services

Question 6:
How could local Health board's better support primary care nurses in their roles?

Question 7:
What advice would you give to someone new to primary care nursing?

Question 8:
Is there anything else you would like to share about your experience as a primary care nurse or working alongside primary care nurses?

Interview Candidate	Role
Candidate 1	General practice manager
Candidate 2	GPN educator with LHB
Candidate 3	National Nursing Primary care education and clinical lead
Candidate 4	Practising GPN over 30 years
Candidate 5	Practising GPN Foundation programme graduate

Discussion

I set out the answer the following question:

> **"What are the experiences of General Practice Nurses in LHBs and the future model for Welsh primary care service?"**

The Researcher identified the following themes from the literature and research:

An Aged workforce

Career pathways in General Practice are often associated with the end of a career, where younger nurses and newly qualified nurses are not encouraged to enter the profession for a fear of being de-skilled due to the lack of exposure and understanding of the GPNs role. The survey identified from the respondents 52% are over the age of 50 which aligns to the findings of the National RCN Nursing in numbers 2023 report and suggests nurses are older in this area of work. (RCN 2023)

Maximising the opportunities to share the experience of the long service GPNs identified in the survey which identified 25 out of 40 have worked in General practice for over 10 years 15 of which have over 20 years plus as a GPN.

Interview Candidate 1 a practice manager affirmed the value of experienced nurses by adding:

> *"We've got a vastly experienced nurses, and frankly without them things like chronic disease reviews, the day to day running of the practice and the support to the GP cohort would not be there."*

Interview Candidate 2 a GPN in practice when asked about the perceptions of GPNs from those outside the professions added:

> *"Many nurses will see Practice Nursing to enter at the end of their career when shift patterns and stress becomes troublesome in other nursing teams, however, from my experience many nurses find it difficult to adjust to proactive when entering late and often return to their speciality".*

The "age issue" is an acknowledged problem with the profession and the growing shortage of general practice nurses has resulted in calls for better marketing of such roles and increasing the value of general practice nursing as a specialty in the eyes of future potential applicants – these target audiences being nursing students, newly registered nurses and nurses with previous experience in other areas of nursing. (QNI 2015).

There are several untruths that surround newly qualified nurses being able to work in primary care as they start out in their career. (Gilroy 2020) However, the research has identified that attracting new nurses into Primary care is a challenge for potentially the following areas. The survey was conducted in Ques 11. Attracting new nurses into the GPN workforce as the most common challenge to impact on the future workforce which will be discussed under the following themes in the literature.

Lack of understating of the role outside the profession

The role of a GPN is often misunderstood by individuals and even downplayed by GPNs themselves. Despite the variety of tasks completed by GPNs, the role of the GPN is often unclear, and its scope and depth are not understood by the wider public (Launder, 2022)

Even by definition, the National data reported by practices has a variety of titles for GPNs including, practice nurses, extended role practice nurses, nurse partners, nurse specialists.

GPNs can have a varied professional background given they support patients across the lifespan and either complete an adult nursing degree a child, mental health or learning disability degrees (NHS Health Careers, 2022) if they can demonstrate the relevant competencies.

These misconceptions were discussed during the researcher's interviews. The answers from the nursing candidates were very similar, Candidate 2 an experienced GPN and now working in sustainability, training and education for the workforce stated:

> *"I don't think other teams know what we do, where I've worked in the past we've had student nurses come to work with us and they have been blown away by the scope of the roles"*

HEIW has taken huge leaps to change the narrative and attract new nurses into General practice with the launch of initiatives such as the GPN foundation in Wales which enables new nurses with no practice nurse experience, an accelerated pathway to training and achieving all the key competencies required in general practice.

Wales has seen the development of Primary and Community Academies across all 8 regions driven and funded by HEIW. These Academies support training and education which support local needs and have delivered support for the Primary Care nursing workforce which includes:

An Australian paper noted that in Countries such as Wales the United Kingdom, Australia and New Zealand recognised the challenges faced by nurses in Primary Care who predominantly work in independent businesses outside Health boards (where physical environments, lack of equipment, and ill-defined roles have all been cited as issues causing dissatisfaction amongst PHC nurses (Halcomb et al.,2018)

Career progression in nursing is an important feature in retention for the nursing workforce.

Interview candidate number 5 a practising GPN for over 30 years stated in her interview several opportunities to change the narrative and raise the profile of GPNs through further integration with key stakeholders such as the LHBs and Universities and accessing training and exclusion in the Primary care Academies.

Career progression

The scope of practice for GPNs and Carer progression opportunities in the independent sector where nurses are not supported by an agenda for change terms and conditions is also a potential for inequity and variation in standards of practice.

In the survey over 60% of nurses were identified to lack understanding of career opportunities and progression in General practice which may also indicate the lack of opportunity aviable to this workforce or attribute to the age of the current GPN workforce.

Interview Candidate 3, an experienced National Primary care education lead and practice ANP in primary care, stated in her interview:

> *"We're not in the treatment room just dressing simple wounds we are autonomous practitioners with a lot of strengths where we can demonstrate we a clinician at the top of our licence providing the best healthcare to patients".*

Promoting GPNs into leadership roles will empower the workforce to build a voice and increase value in the profession which would also help the ongoing issues of the workforce feeling invisible. (Bowers 2023)

The GPN Nursing framework offers the opportunity for a clear and consistent approach to preparing and developing nursing roles, teams and careers in general practice, to meet the care and support needs of people registered with practices across Wales. It has paved the way for career progressions however, the survey suggests more needs to be done to put this into practice.

Terms and Conditions

The majority of GPNs and health care support workers (HCSWs) are directly employed by general practitioners (GPs) who are subcontracted by health boards to deliver the general medical service con This perception of feeling unrecognised is compounded by the fact that GPNs are not paid on NHS terms and conditions and often have only statutory sick pay, statutory maternity pay, and limited access to clinical and restorative supervision which has been a significant priority in NHS recovery post pandemic. A small number of GPNs and HCSWs are employed directly by health boards.

Morale has also exacerbated following recent reports that senior policy makers were of the opinion that the inclusion of an agenda for changing pay scales, terms and conditions within the contract would be unaffordable, therefore unlikely, adding to the frustration and feeling of being undervalued (RCN 2024)

Pay features as a predominant answer from the GPNs in the survey.

Interview Candidate 2 stated:

Attracting new nurses into General Practice

To encourage new nurses into Primary care emphasis needs to be considered to provide effective support and development opportunities from the outset. National initiatives such as the GPN foundation programme clearly offer the governance and support required to train and hopefully retain nurses in general practice, however, have only managed to support a small number of nurses to date. Health boards need to support a sustainable opportunity to deliver this programme recurrently.

In terms of pre-registration placement capacity, previous HEIW placement scoping in 2021 revealed that of the 395 identified General Practices in Wales, only 18 supported pre-registration nursing student placements. (HEIW 2021)

Interview Candidate 5, a practicing GPN who has recently completed the GPN foundation programme discussed the opportunity to incorporate Primary care skills days into the preregistration nurse degree programme to raise awareness of the profession and have the opportunity for further stakeholder engagement. As a young GPN this was a creative opportunity to attract new nurses into practice.

General Practice placement offers were challenged by workload pressures in balancing student supervision and clinic responsibilities; incurred financial costs relating to placement governance and administration, and time to release staff to undertake practice supervisor and assessor training. Scoping also suggested GP Practices were often extremely keen to offer placements to showcase contemporary primary care services and influence students' first-destination career choices.

There is real momentum, therefore, in increasing placement capacity in General Practice settings and primary and community care more widely, yet in terms of General Practices, this still only represents 35% of the 395 identified General Practices in Wales. (HEIW 2024)

Public Demand and Expectations

It is well understood that they are key to the reduction of referrals/admissions into secondary care and play a fundamental role in health promotion and prevention. The role of the nurse in general practice is essential to the provision of safe and effective care. RCN has also heard from our membership that demand far exceeds supply and that patients' needs are frequently not met with staffing levels at the level they are.

General practice was already under significant pressure prior to the pandemic and the unprecedented increase in demand along with the largest vaccination programme in modern times and the resulting work left undone has created unsustainable pressure.

Interview Candidate 1 stated:

> *"GPNs are a valuable resource and they are perceived as such by the practice population, have a good working relationship and are on first name terms with the majority of patients"*

Wales has significant chronic disease prevalence which contributes to the majority of the workload for our GPNs. Complex Disease was seen as one of the highest challenges faced by GPNs in the survey questions with increased demand there is a risk of dilution in the workforce and demand to outstrip capacity.

The increase in demand for care has not led to a proportional growth in the number of primary care nurses. This imbalance is related to the decrease in the quality of care and patient safety, and also to the impact on the health of the professional group. (Prerez et al 2020) Opportunities to support GPNs with complex population needs facilitated by working with LHBs and Academies to improve training and wider support is needed as well as reviewing current roles and responsibilities recognising enhanced and advanced roles in Nursing with fair and equitable grading against pay bands. Nurses need to feel valued for the work they undertake in General Practice as a highly skilled workforce.

There are key gaps recognised in the literature and strategic content that need further exploration and was a theme that was strongly emphasised by the interviewees who participated in the research.

- Terms and conditions in independent practice are variable for GPNs who often face challenges with no maternity pay, sick pay or pay progression in line with the scope of practice.
- GPNs value and recognition for the role in wider health care services including Local Health Boards
- Access and understanding of professional development for GPNs
- The impact of an increasingly complex community patient population and its impact on practice nursing.
- How working collaboratively with Health Board teams can enhance opportunities for patients and learning in Primary care and provide leadership.
- The importance of the inter-depenadcies on GPNs in population health and other Community nursing teams to manage community caseloads and explore opportunities to collaborate.

Conclusion

This section will conclude this study, mark its contribution and identify a series of recommendations for stakeholders of the GPN ecosystem.

The views of GPNs align to the wider findings in survey carried out across Wales and the challenges addressed in the Vision and Strategic frameworks. The desire to raise the profile of their profession, attract new nurses and create opportunities to do so was a common theme in the interviews for the GPNs and wider professionals. Addressing terms and conditions that are fair and equitable to recognise career progression, and their skill set is more challenging and not really addressed in literature and its impact on retention.

Research illustrates the urgent need to address the future sustainability of the GPN workforce to meet the required need of an increasingly complex patient demographic. The workforce data speaks for itself with over 50% GPNS due to leaving the profession in the next 10 years. The National work being done via HEIW aims to address some of the gaps in the workforce is very welcomed by the profession with the facilitation of the GPN foundation programme, increasing pre-registration placements. The GPN framework and Primary Care Academies are aiming to address training gaps, however, due to the NHS poor financial climate is the offer enough without Health Boards also and the Welsh Assembly Government investing more in Primary care?

As we face an aging population, and Wales tackles the burden of chronic disease prevalence with GPs also on the decline there will be more and more emphasis placed on the role of nurses in Primary care therefore opportunities to access enhanced and advanced training must be aviable and then valued via fair pay and contracts.

It was clear from the GPNs views they represents a patient centric profession who are keen to raise the profile of their roles and bring solutions to the workforce and retention challenge, which will need local and national enablers and drivers.

With a recent pay award in Wales for nurses under the agenda for change we need to ensure that nurses working in contracted services who play a critical role in the ‘whole system’ delivery in healthcare are considered in any investment from the Welsh Government.

Nursing is the beating heart of the NHS as its largest workforce and GPN are an integral part of our Nursing services at the front door of population health.

Recommendation for future research

Implications for GPNs

- Understanding the views of the GPN can lead to improved practices and better patient outcomes by addressing their insight.
- Views from within the workforce to inform the future workforce.
- Creating leadership amongst GPNs in the Health board can strengthen representation.
- Addressing Nurses views can enhance job satisfaction, reduce burnout and improve retention.

Implications for the Nursing Profession

- Primary Care nursing are equitable partners in the future nursing model
- Opportunities for wider stakeholder engagement and further collaborative
- Exploring nursing perspectives enhances cultural sensitivity and competence in care delivery

Implications for the Organisation

- Highlighting nurses' perspectives can facilitate better teamwork and communication among healthcare professionals leading to more cohesive care
- Research can generate new ideas and innovations in practice from nurses that they can drive and develop

Implications for the Welsh Government

- Insights into Nursing Views can inform healthcare policies, ensuring they are relevant and practical for frontline workers such as Primary care workforce
- Nurses are patients' advocates and research can support meeting the need of an ever-changing patient demographic and addressing gaps in care provision through their shared experiences in practice.

What Next?

Any process of research never truly ends. The limitations of this current study was its focus on a region within Wales and therefore to extend this research, it is necessary to explore the other countries of the United Kingdom and replicate this study.

Another worthy research project would be to undertake a longitudinal study of change at General Practice.

Finally, it would be worthy creating a learning showcase and an exemplary site where staff can visit and see and experience the benefits of a well-developed and well-resourced GNP role.

Final Words

This study is both personal interest and professional responsibility for the researcher. The research has occupied hundreds of hours of design and delivery of field research. It is hoped that readers of this thesis will be motivated to take this study further.

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Barriers and Enablers in discharging patients with cognitive impairments in Swansea Bay University Health Board

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Abstract:

As the ageing population increases, effective discharge planning has become a critical component of health and social care, yet patients with cognitive impairments face extended hospital delays due to challenges in coordination, care availability and community support. A quantitative research design was employed using surveys distributed to health and care practitioners involved in the discharge process. The findings highlight four themes complex needs, capacity, communication and culture as barriers to discharge. Equally, access to community care services and specialist dementia teams were identified as key enablers, though access to there resources remains inconsistent. The paper concludes that systematic improvement in communication, care coordination, and community-based services are essential for optimising discharge outcomes for patients with cognitive impairment. The results emphasise the need for integrated care models and targeted interventions that balance professional responsibilities with patient and family preferences, ultimately aiming to reduce unnecessary hospital stays and improve patient well-being,

Keywords: dementia, cognitive impairment, transition to home, acute care, hospital

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INTRODUCTION

BACKGROUND AND CONTEXT

The global ageing population has resulted in 55 million individuals living with Dementia and it is estimated that there will be 10 million new cases every year (WHO, 2023). In the UK, approximately 982,000 individuals are affected by Dementia (Farrar, 2024), with 46,800 cases in Wales (Wittenberg et al., 2019). Projections indicates that within the next two decades, the number of older people with dementia in the UK will rise to 1.4 million, with a projected economic burden of £90 billion, driven by an anticipated increase in dementia prevalence and the costs associated with the services (Farrar, 2024). In addition to that Department of Health and Social Care states that as cited on Featherstone et al., (2019), one in four inpatient beds will be occupied by an individual with Dementia.

The transition of care between inpatient and community settings presents significant challenges in terms of patient safety and quality (Snow et al., 2009). NICE guideline 94 defined discharge planning as "the process by which the hospital team considers what support might be required by the patient in the community, refers the patient to these services, and then liaises with these services to manage the patient's discharge." Shepperd et al., (2013) states that discharge planning aims to reduce hospital length of stay and prevent unplanned readmissions by providing condition-specific information and organising post discharge support when necessary. It can also improve health outcomes for the patients (Wong et., 2011). Effective discharge planning ideally involves collaboration between health and care professionals and the patient and/or their family, considering a holistic approach for post discharge care (Coleman & Boult, 2003). Ohta et al., (2016) points out that initiating the discharge planning process early during the hospital stay and involving the patient and their family can facilitate a seamless transition from hospital to community settings. On the other hand, inadequate discharge planning can result to poor outcome for the patients and can result to prolong unnecessary hospital stays, occupying inpatient beds that can be more utilise efficiently (NICE, 2018).

Patients with dementia experience hospital stays that are twice as long as those patients without dementia and their risk of readmission are also higher. Patient with cognitive impairment or dementia has also at an increased risk of experiencing a decline in their functional abilities during hospitalisation (Stockwell-Smith et al., 2017).

STRUCTURE OF THE REPORT

This chapter provided a background and context on the issue that will be explored. The remaining part of the report is divided into six sections; Chapter 2 will look at the project requirements. Chapter 3 will discuss the research methodology and design. Consequently, Chapter 4 will present the findings of the study. Chapter 5 will provide an analysis between the findings and the literature. Lastly, Chapter 6 and 7 will cover the conclusion and key recommendations.

IDENTIFICATION OF CLIENT REQUIREMENTS

This chapter introduces the research project to be undertaken. It begins by outlining the problem the study aims to address, followed by the specific task to be examined including the relevance and value to the organisation.

PROBLEM IDENTIFICATION

A collaborative workshop was held on July 2023 to discuss the issues faced when discharging patients with cognitive impairment. The workshop was attended by multidisciplinary professionals within health and social care including Geriatrician, site leads, commissioning team, social workers, service managers, long-term care team and discharge liaison nurses.

During the workshop, five case studies of patients who were deemed as longest delays were reviewed. The common theme was that all patients have a diagnosis of a cognitive impairment/dementia with complex needs which impacts their timely discharge from the hospital. The patient's details were anonymised for data protection.

Table 2.1. Case Studies

Length of stay:	
Patient A	84 days
Patient B	137 days
Patient C	206 days
Patient D	45 days
Patient E	238 days

The total days accumulated between the five patients was 710 days (just 20 days short for two years). According to NHS Confederation (2023) the cost of an acute bed is £350 per night, considering Patient E (238*£350) length of stay, it has costed SBUHB £83,300.

However, apart from the financial and economic impact to the health board, there are also personal implications of staying in the hospital longer than necessary. Patients are prone to deconditioning, acquiring hospital infections, loneliness and increase frailty (Cavallaro et al., 2013).

The feedback from the workshop were gathered using the Six Thinking Hats of Edward De Bono. The purpose of each hat is shown on Figure 2.1. It promotes parallel thinking, discussing issue one hat a time to enable the attendees to provide a solution and avoid conflict during discussion (De Bono, 2000).

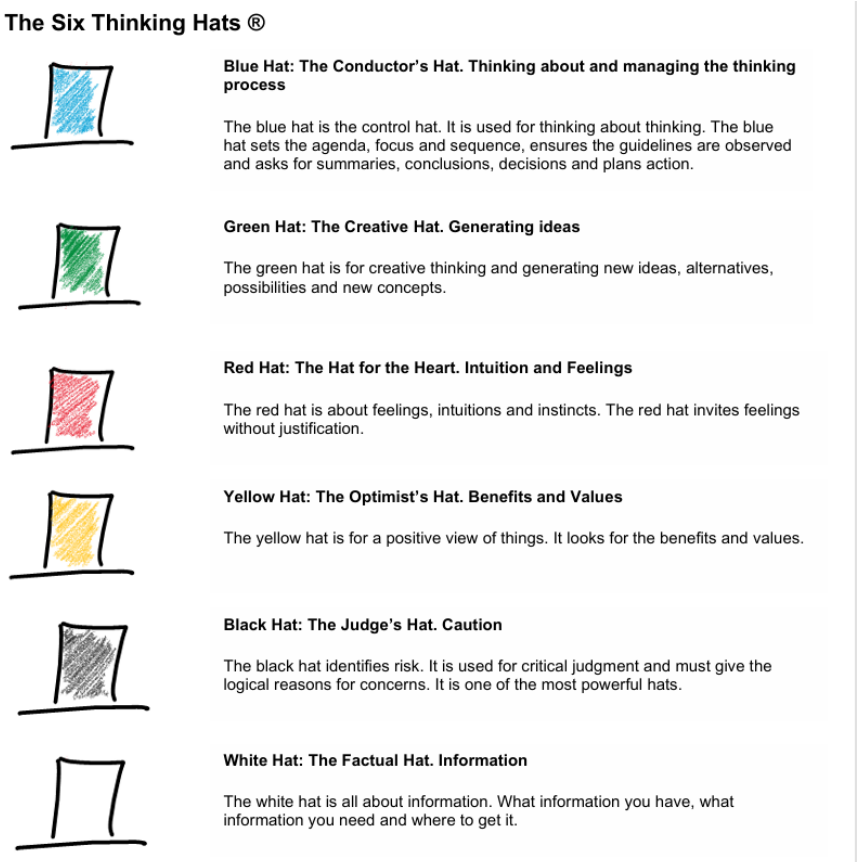


Figure 2.1. The Six Thinking Hats (De Bono, 2000 p.13)

Table 2.2. Feedback from the collaborative workshop

White Hat-Facts	Red Hat-Feelings	Yellow Hat-Benefits	Green Hat-Creativity	Blue Hat-Process	
Resource Intensive	Confusion with process/systems	Discharge to recover then assess (D2RA)	Access more clients in their home	Gather patient and family feedback	Lack of funding
MCA and BI needed as part of the process	Dissatisfied because of Nurse burnout	Escalation process	More specialist care staff	Gather data and analyse for improvement	Length of time to complete assessment
Lack of ownership/co-ordination of the key worker	Avoidance of not having the answers	More assessments happening outside the hospital	Reablement service for people with dementia	Develop fact sheets about resources available	Lack of skilled/experienced staff
Limited care home places	Disempowered	Trusted assessors—no FNC and CHC in hospitals	Avoiding intra-ward transfers	Home First as admission avoidance	Fewer alternatives to hospitals
Assessment disjointed	Frustration	Relationship with MDT	Increase triage in ED	Networking	Reduction of beds
MDT assessments-taking a long time	Patient and family feeling overwhelmed	Huddles	Supported transfers back to care home	Clearer pathways for dementia and brain injuries	Demographics-social workers have seen a shift on client needs
Signal—one version of the truth	Process before patient	Using SAFER in wards	Increase resources for community social worker	Manage families and patients' expectations	Start from scratch at each hospital admission
Data shows delays, deconditioning, increased length of stay	De-motivated	More awareness by ward staff of decision planning	Pathway for patients with dementia and mental health	More communication from front door	Gaps exist between medical and mental health service

Table 2.2. Continued

White Hat-Facts	Red Hat-Feelings	Yellow Hat-Benefits	Green Hat-Creativity	Blue Hat-Process	Black Hat-Cautions
Discharge decisions are made in the wrong environment, sometimes decisions are made based on delirium which might improve	Sense of injustice	This workshop, acknowledging given issues and talking about them together	Regional investment in dementia beds in care homes (assessment beds)	Follow up workshop would be useful to work at the feedback from today's session	Acute hospital wards are inappropriate environments to care for patients with cognitive impairment and often exacerbate presentation making assessments unreliable and sometimes leading to perceived need for high-cost placements
Ageing population	Inefficient	Patient flow coordinators	Increase in reach	Ward staff feedback	Legal challenges
Lack of family and social support	Worried for the future	Improved communication at the end process	Dedicated dementia assessments	Outreach models for dementia	Compounded by cuts in health and social care services
Prolonged admission leads to infection, fall, polypharmacy, and risk of early placement	Families/patients feel like we are trapping them in a setting, they feel we are not doing anything in a timely way	There is a group of likeminded staff that wanted to make this process beneficial for our patients	Improv communication on community services that support individuals with dementia/mental health issues	External dedicated care team to specialise in dementia care and respite for carers to avoid hospital admission	MDT are working competitively not collaboratively
Government policy and regulations	Avoidance of not having the answers	Regional assessment beds	Increase specialist support IMCA, RPR	More in reach staff to support education	Lack of community resources

LITERATURE REVIEW

Most of the patients that were hospitalised, the expected outcome is to be discharged back to their usual place of residence. However, some of the patients remain in hospital after their acute episode because either their care needs have changed or they cannot access post-discharge services, and these circumstances are prevalent with patient with cognitive impairments (Sakamoto et al., 2023). There is also the factor when a patient presents confuse or disorientated, the ability to return home is questioned (Poole et al., 2014).

Cognitive impairments, including dementia, delirium, and other cognitive dysfunctions, are prevalent among hospitalised patients, particularly older adults. The complexity of these conditions poses challenges for health and care providers during the discharge process which is critical for ensuring continuity of care and preventing hospital readmissions.

Patient with cognitive impairment experience longer stays in hospital and their mortality rates are higher (Dewing & Dijk, 2016: Sakamoto et al., 2023) and they are also at a higher risk of facing a discharge delay (Cook & Gregory, 2018: Jutan et al., 2013:). According to the findings of Health and Social Care Committee (2022) the issue of delayed discharges has been a "long standing and persistent issue" even though during

the 2002 NHS Wales Capacity Review it was already highlighted that there is a “need to identify beds for emergency cases accounts for over 1000 operations cancelled each month across Wales” in which was further exacerbated by the pandemic. With the aim of continuously evolving and finding ways to make NHS sustainable and equitable, Welsh Government as articulated in “A Healthier Wales” encourages a shift left on having more community-based services, “care closer to home” however this also affect the staffing resource available to manned both primary and secondary services Health and Social Care committee (2022) found.



Figure 2.2. Average length of stay by health board (BBC, 2024)

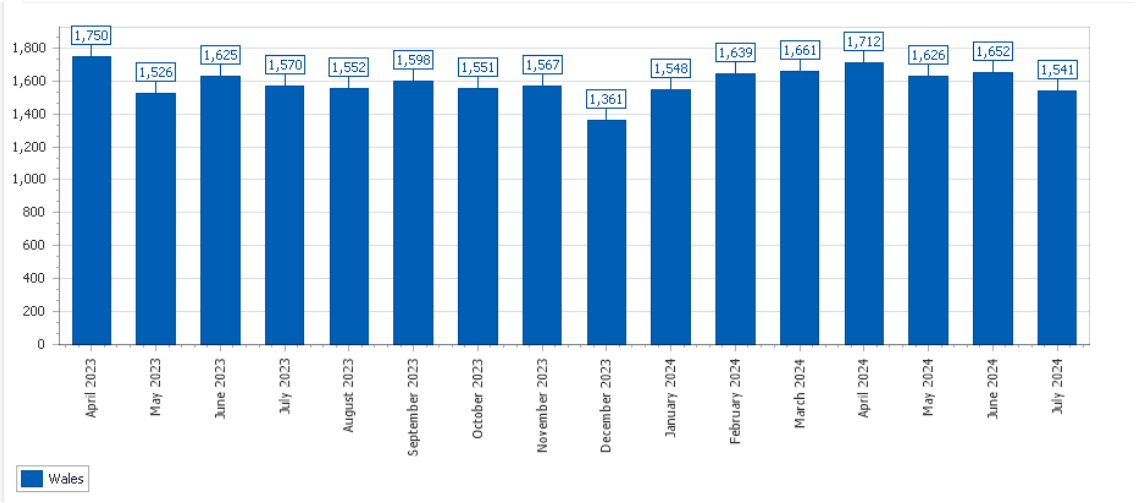


Figure 2.3. Number of patients delayed across Wales.

A recent media article produced by BBC presents the current state of the hospitals in Wales They have claimed that the estimated cost for this delay is £14.3 million per month and the number of patients that were delayed in hospital can occupy two hospital estates. Correspondingly it shows that SBUHB has the longest average delay in days in comparison to other health boards but as previously mentioned apart from the financial cost there is also a human cost to all these issues which will need a further exploration. In addition to this the delays continue to impact other services such ambulance and urgent and emergency care.

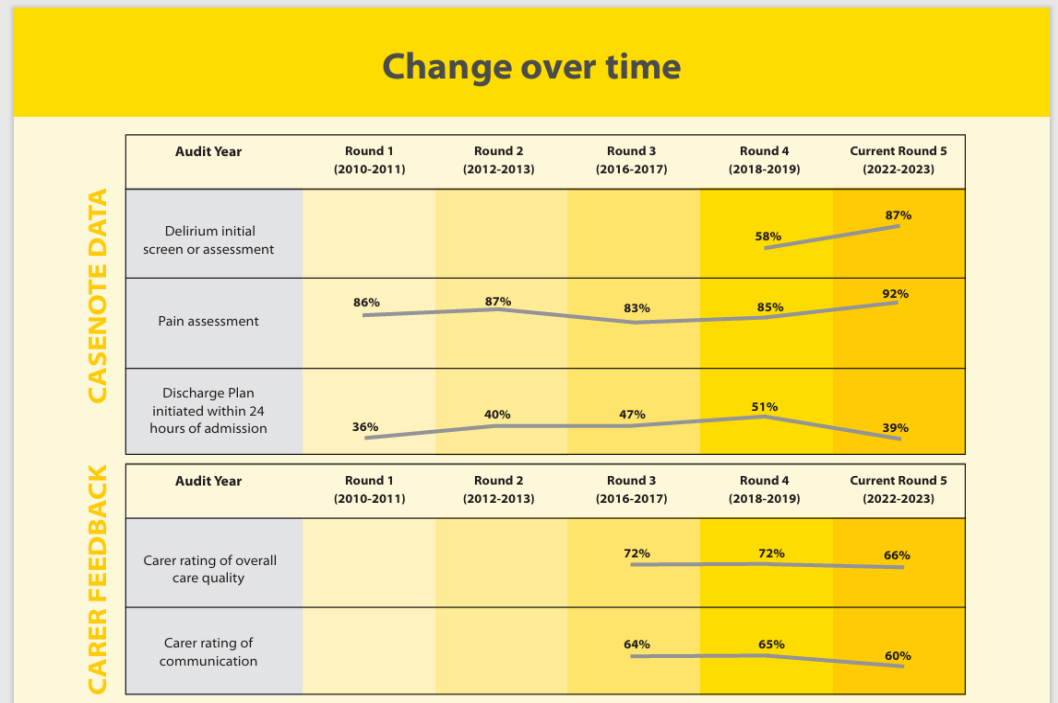


Figure 2.4. National audit of dementia care in general hospitals 2022-2023 Round 5 audit report p.6 (Royal College of Psychiatrists, 2023).

GOVERNMENT POLICY AND FRAMEWORK

There has been an emphasis on transformation and innovation within the NHS in order to create a sustainable health service. In the recent years, Welsh Government have shifted its strategic direction adapting its policies and framework which aim for health and social care sector in making a change with an emphasis on culture change and providing services that is designed to meet the needs of its population.

Table 2.3. Government policies and frameworks

A Healthier Wales	Overarching policy that sets the future plan for Wales of 'bringing care closer to home'
Social Service Well-Being Act 2014	Prevention and early intervention, citizen at the heart of the service, co-production, and well-being
Dementia Action Plan	outlines the strategic goals for enhancing care quality and supporting patients through transitions Key elements from the plan include promoting person-centred care, improving workforce training and developing community-based services.
Hospital Discharge guidance (2023)	sets out the guidance for discharges from hospital. Patients should have an allocated D2RA pathway twenty-four hours post admission.
Six Goals for Urgent and Emergency care	sets out the expectation with the sector with the delivery of the "right care, in the right place, first time for physical and mental health."
Right sizing community services to support discharge from hospital	NHS Wales Delivery Unit to John Bolton's model. Set recommendations that "no patient should be assessed for long term care in an acute hospital bed"

DISCHARGE TO RECOVER THEN ASSESS MODEL

Currently, all national initiatives around managing flow in the hospitals are focus on D2RA model, The Discharge to Assess (D2A) model was introduced in England in 2015 to expedite hospital discharges by conducting post-hospital assessments in the community rather than in a hospital setting. This model has since volved into the Discharge to Recover then Assess (D2RA) in Wales, which incorporate recovery principle to ensure that patients have time to recuperate before assessments are conducted. The Welsh Government's "Hospital to Home" initiative has been key in supporting this model, emphasising patient recovery at home or in a step-down bed setting rather than extended hospital stays (Welsh Government, 2021b).

The D2RA model has been instrumental in reducing hospital length of stay by providing community-based assessments and avoid unnecessary delays caused by inpatient assessments. The model is designed to prevent deconditioning, reduce risk of infection and support patients' independence and recovery. Research by Welsh Government (2021b) shows that D2RA pathways significantly reduce the time patients spent in hospital, with improved outcome when patients are assessed in familiar environments rather than in the ore disorienting hospital setting. Audit Wales (2019) acknowledge that this model is a step towards improvement.



Figure 2.5. Discharge to Recover then Assess discharge pathways.

Although John Bolton on his report commissioned by Local Government Association, he stated that he preferred the Welsh model, he recognised the need to adapt the model to meet the needs of patients with dementia. Part of his recommendation that health and care systems provide a comprehensive range of specialised mental health and dementia care services. The goal of these services is to enable the return of older adults to their homes with the support of trained care professionals and assistive technology (Local Government Association, 2021). There is a very little evidence on the impact of transitional care (Rameli & Rajendran, 2022) and D2RA in achieving better outcomes especially for patients with cognitive impairment (Jeffery et al., 2023).

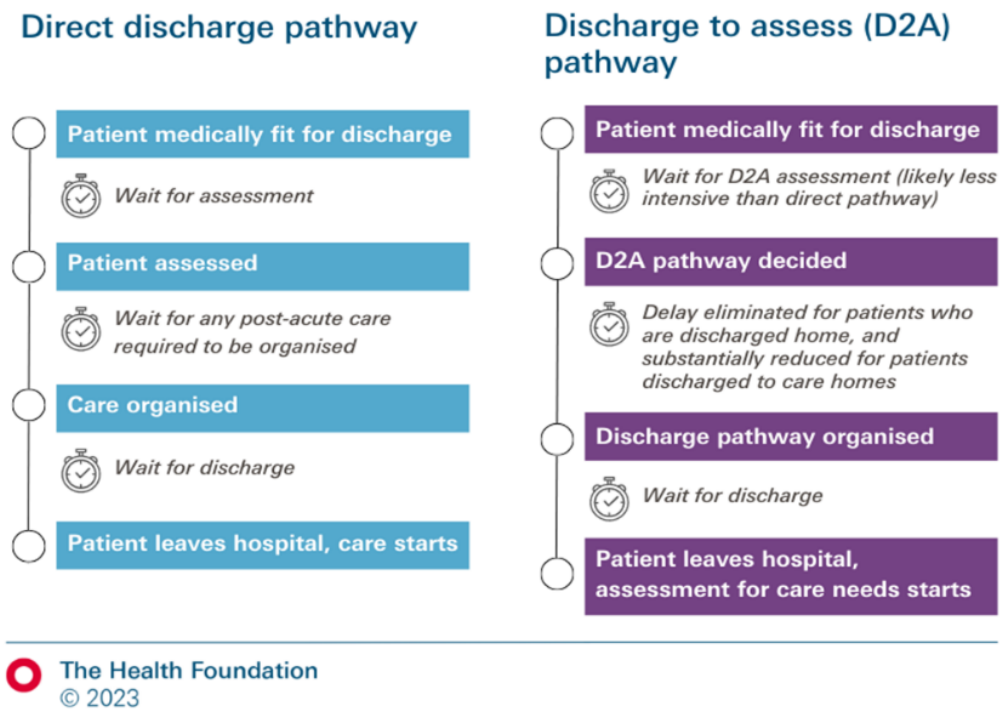


Figure 2.5. Two types of discharge process (Cavallo et al., 2023 Figure 4)

TRENDS IN DELAYED DISCHARGE FROM HOSPITAL

The following section will present the current data which represent a census snapshot of discharge delays on a specific day each month across Wales and do not account for the total number of delays throughout the month. This information is used to monitor the incidence and causes of delays, helping NHS and Local Authority partners develop regional plans focused on outcome-based actions to reduce discharge delays across the healthcare system (StatsWales, 2024). It is believed that the statistics were utilised in various ways including providing advice to Ministers, assessing NHS Wales performance, informing service improvement projects benchmarking for local heath boards, and determining public service delivery (Welsh Government, 2012).

Data source: Stats Wales Pathway of Care Delays, 2024

General description of the data:

A delayed discharge occurs when a patient who is clinically ready for discharge cannot leave the hospital due to the unavailability of necessary ongoing care, support, or suitable accommodation. This dataset tracks the number of adults occupying NHS hospital beds who, while being 'clinically optimised'—that is, ready to return home or transition to the next stage of care—experience a delay in their transfer exceeding 48 hours past this readiness point. The 'next stage of care' encompasses all destinations outside of NHS hospitals

The codes that were used for data collection can be seen in Appendix A.

DATA COLLECTION AND CALCULATION

Data are supplied by Local Health Boards and jointly validated with Local Authority partners. The Pathway of Care Delays census identifies individuals with discharge delays and their reasons at a specific point each month. Health Boards are responsible for extracting this data from local systems on the designated census day each month and for validating the delays with Local Authority partners. The validated data are then entered into a web-based tool and submitted to NHS Wales.

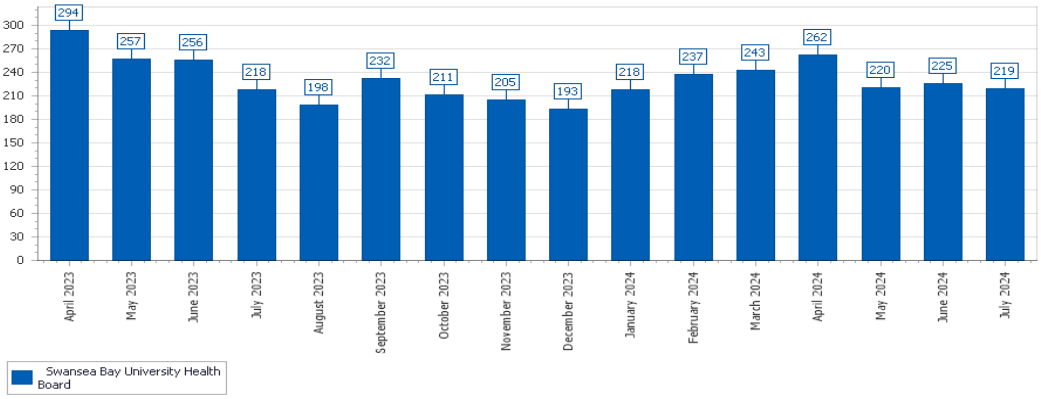


Figure 2.6. Number of patients delayed within the health board between April 2023-July 2024

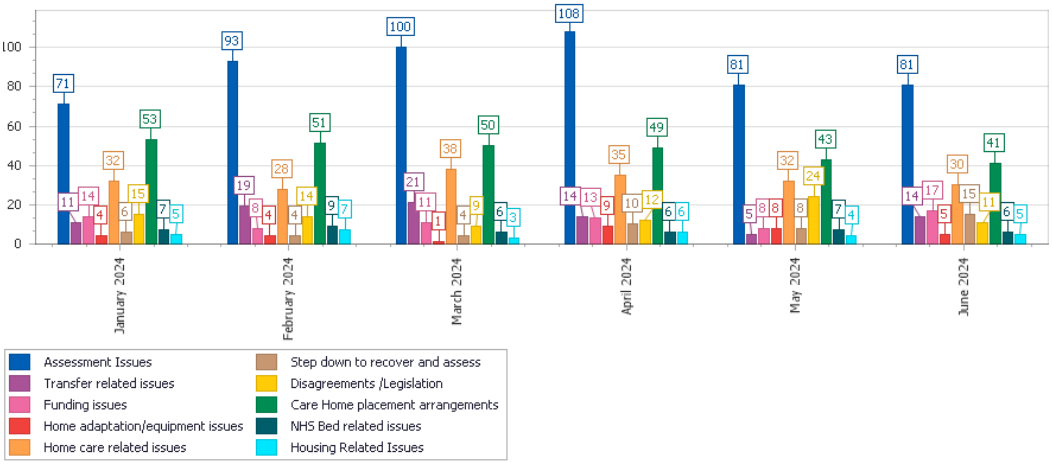


Figure 2.7 Reason for delays within the health board.

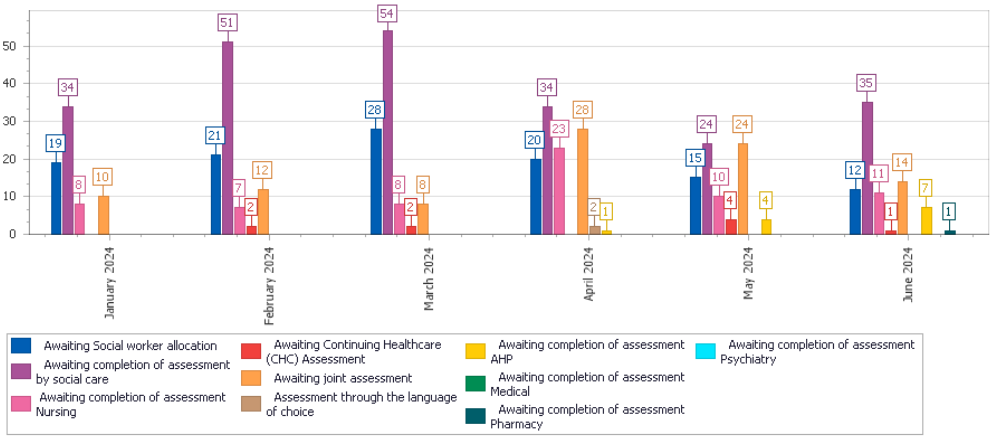


Figure 2.8. Reason for delay: assessment issues

On average over 14% of patients delayed in Welsh hospitals during the reporting period were from SBUHB. Consistent with previous publications (Bolton (2024): Health and Social Care committee (2024)) the data indicates that full assessments are still being completed in the hospital which opposes the purpose of D2RA principles.

RESEARCH STUDY

With the gap exposed in the current literature, created a research question of “What are the barriers and enablers for discharging patients from the acute setting.”

The purpose of this paper is to identify the barriers and enablers in discharging patients with cognitive impairment within Swansea Bay University Health Board (SBUHB).

Research objectives:

1. To identify the primary barriers faced by health and care professionals in discharging patients with cognitive impairment or dementia.
2. To explore the enablers that facilitate the successful discharge of these patients, including best practices and effective strategies.
3. To examine the perspectives of heath and care providers on the challenges and facilitators of discharging patients with cognitive impairment or dementia
4. To develop evidence-based recommendations for improving discharge processes for patients with cognitive impairment or dementia
5. To analyse the influence of hospital policies, health and care systems, and external support services on the discharge process for these patients.

RESEARCH METHODOLOGY AND DESIGN

This chapter outlines the research methodology and design employed in this paper. The methodology section provides a detailed description of the research approach, data collection methods and analytical techniques used to address the research question.

RESEARCH APPROACH

The researcher used the 'research onion' by Saunders et al. (2016) to design and support the chosen research methodology.

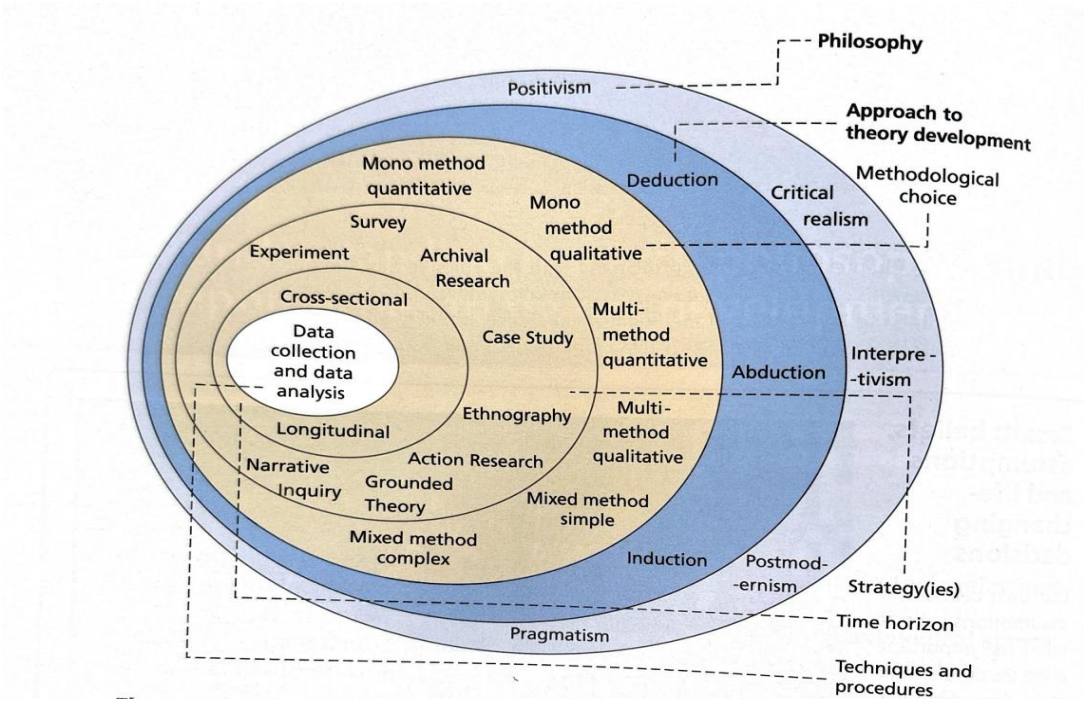


Figure 3.1 "The Research Onion"

Critical realism: this approach aims to uncover the underlying structures and mechanisms that generate observable phenomena.

Deduction: deductive reasoning involves testing hypotheses derived from existing theories (using the feedback from the thinking hats)

Mono-method quantitative: it is important to identify the markers to understand why it is occurring.

Surveys: provide standardisation by providing respondents same structured questions which helps in maintaining consistency and reliability of the data. Surveys can also help identify themes and regularities in the data which can then be analysed to infer these deeper mechanisms.

DATA COLLECTION

Method: Questionnaires

Participant selection: Health and care practitioners working within West Glamorgan that have a role or involvement in discharging patients.

Survey distribution: Link shared via email, social media platforms and QR code.

Survey design: The surveys have fifteen questions which were derived from the gap identified from the literature review. The second art of the survey uses Likert scale to provide a structures and quantitative way to measure attitudes, opinions, and perceptions of the respondents (see Appendix B).

Survey format: Qualitrics.

ETHICS

Ethics approval was granted by Swansea University in August 2024.

LIMITATIONS OF DATA

The primary data is limited to health and social care practitioners within West Glamorgan.

The paper did not explore subjective experiences of delayed discharge from the perspective of patients with cognitive impairment and their family.

FINDINGS

This chapter presents the findings of the research conducted to address the research question and research objectives. The findings are organised thematically to provide a clear and coherent narrative of the data collected. The presentation of findings includes both primary and secondary data.

There were four themes identified that influences the discharge process:

- Complex care needs
- Capacity
- Communication
- Culture

COMPLEX CARE NEEDS

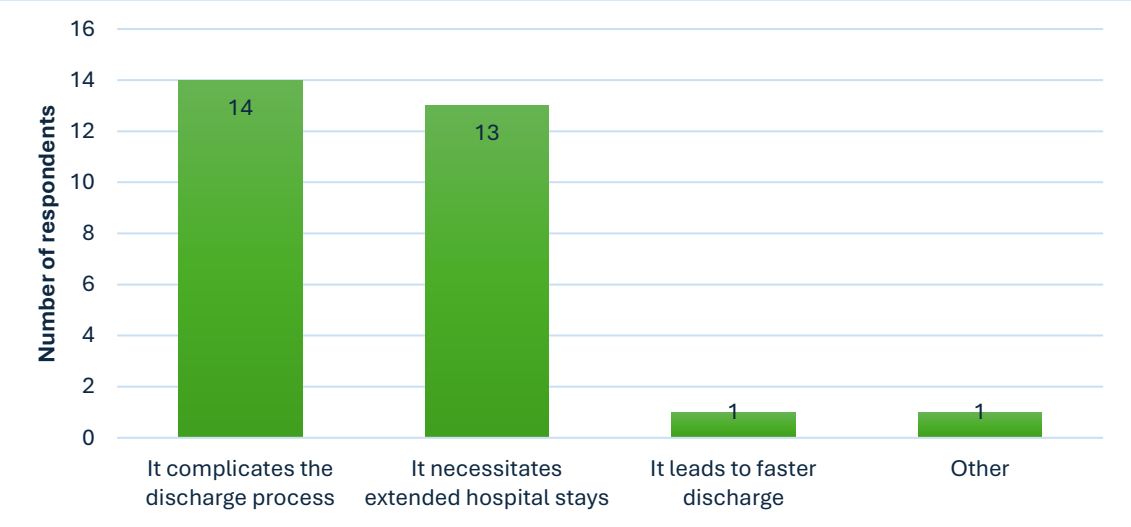


Figure 4.1. The consequences of patient's complex care needs on discharge planning

The data demonstrates the consequences of a patient's complexity of needs on the discharge process. The data reveals that the most significant result identified by 14 respondents, is that it complicates the discharge process. This indicates that patients with complex needs often require more detailed and coordinated discharge planning, which can delay their discharge.

Additionally, 13 respondents noted that the complexity of needs necessitates extended hospital stays. This suggests that these patients often need prolonged medical attention and resources, further extending their time in the hospital.

In contrast, only 1 respondent indicated that complexity of needs leads to faster discharge, suggesting that this is a rare occurrence.

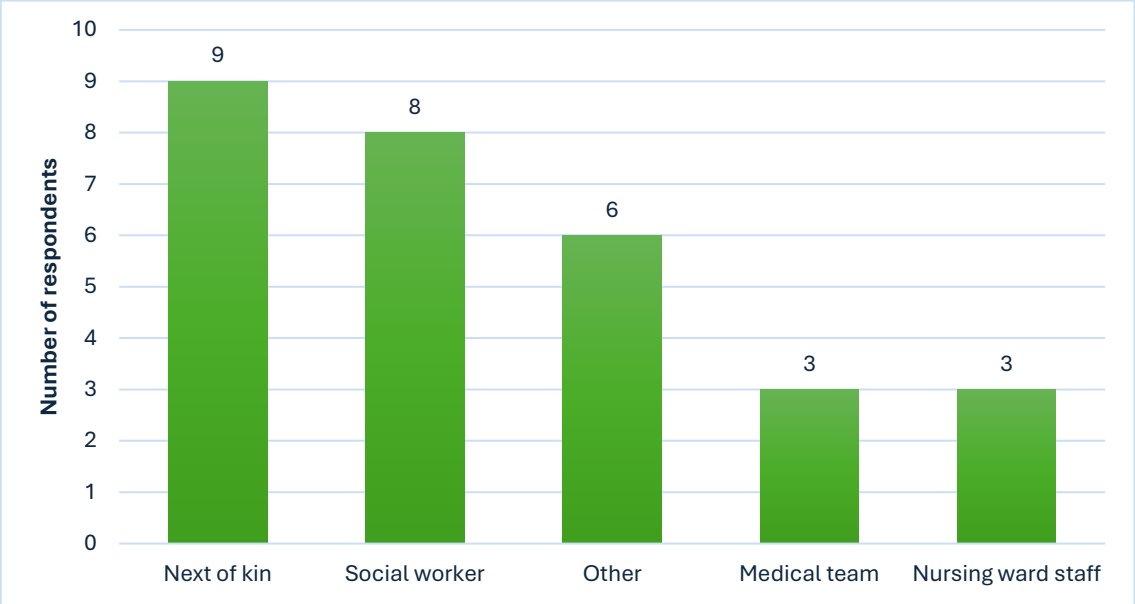


Figure 4.2. The key decision maker for patients who lack capacity.

The data show that most respondents (9) identify the "Next of kin" as the key decision maker for patients who lack capacity. This is followed by "Social worker" with eight respondents. The "Other" category has six respondents, indicating a range of factors such as the nature of the decision, existence of legal appointee (LPA). One respondent commented, "it depends on what is the decision for. More training for hospital staff is needed to clarify what is the role of the social worker decision and what is the role of medical team."

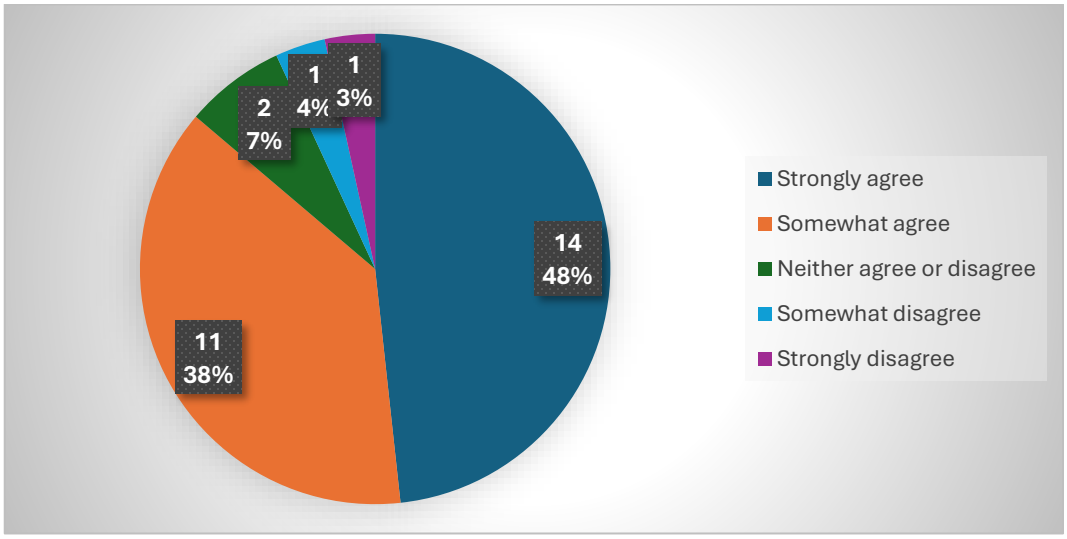


Figure 4.3 Patients with cognitive impairment have delayed discharge due to mental capacity assessments.

Figure 4.3 illustrates the responses to the question of whether patients with cognitive impairment experience delayed discharge due to mental capacity assessments. The largest segment, representing 48% of respondents (14 individuals), strongly agrees with this statement. Another 38% (11 respondents) somewhat agree. A smaller portion, 7% (2 respondents), neither agree nor disagree. The remaining segments, each representing 4% (1 respondent each), somewhat disagree and strongly disagree.

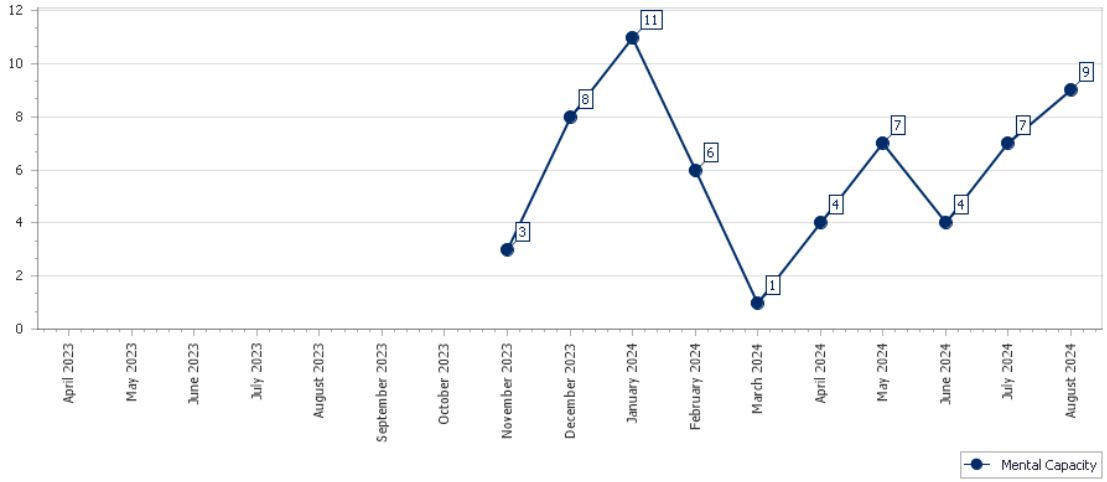


Figure 4.4 Reason for delay: Disagreement/Legislation (mental capacity)

Figure 4.4 shows the number of patients waiting for mental capacity assessment during the reporting period. No data available prior to November 2023.

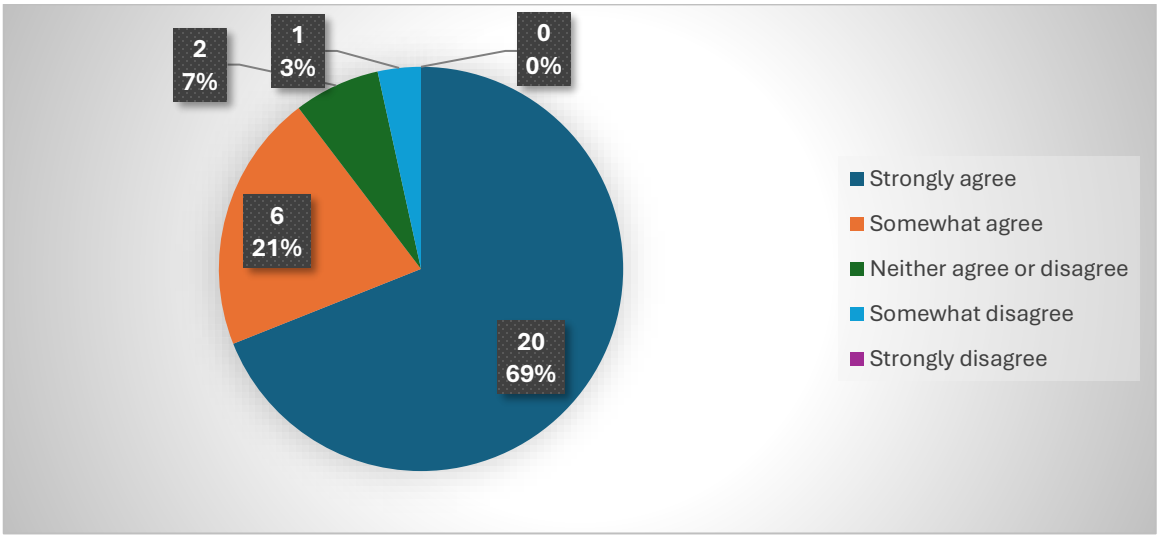


Figure 4.5. Patients have an increased length of stay due to their cognitive impairment.

Figure 4.5 demonstrates the responses to the question of whether patients with cognitive impairment experience an increased length of stay due to their condition. The largest segment, representing 69% of respondents (20 individuals), strongly agrees with this statement. Another 21% (6 respondents) somewhat agree. A smaller portion, 7% (2 respondents), neither agree nor disagree. Only 3% (1 respondent) somewhat disagree, and no respondents strongly disagree.

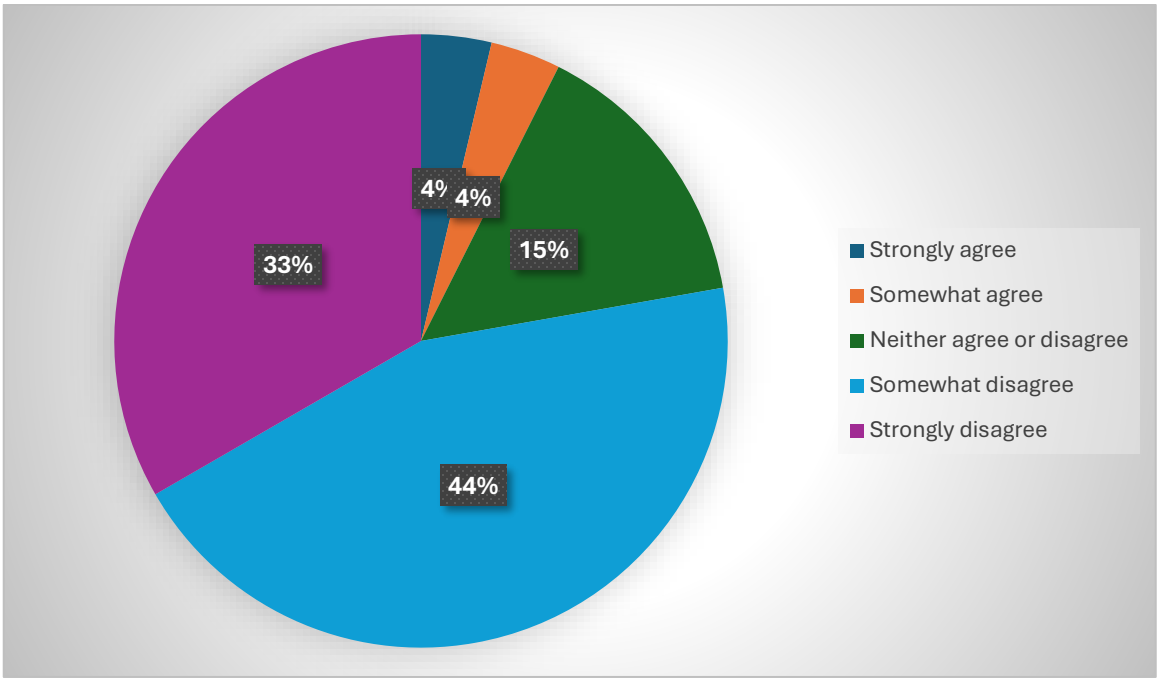


Figure 4.6. Discharge pathways were sufficient for patients with cognitive impairment.

Figure 4.6 illustrates responses to the question of whether there is a sufficient discharge pathway for patients with cognitive impairment. The largest segment, representing 44% of respondents, somewhat disagrees with the statement, indicating significant dissatisfaction. Another 33% strongly disagree, further highlighting concerns. Four respondents (15%), neither agree nor disagree. A small portion of respondents (1 each) chose somewhat agrees, and strongly agree.

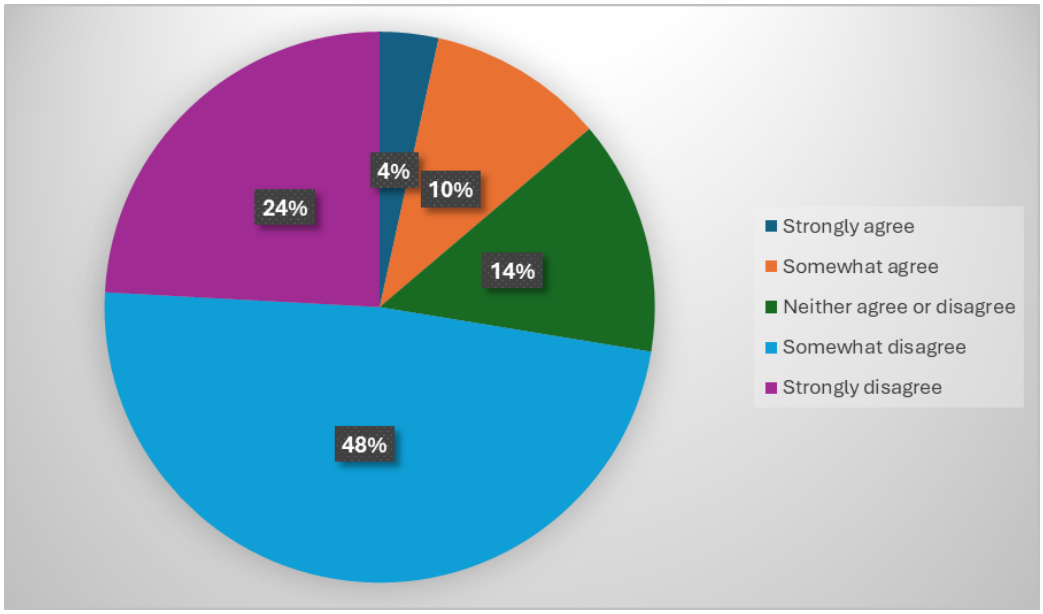


Figure 4.7. Discharge pathways for patient with cognitive impairment is equitable to those with no impairment.

Figure 4.7 shows responses to the question of whether discharge pathways for patients with cognitive impairment are equitable to those without cognitive impairment. The largest segment, representing 48% of respondents (14 individuals), strongly disagrees with the statement, indicating a significant belief that discharge pathways are not equitable. The second-largest segment, representing 24% of respondents (7 individuals), somewhat disagrees. Further 14% (4 respondents), neither agrees nor disagrees. Only 10% (3 respondents) somewhat agrees, and 4% respondents (1 individual) strongly agree.

CAPACITY

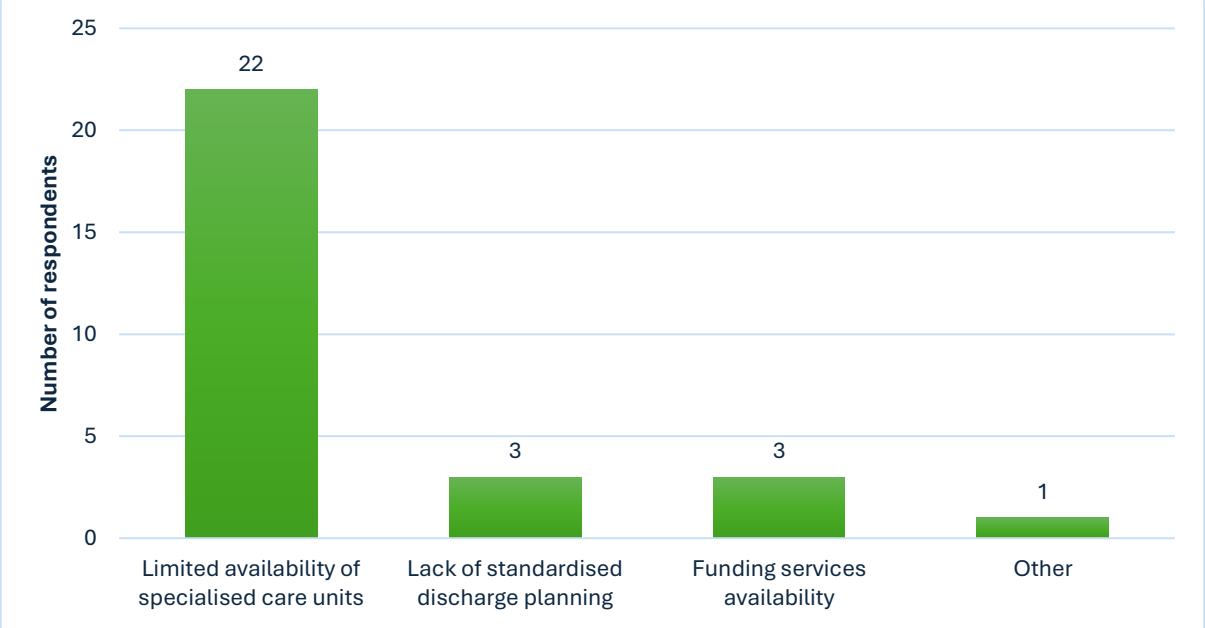


Figure 4.8. Primary barrier to discharging a patient with cognitive impairment.

The primary barrier to discharging a patient with cognitive impairment from the acute settings as identified by 22 respondents was the limited availability of specialised care units. This issue has significantly surpassed other barriers, such as lack of standardised discharge planning and funding services availability which both have chosen by 3 respondents each.

One respondent commented using the open text box (other) “combination of lack of training of hospital staff in regards to what’s needed before discharge, i.e., psych referrals, in addition to DoLS and then limitation of availability of care.”

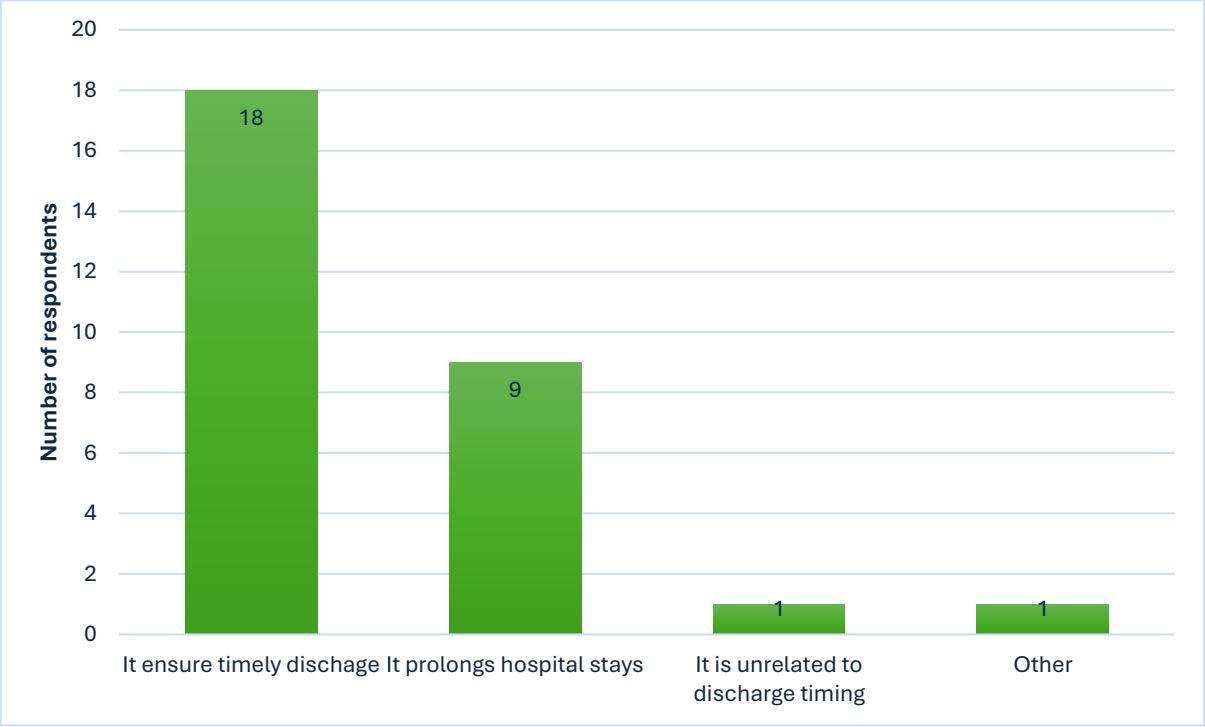


Figure 4.9. The influence of the availability of community care services on discharge timing

The data illustrates the influence of the availability of community care services on discharge timing. According to the data, most respondents (18) believe that the availability of community care services ensures timely discharge from hospitals. This suggests that when community care services are accessible, patients can be discharged more efficiently, reducing their length of stay in the hospital.

Conversely, 9 respondents indicated that the availability of these services prolongs hospital stays. This could imply that in some cases, the coordination or quality of community care services might not be sufficient to support immediate discharge, leading to extended hospital stays.

A smaller number of respondents (1) felt that the availability of community care services is unrelated to discharge timing, suggesting that other factors might play a more significant role in the discharge process for these individuals. Lastly, 1 respondent selected Other, stated “lack of appropriate community service impacts on discharge from a practical point of view but this also affects the person’s health as they deteriorate in hospital and their care needs change, then the discharge process needs to be restarted often and around it goes, until the person dies in hospital.”

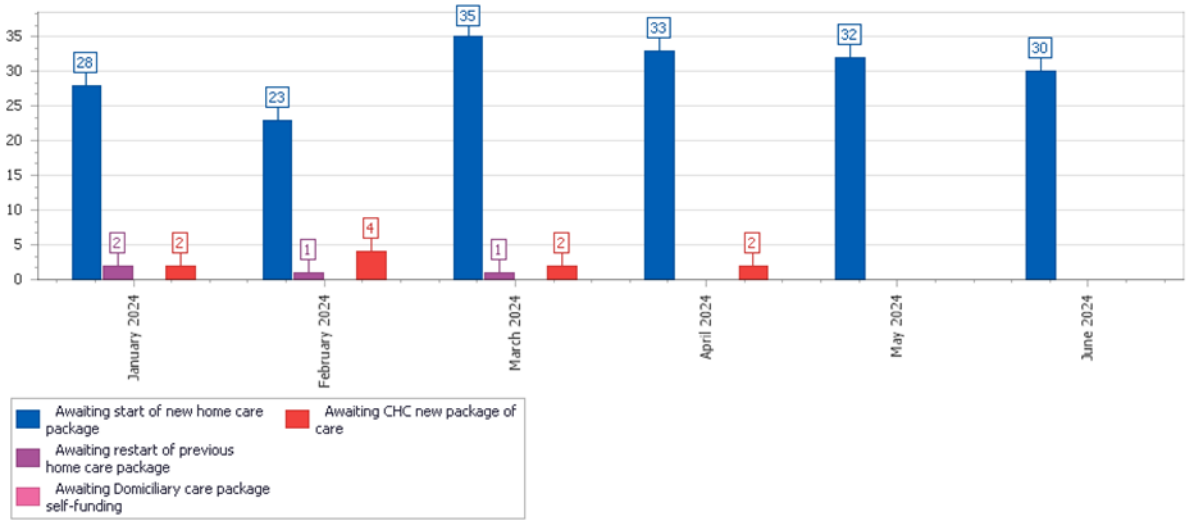


Figure 4.10. Reason for delay: Home care issues

A major delay reason for patients being delayed in hospital is waiting for new package of care. This is exacerbated by the domiciliary provider policies that existing package of care can only be put on hold for seven days. Another reason that may contribute to this issue is that patients who were hospitalised experienced some kind of deterioration whilst in hospital leading to a bigger package of care.

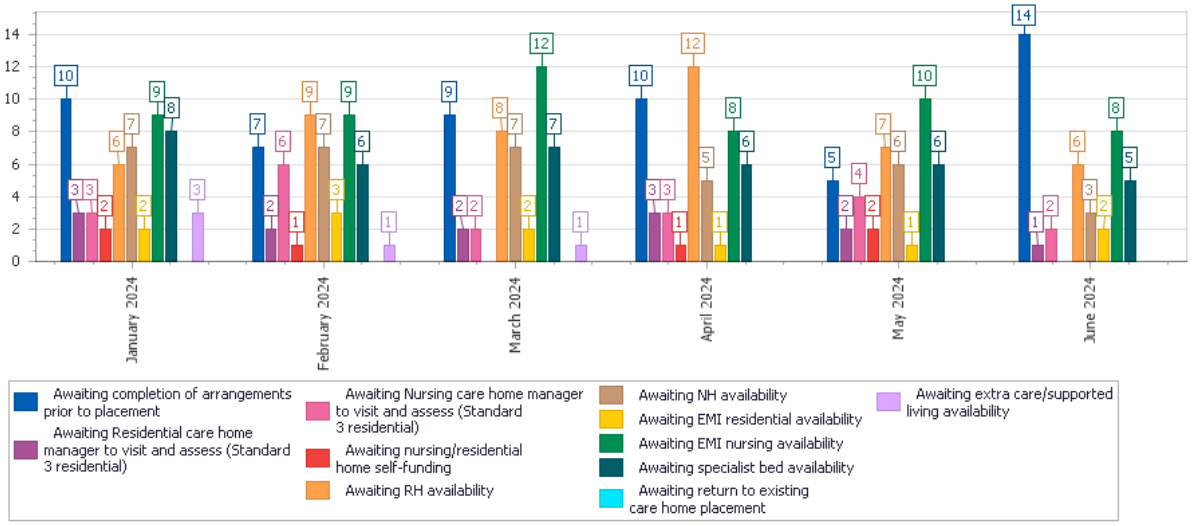


Figure 4.11. Reason for delay: Care Home placement arrangements

Some patients may require a long-term care arrangement because their needs cannot be met at home. However, care homes are independent providers who have also experienced difficulties post-pandemic with their workforce and high cost of living.

COMMUNICATION

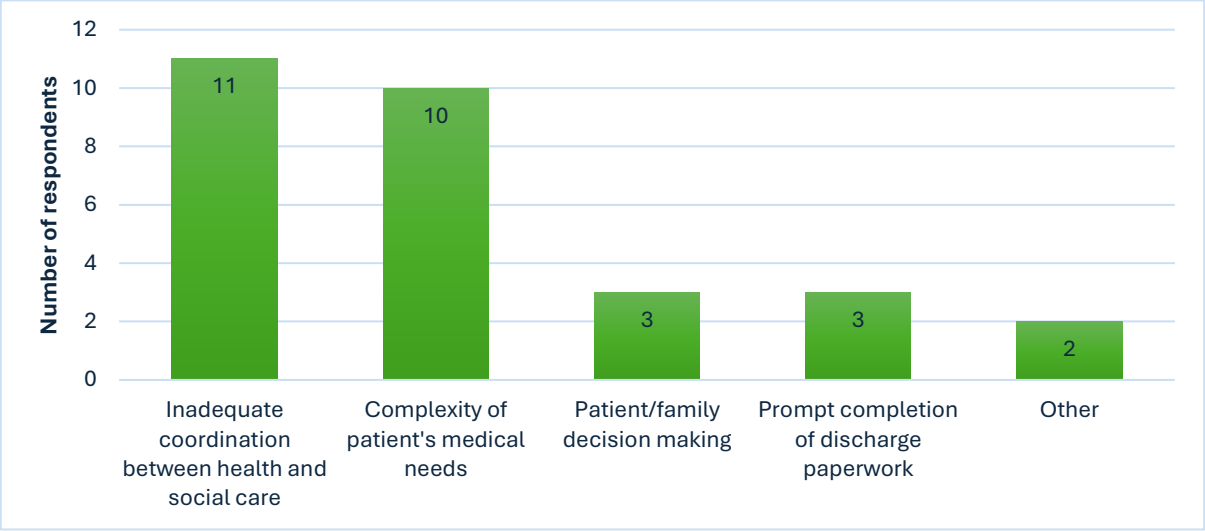


Figure 4.12. Main factor that contributes to delayed discharges for patients with cognitive impairment.

Figure 4.12 highlights the main factors contributing to delayed discharge for patients with cognitive impairment. The most significant factor, identified by 11 respondents, is inadequate coordination between health and social care. This suggests that a lack of seamless communication and collaboration between health and social care services can lead to extended hospital stays for these patients.

The second most cited factor, with 10 respondents, is the complexity of the patient's medical needs. This indicates that patients with cognitive impairments often have multifaceted health issues that require more time and resources to address before they can be safely discharged.

Other factors include patient/family decision making and prompt completion of discharge paperwork, each mentioned by 3 respondents. These factors highlight the role of family involvement and administrative efficiency in the discharge process. Lastly, 2 respondents identified other unspecified factors contributing to delays such as "appropriate discharge destinations and availability of affordable placements or inadequate support to keep people safe in their own homes."

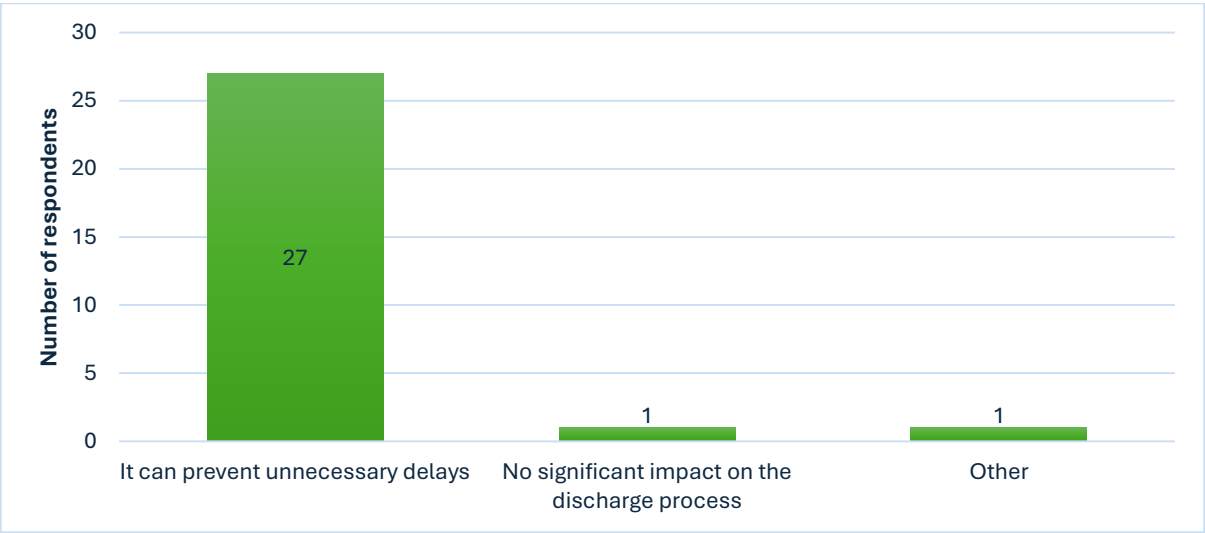


Figure 4.13. The extent to which effective communication affects the discharge process.

The diagram illustrates the extent to which communication affects the discharge process. According to the data, the majority of respondents (27) believe that effective communication can prevent unnecessary delays in the discharge process. This indicates a strong consensus that clear and timely communication between health and care providers, patients, and their families is crucial for facilitating smooth and timely discharges.

In contrast, only 1 respondent felt that communication has no significant impact on the discharge process, suggesting that this view is not widely held. Similarly, another 1 respondent selected Other, indicating a different perspective, “there are systems in place for communication but this is not utilised consistently or by all staff, even when systems are updated emails requesting updates are still sent, doubling work and delaying information sharing.”

CULTURE

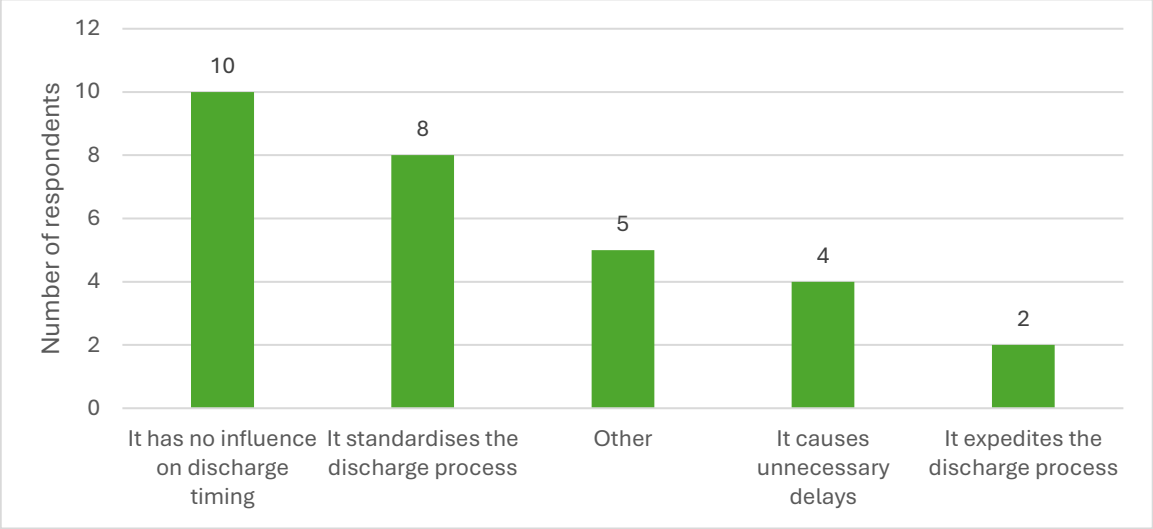


Figure 4.14. The influence of hospital discharge policy on discharge timing

The data shows that most respondents (10) believe that it has no influence on discharge timing. Eight respondents felt that the discharge policy standardise the discharge process. Five respondents selected “Other,” and entered comments such as, “it is causing issues to be resolved in community settings, a discharge policy is positive, it set an aim however this is often unrealistic and cannot be used as a blanket policy due to a number of factors needing to be considered for a safe discharge.” Four respondents think that discharge policies cause unnecessary delays, while only two respondents believe they expedite the discharge process.

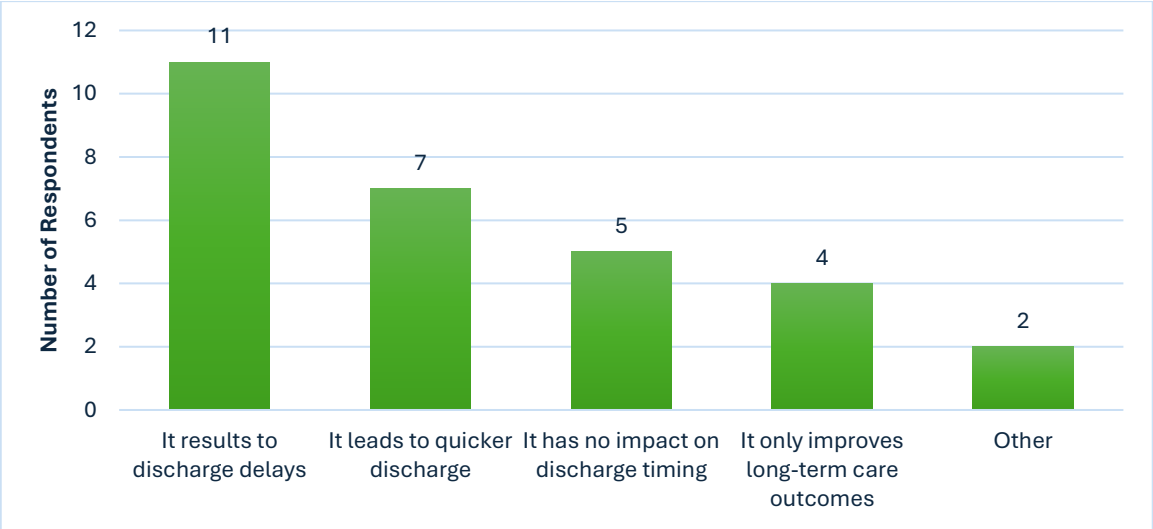


Figure 4.15. How does the integration/interoperability of systems impact the discharge process?

The image above illustrates the impact of system interoperability on the discharge process. According to the data, most respondents (11) believe that system interoperability issues result in discharge delays. Seven respondents think it leads to quicker discharges. Five respondents feel that it has no impact on discharge timing, while four respondents believe it only improves long-term care outcomes. Lastly, two respondents selected “Other” as an impact.

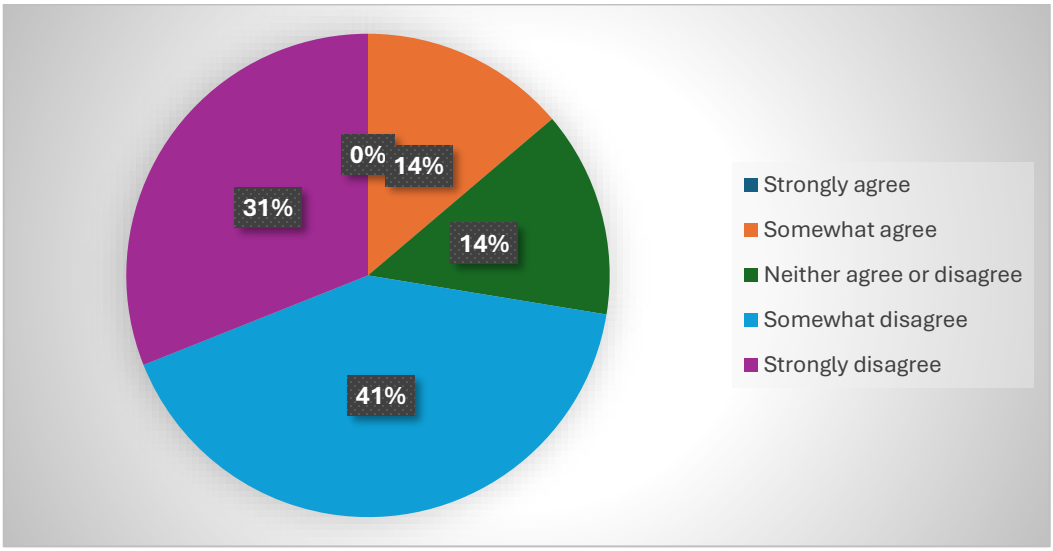


Figure 4.16. Ward staff were informed and educated to support discharge for a patient with cognitive impairment.

The diagram illustrates the opinions on whether ward staff are aware of the discharge process for patients with cognitive impairment. The largest segment, representing 41% of respondents (12 individuals), somewhat disagrees with the statement, indicating a significant portion of respondents believe there is a lack of awareness. The second-largest segment, at 31%, strongly disagrees (9 individuals), further emphasising this concern. Both “Strongly agree” and “Somewhat agree” segments are equal, each at 14% (4 individuals each), suggesting a minority of respondents felt that ward staff are aware of the discharge process. Notably, no respondents selected “Neither agree nor disagree.”

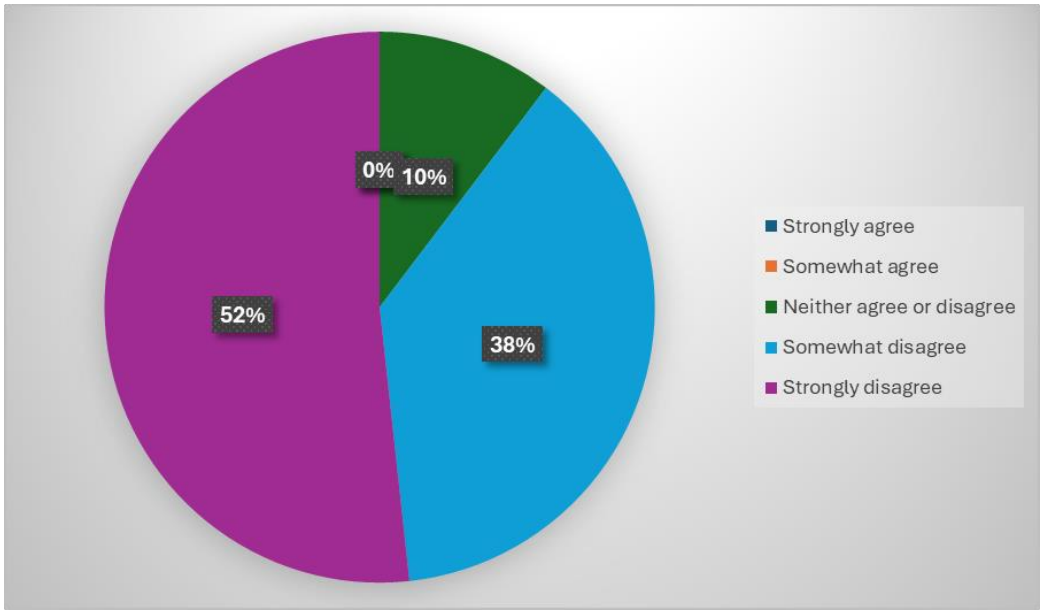


Figure 4. 17. Patients with cognitive impairment have timely access to specialist dementia teams.

Figure 4.17 illustrates responses to the question of whether patients with cognitive impairment have timely access to specialist dementia teams. The largest segment, representing 52% of respondents (15 individuals), strongly disagrees with this statement. Another 38% somewhat agree (11 individuals), indicating they somewhat disagree. A smaller portion, 10% (3 individuals), neither agrees nor disagrees. Notably, no respondents selected “Somewhat agree” or “Strongly agree.”

CHOICE

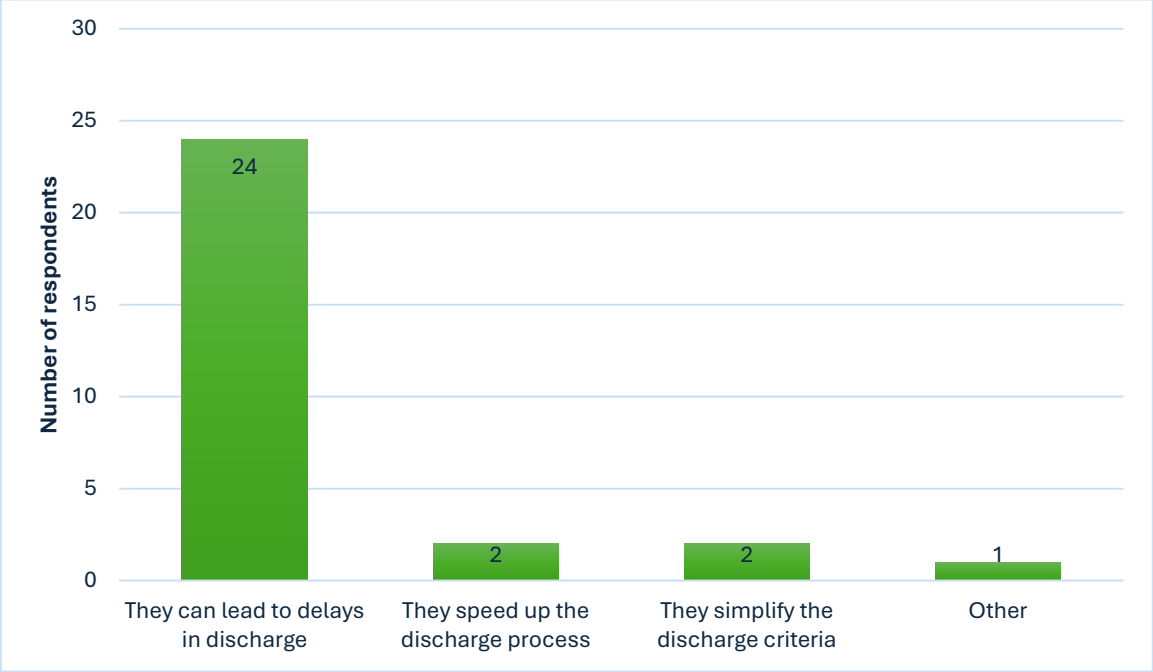


Figure 4.18. Patient and family preferences effect on timeliness of discharge

Figure 4.18 shows the impact of patient and family preferences on discharge timing. The data reveals that most respondents (24) believe these preferences can lead to delays in discharge. A smaller number of respondents (2 each) think that patient and family preferences can either speed up the discharge process or simplify the discharge criteria. Only one respondent selected “Other” as an effect, “this depend on the skill of those facilitating the discharge, good communication skills with family and patient can really speed up the whole process when taking preferences into full account.”

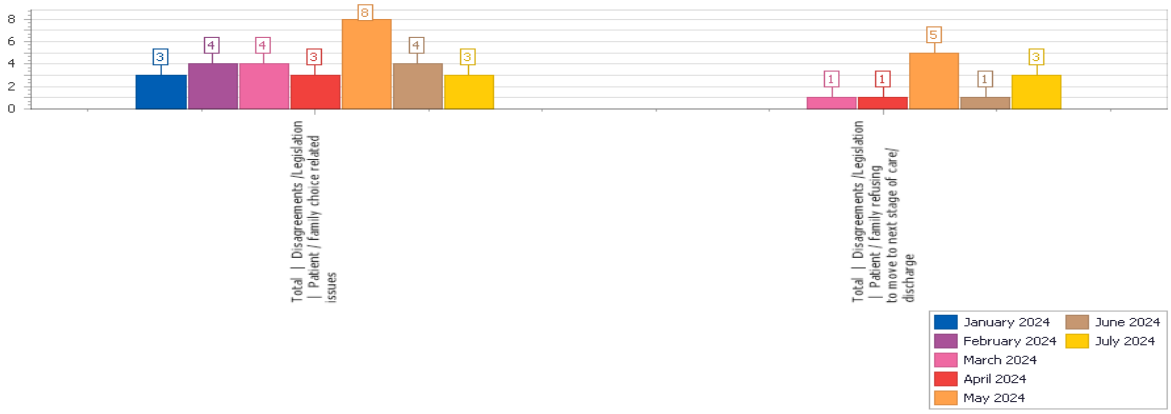


Figure 4.19. Delay reason: disagreement (Family choice related issues)

DISCUSSION

The purpose of this report is to identify the barriers and enablers to discharging patients with cognitive impairment/dementia. While it was found that there is more barrier than enablers, there is emerging evidence that some practices that focuses on working collaboratively between health and social care professionals may mitigate the risk of these patients becoming “stranded patients”. The work on Integrated Care in England and “teams around individuals” in Wales looks promising for these patient cohort.

5.1 BARRIERS TO DISCHARGE

COMPLEX CARE NEEDS

Complexity of patient medical needs was another notable factor preventing a timely discharge for this patient cohort. This is particularly concerning for patients with cognitive impairment, as extended hospital stays increase the risk of deconditioning, infection, and further cognitive and functional decline.

CAPACITY

The findings of this research highlight that limited availability of specialised care units is the most significant barrier to timely discharge for patients with cognitive impairments. This finding aligns with the broader literature that emphasises the increasing demand for dementia-specific care facilities due to the growing ageing population. Although the data being reported to StatsWales does not reflect this argument, the report suggests that patients waiting for specialist placements only account for less than half of the reason for delays for patients in the hospital. However, it is consistent on the findings of this study that the availability of community care services directly influences the discharge timing. These findings suggest that the discharge delays are not only a result of inpatient hospital processes but are also heavily influence by the post-acute care infrastructure, echoing the well-documented challenge of bridging hospital and community care. These findings emphasise the critical role that community care service plays in the discharge process and suggest that improving these services could lead to more timely discharges, better patient flow within the hospital and improve patient outcomes.

COMMUNICATION

It can be acknowledged that specialist care placements are identified as the most significant delay identified in this study. The respondents also pointed out other factors such as inadequate coordination between health and social care services as an obstacle to achieving timely discharge. This issue of poor coordination mirrors earlier research, which found that the complexity of the discharge process for cognitively impaired patients often stems from fragmented communication across health and care providers. Respondents agreed that clear and effective communication could prevent unnecessary delays (Cook and Gregory, 2018). However, the findings also revealed discrepancies in how communication systems are utilised, with one respondent noting that existing systems are not consistently applied, leading to inefficiencies. This reflects existing literature that highlights the need for consistent and transparent communication channels between health and social care professionals, patients, and their families to optimise hospital operations (Health and Social Care Committee, 2022: Rameli & Rajendran, 2022).

Technology has continuously evolved, however the issue of access to systems is a longstanding problem within health and social care, the systems still do not talk to each other. The respondents felt that the issues of the system interoperability can lead to delay discharges of additional administrative tasks.

CULTURE

The findings of this research consistently align with existing literature (Health and Social Care Committee, 2022: Audit Wales, 2019: NICE, 2015) in relation to the importance of having a skilled workforce. Most of the respondents feel the ward staff are not adequately aware of the discharge. This highlights a potential area for improvement in staff training and communication to ensure better discharge planning and patient care.

Bolton (2024) argued that medics are more focused on assessments rather than recovery plan and he empasised that “it’s not the assessment that makes a difference to the outcome for the person but the support they are offered—recovery, rehabilitation and recuperation.”

The findings also highlighted that there is a gap on discharge pathway, some clinical conditions (i.e. stroke, end of life) have a clear and defined pathway unto the next step however with patient with cognitive

impairment there is no designated discharge pathway (Dewin & Dijk, 2016). Respondents strongly felt that the current discharge pathways are not equitable and not sufficient for these vulnerable individuals.

Another factor to consider is the legal implication of certain policies such as Mental Capacity Act 2005, a mental capacity assessment is a process used to determine whether an individual has the ability to make specific decisions at a particular time. The assessment is required to be completed by a qualified practitioner, in practice if you will link this to the D2RA ethos that patient should be discharge after forty-eight hours of being "clinically optimise" depending on workload capacity, a practitioner might not be able to get around to do it. A patient who is "clinically optimise" does not mean the patient is discharge ready. This circumstance can be argued that it is an example of correlation between the day of reporting and where that patient is at that time on their journey.

CHOICE

The needs of this patient cohort are being overlooked and "what matters to them" are not being explored. The impact of on-going scarcity of community-based resources remains a significant challenge in discharge planning for older adults in general, and particularly for those with dementia (West Glamorgan Regional Partnership, n.d.). This lack of resources results into a risk-averse approach to discharge planning (Audit Wales, 2019), as clinicians strive to mitigate professional and organisational liability for potential post-discharge issues, whilst attempting to support patient and family preferences (Stockwell et al., 2017).

Although the findings suggest that patient and family preferences are an important factor to be considered in discharge planning, they are often seen as a reason for delay in the discharge process as they can make it complicated. However, results also suggest that family members are most commonly identified as a key decision maker for patients who is lacking capacity which highlights the importance of involving relatives in the discharge planning process.

The support families can provide post-discharge should be considered at the early stage of the discharge process (Sakamoto et al., 2023). They need to be involve in the "what matters to you" conversation and they should understand what support and services they can access post-discharge (Mockford, 2015) which could result to families and unpaid carers to be able to provide support on some aspect on activities of daily living which may result to a smaller package of care or the individual can stay at home longer. However, Audit Wales (2019) found that this has not been being consistent across Wales and access to information was limited. This echoes the suggestion of one of the participants in the workshop, to develop a resource and information pack for families and their advocates.

ENABLERS FOR DISCHARGE

Despite the numerous barriers, the findings also pointed to several enablers that could discharge outcomes. Notably, the availability of community care services was cited as a facilitator of timely discharge. Respondents acknowledged that when such services are available, patients can transition more smoothly from the hospital to their homes or other care settings. However, the variability in these services' availability underscores the need for systematic improvements in community support infrastructure.

Additionally, access to specialist dementia teams was identified as a crucial factor in ensuring appropriate discharge planning. However, respondents overwhelmingly agreed that patients with cognitive impairments do not have timely access to these services which further delays the discharge process. Expanding access to specialist dementia care during inpatient stays could therefore play a key role in mitigating discharge delays for this patient population.

The assessment issues can also be addressed by having an infrastructure that could be a step-down/transitional beds for patients outside the acute setting. This theme was highlighted in feedback from the workshop where practitioners felt that hospital is not the right environment for patients with cognitive impairment to be assessed. According to Health and Social Care committee (2024) a similar project initiative has been done in England where the health board utilised an empty community hospital as assessment beds. Some health board in Wales are considering following suit. By adopting this initiative, the health board can provide a targeted intervention and resource focused that can improve patient outcomes. A designated health and social care team can be allocated to support the programme. For example, multi-disciplinary professionals that include discharge liaison nurse (1), social worker (1), health care assistants (number will be influence by dependency ratio), occupational therapy (1), physiotherapy (1) and liaison officer (1) with an oversight from a geriatrician and psychiatrist, all staff are dementia champions. Having a dedicated team

can mitigate the risk of patient deterioration and the need for an increased package of care or long-term care and a rapid response to discharge planning.

BRINGING IT ALL TOGETHER

It is difficult to establish the correlation between the data reporting (StatsWales), staff perception (six thinking hats) and the findings of this study. The statistics that were being used to influence policies and benchmark the performance of the health board do not reflect how the staff feels why these cohorts of patients are experiencing delay in the acute setting. It could be for the following reasons: the reporting period does not align with the bigger picture it only provide a snapshot of where is the patient on their discharge journey on that given day, the definition and interpretation of the term “clinically optimise”, and the data is a general statement of the state of the hospital flow, the data does not confined to a patient with or without cognitive impairment, if the discharge is simple or complex (Audit Wales, 2019).

CHAPTER CONCLUSION

This research has identified several key barriers and enablers in the discharge timing of patients with cognitive impairments. The findings suggest that addressing issues related to care coordination, communication, capacity, and culture can significantly improve discharge outcomes for this patient cohort. As health and care systems continue to evolve, focusing on patient centred and integrated care models will be critical to ensuing that individuals with dementia receive the support they need both during and post-acute episode.

CONCLUSIONS AND RECOMMENDATIONS

This research set out to identify the barriers and enablers in discharging patients with cognitive impairments. The study reveals that whilst some progress has been made, significant challenges remain in providing timely and effective discharges for these individuals.

Key barriers include complex care needs, community-based capacity, communication and culture. These factors contribute to prolonged hospital stays, increasing the risk of deconditioning, infection, and a decline in overall well-being. Moreover, communication gaps between health and care professionals and inconsistencies with discharge planning further complicates the process.

On the other hand, the findings also highlight potential enablers to a timely discharge, such as access to community care service, and involvement of specialist dementia teams and These resources are important in ensuring seamless transitions from hospital to home or other care settings. However, access to these services remains inconsistent, pointing to the need for systemic improvement in community-based support and care infrastructure.

To address these challenges, this study recommends strengthening the communication and coordination between healthcare staff and social care services, improving access to specialised dementia care providers, and creating a skill development training programme for staff in discharge planning and dementia care. Implementing integrated care models and “teams around individuals” can also help streamline the discharge processes and potentially reduce the risk of delayed discharges.

To summarise, this research underscores the urgent need to reforms in discharge planning, particularly for patients with cognitive impairments, By addressing the identified barriers and leveraging the enablers, health and care providers can significantly improve discharge outcomes, reduce length of stay, an ensure better post-discharge care for this growing patient population.

CONCLUSIONS AND RECOMMENDATIONS

IMPLICATION FOR KNOWLEDGE

- This research provides an insight into the barriers and enablers of discharging patients with cognitive impairments.
- This research adds to knowledge as there is a little research on the equitability of existing discharge pathway to patient with cognitive impairments.

IMPLICATION TO PRACTICE

- Develop and implement a comprehensive skills and knowledge programme to ensure that all hospital staff are well-informed and adequately prepared to fulfil their responsibilities and promote and value-based practice.
- Promote awareness of the hospital discharge policy such including in the induction and signposted in the intranet. If updates are made, send a communication email to all staff (one respondent queried if the health board discharge policy is updated)
- Focus on outcome-based assessment. Use the trusted assessor network. Long-term decision should not be made in an acute setting (D2RA principle).
- Implement Dementia Care mapping using the driver diagram.
- Provide a definitive definition of “clinically optimise” which will be widely understood, and subjective interpretation is limited.
- Review the current reporting process and include the ability for system to identify patient cohort to provide a better analysis of the data for wider use.
- Implement the Good Work (A Dementia Learning and Development Framework) by Social Care Wales to all NHS staff.
- Organise bite-size events for information sharing and discharge planning discussions.
- Develop an information pack for patients, families and carers taking their input to consideration (include a key discharge coordinator contact, community services available post-discharge, and access to third sectors).
- Evaluate the health board’s performance against All Wales Dementia Care Pathway of Standards

IMPLICATION FOR FUTURE RESEARCH

- Cognitive impairment/dementia focused quantitative research assessing the impact of these barriers on patient outcomes, including the long-term effects on well-being.
- Research is needed to explore the roles of the family and their involvement in mitigating delay discharges. Understanding how family and unpaid carers can be better involved and supported throughout the discharge process which will lead to more patient-centred care and better outcomes.
- Undertake a comparison of effectivity of integrated care models and how can it improve patient outcomes and value-based health and care.
- Evaluation of the effectivity and impact to hospital flow and operations of “teams around the individual” as set out in Dementia Action Plan for Wales.

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Appendix A: Pathway of Care Delays Codes

Code	Descriptor	Service Lead	D2RA
1			
1.01	**Assessment Issues**		
1.01.01	Awaiting Social worker allocation	Social Care	1,2,3
1.01.02	Awaiting completion of assessment by social care	Social Care	1,2,3
1.01.03	Awaiting completion of assessment Nursing/ AHP/ Medical / pharmacy	Health Care	1,2,3
1.01.04	Awaiting Continuing Healthcare (CHC) Assessment	Health/ Social Care	3
1.01.05	Awaiting joint assessment	Health/Social Care	1,2,3
1.01.06	Assessment through the language of choice	Health/Social Care	1,2,3
	Transfer related issues		
1.02.01	Awaiting transfer to intermediate care bedded facility	Health Care	2,3
1.02.02	Awaiting community based health provision D/N CPN	Health / Social Care	1,3
1.02.03	Awaiting integrated health / social care community provision	Health/Social Care	1,3
2	Descriptor	Service Lead	D2RA
2.01	**Funding issues**		
2.01.01	Awaiting funding decision	Social Care	3
2.01.02	Awaiting funding decision FNC/ CHC	Health Care	3
2.01.03	Awaiting joint funding decision	Health/Social Care	3
2.02	**Home adaptation/equipment issues**		
2.02.01	Awaiting completion of assessment/ provision for equipment	Health Care	1,3
2.02.02	Awaiting completion of assessment /provision for equipment	Social Care	1,3
2.02.03	Awaiting completion of adaptations (DFG's)	Social Care	1,3
2.02.04	Awaiting provision of telecare and /or telehealth equipment	Social Care	1,3
2.02.05	Awaiting provision of medicines management dispensing equipment/support	Health Care	1,2,3
	Home care related issues		
2.03	Awaiting start of new home care package		

2.03.01	Awaiting restart of previous home care package	Social Care	1
2.03.02	Awaiting Dom care package self-funding	Health / Social care	0
2.03.03		Health Care	1
	Step down to recover and assess		
2.04	Awaiting reablement package of care		
2.04.01	Awaiting Community Resource capacity	Social care	1
2.04.02		Health / Social Care	1
2.05	**Disagreements/Disputes**		
2.05.01	Patient / family choice related issues	Health/Social care	3
2.05.02	Patient/ family dispute CHC outcome	Health Care	3
2.05.03	Patient / family refusing to participate in financial assessment	Social Care	1,3
2.05.04	Patient / family refusing to move to next stage of care/ discharge	Health / Social Care	1,2,3
2.05.05	Disputes between agencies CHC outcome Intervention by patient's (lawyer) legal representation	Health/Social Care	3
2.05.06	Mental Capacity / Court of Protection delays	Health/Social Care	3
2.05.07	Safeguarding issues impacting discharge arrangements	Health / Social Care	3
2.05.08		Social Care	1,2,3
3	Descriptor	Service Lead	D2RA
3.01	**Care Home placement arrangements**		
3.01.01	Awaiting completion of arrangements prior to placement	Health/ Social Care Social care	2,3
3.01.02	Awaiting care home manager to visit and assess (Standard 3 residential)		2,3
3.01.03	Awaiting care home manager to visit and assess (Standard 3 nursing)	Health Care	3
	Awaiting nursing/residential home self-funding	Health Care	
3.01.04	Awaiting RH availability	Health /Social care	3
3.01.05	Awaiting NH availability	Health / Social Care	2,3
3.01.06	Awaiting EMI Residential availability	Health / Social Care	3
3.01.07	Awaiting EMI Nursing availability	Health / Social Care	2,3
3.01.08	Awaiting specialist bed availability	Health / Social Care	3
3.01.09			3
	NHS Bed related issues		
3.02	Awaiting Mental Health bed	Health Care	
3.02.01	Awaiting palliative care specialist bed	Health Care	3
3.02.02	Awaiting palliative care POC	Health Care	3

3.02.03	Awaiting palliative care home	Health Care	3
3.02.04			3
	Housing Related Issues		
3.03	Homeless	Local Authority	
3.03.01	No suitable abode	Social Care	0,1
3.03.02			0,1

Appendix B: Questionnaire

Multiple Choice Questions: Barriers to Discharging Patients with Cognitive Impairment from Acute Settings

1. In your opinion what is the primary barrier to discharging a patient with cognitive impairment from an acute care setting?

   A) **Limited availability of specialised care units**
   B) **Insufficient staff training on cognitive impairment care**
   C) **Lack of standardised discharge planning**
   D) **Funding services**
   E) **Other: _____**

2. Thinking about your day, which factor contributes most to delayed discharges for patients with cognitive impairment in acute settings?

   A) **Complexity of the patient's medical needs**
   B) **Prompt completion of discharge paperwork**
   C) **Inadequate coordination between health and social care providers**
   D) **Family/Patient decision making**
   E) **Other: _____**

3. Based on your experience how does the complexity of care needs impact the discharge timing?

   A) **It leads to faster discharge**
   B) **It has no effect on discharge timing**
   C) **It necessitates extended hospital stays**
   D) **It complicates the discharge process**
   E) **Other: _____**

4. To what extent does communication affect the discharge process?

   A) **It has no significant impact on the discharge process**
   B) **Effective communication can prevent unnecessary delays**
   C) **Poor communication leads to improved discharge outcomes**
   D) **Communication is only important post-discharge**
   E) **Other: _____**

5. How does the availability of community care services influence the discharge of patients with cognitive impairment from acute settings?

   A) **It is unrelated to discharge timing**
   B) **It ensures a timely discharge**
   C) **It prolongs the hospital stay**
   D) **It decreases the quality of care**
   E) **Other: _____**

6. In your opinion what impact does the hospital's discharge policy have on the timing of the discharges?

   A) **It standardises the discharge process**
   B) **It causes unnecessary delays**
   C) **It has no effect on discharge timing**
   D) **It expedites the discharge process**
   E) **Other: _____**

7. To what extent does the patient and family preferences influence the timeliness of discharge?

   A) **They speed up the discharge process**
   B) **They are not considered in discharge planning**
   C) **They can lead to delays in discharge**
   D) **They simplify the discharge criteria**
   E) **Other: _____**

8. How does the integration of system impact the discharge of cognitive impairment patients?

   A) It has no impact on discharge timing
   B) **It leads to quicker discharge**
   C) **It results in discharge delays**
   D) **It improves only long-term care outcomes**
   E) **Other: _____**

9. From your point of view, in the acute care settings who should be the key decision maker for patients who lack capacity?

   A) Medical team
   B) **Nursing ward staff**
   C) **Social worker**
   D) **Next of Kin**
   E) **Other: _____**

10. Do you feel that patients with cognitive impairment have delayed discharges due to mental capacity assessments?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

11. Do you feel patients have an increased length of stay due to their cognitive impairment?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

12. In your opinion, are the discharge pathways for patient with cognitive impairment equitable to those with no impairment?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

13. Are ward staff informed and educated to support discharge for a patient with cognitive impairment?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

14. Do you think patients with a cognitive impairment have timely access to specialist dementia teams?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

15. Do you think that there is a sufficient discharge pathway for patients with cognitive impairment?

    A) Strongly Agree
    B) **Agree**
    C) **Neither agree nor disagree**
    D) Disagree
    E) **Strongly Disagree**

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Thank you to my line manager within Hywel Dda University Health Board for allowing me study leave to complete this research. A special thank you to the participants who took the time to complete the survey and share their experiences.

Cost and Volume funding models for medical microbiology services inhibit Value-Based Health Care

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Abstract:

Background: The use of cost and volume contracts (Fee-for-services) is common in NHS Wales. When Payer and Provider are separate, such an approach has an intrinsic disincentive for Value-Based Health Care as any reduction in activity results in a reduction in income for the Provider. This is a barrier to effective diagnostic stewardship. **Methods:** Using a real-life scenario, a perceptual questionnaire, and semi-structured interviews with system leaders, were utilised to explore aspects including perception of value, the advantages and disadvantages of cost and volume contracting, the opportunity to change allocative value and potential alternatives to the funding model. **Results:** The results aligned with parts of the literature review, identifying that laboratory testing has value, but more needs to be done both pre- and post-laboratory to ensure testing is targeted at those who have greatest opportunity to benefit from a particular test. However, there is recognition that to do this would require resources (additional and / or released from other activities) to undertake and maintain clinical engagement and education. There is also the pressure of achieving cash saving as a priority over increasing value due to timescales and the current financial climate. **Conclusion:** There is a strong consensus that the current model does not incentivise high value, and to explore alternative funding models including outcome-based supplements.

Keywords: Diagnostic Stewardship, Cost and Volume, Fees-for-Service, Laboratory Testing, Payment reform

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Introduction

Purpose

Previous studies and government policy statements suggest that a significantly high proportion of clinician decisions and pathways are influenced by pathology data. In Wales, NHS Medical Microbiology services process over 2 million samples per annum for a 3.1 million population.

Local research, including a Bevan Exemplar (The Bevan Commission) project demonstrated that innovative approaches including the design of results reports with the provision of narrative reports demonstrate improvements in system efficiency, overall costs and both patient and public health outcomes. However, due to the current program budget allocations, these innovations require an increase in cost, or loss of income, in one part of the pathway (i.e. microbiology services) while making savings elsewhere (e.g. antimicrobial prescribing and reduced overall testing requirements).

This report will explore the following:

- System recognition of the value associated with pathology and in particular, medical microbiology.
- Enablers and incentives / disincentives related to undertaking Value-Based Health Care innovations with respect to medical microbiology testing.
- Alternatives to the current contracting mechanism (Cost and Volume / Fee-for-service) that could enable greater value to be secured from medical microbiology services.

These will be explored in the policy context of “A Healthier Wales”, the “UK Antimicrobial Resistance Strategy – Contained and Controlled” and the NHS Wales Value-Based Health Care Action Plan.

Report Structure

The report structure is as follows:

- Chapter 2 – Background and context. This provides the scene setting with details of the current circumstances, hypothesis, research methodology and literature review.
- Chapter 3 – Investigation and results. This provides details about the questionnaire and interviews undertaken to explore the hypothesis and associated objectives.
- Chapter 4 – Analysis and discussion of the main findings from the research.
- Chapter 5 – Conclusion.
- Chapter 6 – Recommendations.
- Chapter 7 – References.

Background and context

What is pathology?

Pathology is the science of the causes and effects of diseases, associated with the laboratory examination of samples of body tissue for diagnostic purposes. It is an essential element of the health care system and is integral to many clinical decisions, often providing pivotal information for the prevention, diagnosis, treatment, and management of disease.

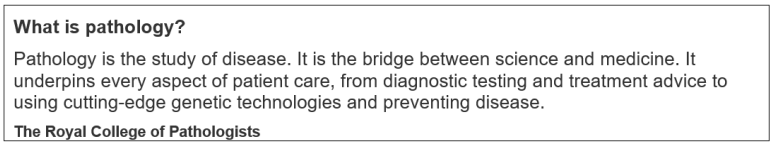


Figure 1. Description of Pathology.

The role of Medical Microbiology

Medical microbiology supports and oversees the prevention, diagnosis and treatment of illness caused by microorganisms (Bacteria, viruses, fungi and parasites). This includes:

- Providing advice and guidance on the best samples to collect to assist diagnosis e.g. a swab, blood or urine.
- In collaboration with scientists, process and undertake tests to discover presence of infection and likely causative agent.
- Provide advice to other clinicians and public health specialists to manage and treat infection.
- Provide advice and guidance for the optimal use of antimicrobial therapies including antibiotics.
- Provide advice and guidance on measures to prevent and control the spread of disease in both hospital and community / population settings.

The Royal College of Pathologists

Figure 2. The role of medical microbiology.

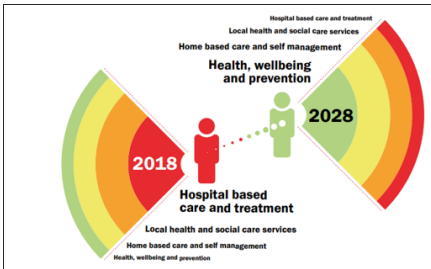
Policy and strategy context

The Healthcare Financial Management Association provides introductory guidance to finances in healthcare. This states that "Responsibility for health and social care services in Wales lies with the Senedd (the Welsh Parliament) and with the Welsh Government as part of devolved responsibility from the UK Government". The Senedd makes laws for Wales and holds the Welsh Government, responsible for health policy, strategy and delivery, to account.

NHS Wales consists of several organisations including Health Boards, NHS trusts and two special health authorities. These sovereign organisations are collectively responsible for providing health care in Wales. This includes collaboration, joint working and contracting with each other as well as other commercial or third-sector partners.

A Healthier Wales

This is the long-term plan of the Welsh Government to transform health and social care services in Wales. It focuses on prevention, integration, workforce, innovation, and sustainability, with increasing value in both as an explicit aim and a design principle.



A Healthier Wales – Quadruple Aim

i. People in Wales have improved health and well-being with better prevention and self-management.
ii. People in Wales have better quality and more accessible health and social care services, enabled by digital and supported by engagement.
iii. The health and social care workforce in Wales are motivated and sustainable.
iv. Wales has a higher value health and social care system that demonstrated rapid improvement and innovation, enabled by data, and focused on outcomes.

Figure 3. A Healthier Wales.

Antimicrobial Resistance and Stewardship

Antimicrobial therapy is not without its risks, including side effects such as allergic reactions and antimicrobial resistance. The latter is thought to be caused by overuse or inappropriate use, resulting in infections becoming untreatable. The World Health Organisation identified antimicrobial resistance one of the top 10 global public health threats facing humanity (WHO 2019).

The UK Government published a 20-year vision to contain and control antimicrobial resistance, involving four 5-year action plans.

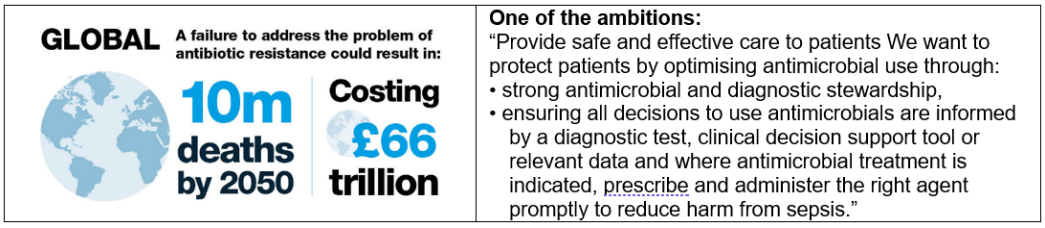


Figure 4. Global impact and ambition regarding antibiotic resistance.

Pathology Statement of Intent

This identifies pathology as a key component in delivering prudent health services (see below), it recognised increasing demand, new technology and techniques and workforce pressures and as such, a need to move closer to personalised medicine with more precise diagnoses and targeting of treatments.

Healthcare spending context

The NHS in the UK provides universal healthcare coverage and while this is meant to provide healthcare and financial protection to all citizens, it comes with the challenge of balancing meeting individual patient needs and being able to fulfil other societal requirements such as education or defence. There is a global recognition that current methods of delivering health care are unsustainable:

- The European Commission has identified a widening gap between need and demand for healthcare and actual investments (correlated to the GNP) and as a result financial sustainability and access to universal health care are increasingly endangered.
- The World Economic Forum identified:
  - that the compound annual growth rate in health expenditures for the OECD countries was 2.9% between 2009 and 2015. The equivalent growth rate in GDP per capita was 1.2%.
  - that growing evidence indicates that a significant portion of healthcare spending - as much as 30% according to some estimates - is wasted on unproven or unnecessary treatments and that the quality of care delivered varies widely across different provider institutions.

Prudent Healthcare & Value Based Health Care

The Bevan Commission was established in 2008 to provide independent advice and consensus on health and care-related matters to the Welsh Government. The Bevan Commission published a White Paper at the end of 2013, "Simply Prudent Healthcare – achieving better care and value for money in Wales – discussion paper." Subsequent engagement and collaboration developed the principles, and these are presented in Figure 5 below, representing Welsh Government policy.

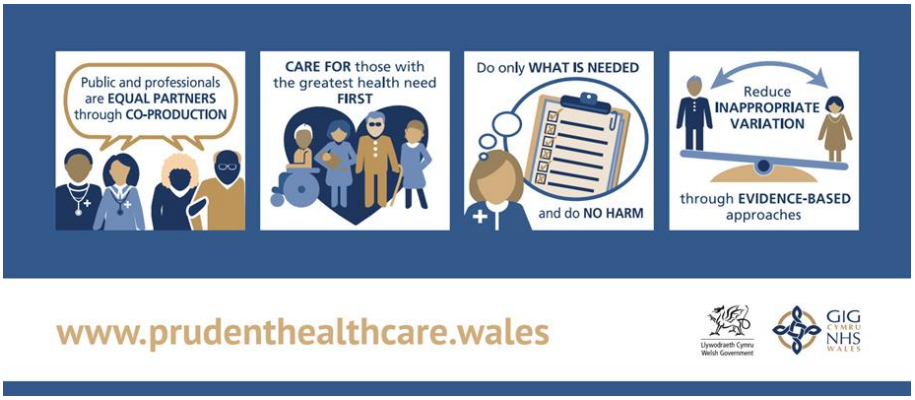


Figure 5. Prudent Healthcare.

Value Based Health Care developed as a concept in 2006 (Porter and Teisberg). It has been described as a tool to implement PH and emphasizes the delivery of high-quality, efficient healthcare services focused on achieving better outcomes for patients while also considering the cost of care. It prioritises value, defined as the quality of outcomes achieved relative to the cost of care. The fundamental principles of VBHC are presented in Figure 6 below.

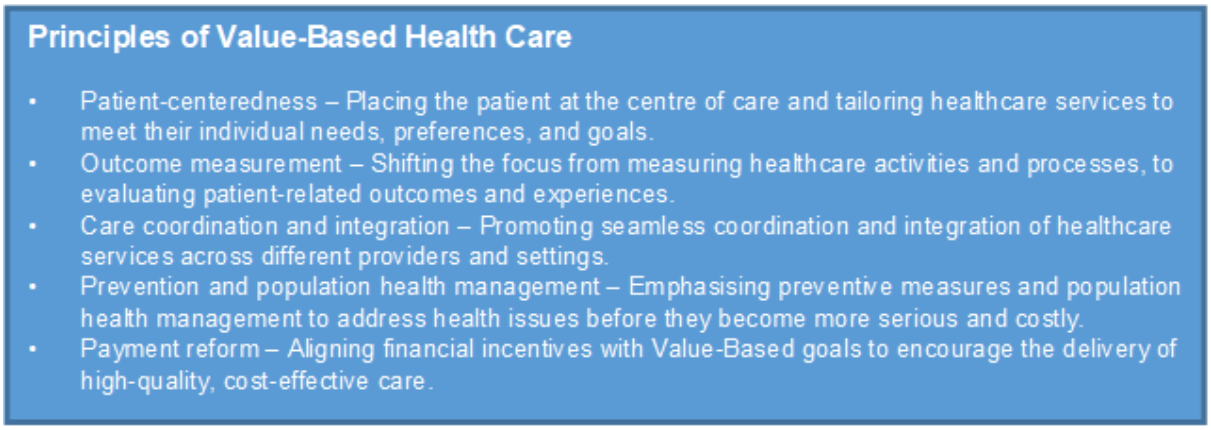


Figure 6. Principles of Value-Based health care.

Cost and Volume (Fees-for-service) Contracts for Medical Microbiology services in NHS Wales

Medical microbiology is part of pathology services and in Wales is predominantly delivered by the Infection Service at Public Health Wales NHS Trust. It typically processes ~2 million samples per annum, each being subject to multiple processes.

Funding is received via two streams: I) directly from the Welsh Government for national responsibilities and II) from service users, primarily Welsh Health Boards to provide services for their respective populations.

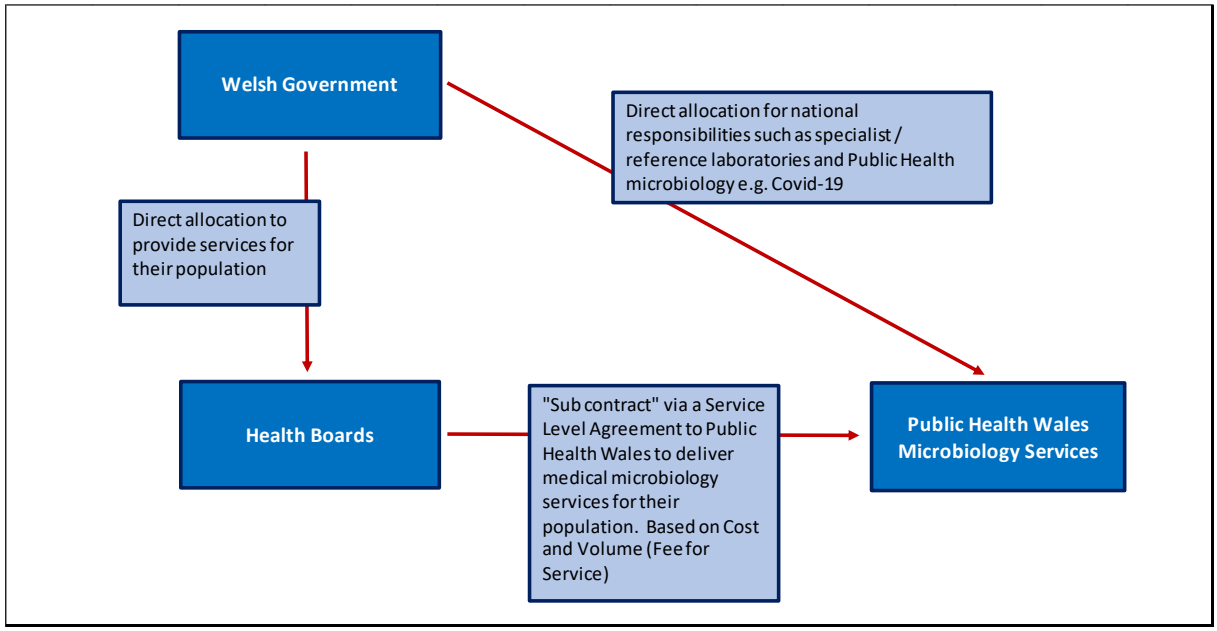


Figure 7. Flow of funding for medical microbiology services in NHS Wales.

Observers typically regard the service as being entirely laboratory-based and dependent upon tested samples to function. Instead, much of the clinical service, such as advice to other clinical teams, is provided separate from laboratory results.

There has been a long-standing debate on the value of a large proportion of samples referred to microbiology services, the timeliness of the results, and whether they make a difference to patient outcomes.

A previous Bevan Exemplar Project by Dr Mike Simmons, Consultant Microbiologist (Simmons et al, 2019), suggests that with effort such as narrative reporting (story telling about the result), the number of samples being requested can be reduced significantly e.g. up to 30% less.

As a result, this would reduce the associated resources, creating more value for the public purse.

However, a challenge to such efforts is that because of the internal market workings, budgets are allocated to different organisations and functions rather than pathways. As such, system savings often occur outside of the primary effort. For example, prescribing costs being avoided from a primary care budget whereas the cost of securing the change sits with the microbiology department.

The initiative to improve the quantity and quality of the urine samples through education and change in referral behaviour created a dilemma for the PHW Infection Service:

- A reduction in samples numbers also results in a loss of income for PHW Infection Services; and
- The cost of change, in this case, the time and energy of microbiology specialists is borne by PHW Infection Services.

This research proposal is built on one of the Value-Based healthcare principles as identified by the European Commission Expert Group report on Value-Based Health Care. This recommends mechanisms to change the allocation of resources, suggesting freeing resources from low to high value care. This research explores payment reform that changes allocative values across clinical pathways. This includes aligning financial incentives with Value-Based goals to encourage the delivery of high-quality, cost-effective care.

It is proposing that a new commissioning model can be agreed upon that incentivises system improvements without financially undermining the microbiology diagnostic service. This should result in improved value as measured by factors including:

- Reduced referral rates
- Increased positivity rates
- Reduced prescribing of generic antibiotics
- Reduced markers of antimicrobial resistance

Hypothesis

The current contracting arrangements between NHS Wales Health Boards (payer) and the medical microbiology services at Public Health Wales (provider) are exclusively Cost and Volume based. This research tests the idea that this model doesn't encourage the providers to do things that would lower activity and income, even though doing so could increase the overall value of the system by using quality and outcome measures.

Aims

The aims of this research are:

- To assess the current system perspective of Cost & Volume contracts, including advantages and disadvantages to improving value.
- To evaluate the system's willingness to utilise a new commissioning (payment) model.
- To gain a better understanding of the incentives and disincentives associated with changing allocative value.
- To identify potential alternative commissioning approaches that could improve value.

Securing value from Pathology and Microbiology

As stated by Drummond et al (2005), “isolating the value of the testing process from the overall process of patient management is complicated. Value can be defined clinically or economically. Clinical value is linked to the improvement of health-related outcomes, whereas economic value is tied to cost-efficiency or cost-effectiveness”. The table below has been extrapolated from the IFCC task force report on the Impact of Laboratory Medicine on Clinical Management and Outcome (2015).

Table 1. Value components of laboratory medicine, with examples.

Value Component	Value of testing	Example
Screening	• Prenatal and Neonatal testing	Heel Prick Test for inherited metabolic disorders, Sickle Cell Anaemia and Cystic Fibrosis.
Risk Stratification	• Support risk assessment for future complications and therapeutics	Lipids and HbA1c
Diagnosis	• Diagnosis supported or defined by a laboratory result • Early warning of developing disease	Influenza, SARS-CoV-2, Type 2 Diabetes Mellitus and Acute Kidney Injury
Treatment Selection	• Calibration for optimal treatment	Antibiotic Sensitivity Testing
Monitoring	• Ongoing measurement of intervention	HbA1c (Diabetes) and Thyroid Stimulating Hormones (Hypothyroidism)

Research methodology and design

The research problem – overview

The NHS (healthcare) system is highly complex (Braithwaite 2018) - To explore the system perceptions and behaviours associated with securing value across a pathway through changes in a single part of that pathway requires several perspectives and diverse experience.

As such, this will incorporate a qualitative research approach, seeking input from stakeholders, and focusing on collecting and analysing spoken and written work, including the use of transcription. This will focus on the use of semi-structured interviews as well as a questionnaire.

To supplement this, a quantitative approach will also be included when analysing the results of the questionnaire as a means of measuring potential relationships between variables such as differences between a respondent's professional role and their perception of value.

Ethical approval was sought and secured from Swansea University (Appendix A).

Sampling Strategy

Table 2 below summarises this research's sampling strategy.

Table 2. Sampling method.

Sampling method	Comment
Non-probability sampling	Interviewing respondents from a targeted list of clinicians, scientists, and managers from within NHS Wales. Selection bias - Not generalisable.
Probability sampling	Perceptual survey distribution through key individuals and generic email, seeking cascade / snowballing of communication. Individuals self-select if they are to complete or not. Potential bias linked to initial contacts and subsequent cascade.

Descriptive Research design

There is no intervention as part of the research – only data collection. As such this research focuses on describing the existing context and perceptions of the system associated with the contracting of medical microbiology and securing greater value. There is limited exploration of potential relationships, but these are designed to help describe current behaviours and potentially identify alternative approaches.

Data Collection

Interviews

Interviews can provide a richness and depth to the context. Semi-structured questions were developed to explore the areas of allocative value and alternatives to a cost and volume only approach. These were preceded by a scenario based on a real-life challenge.

Table 3. Data collection methodology for interviews.

Participant Selection	Interviewees were selected via a process that identified key stakeholders in relation to the scenario. Interviewees were purposely selected based on their expertise, insight and experience in relevant functions. Recruitment was through the researchers' connections.
Interview Length	Up to a maximum of 1 hour
Types of questions	Open questions that were themed
Interview themes	Recognition of value, Different measures of Value, Incentives and Disincentives to allocative value, Alternatives to cost and volume contracting.
Form of Recording	All interviews were conducted via TEAMS and recorded with permission. The videos were transcribed using the TEAMS app.

Questionnaire

A questionnaire was created to improve the validity of the research and its findings by collecting feedback from a larger group of people.

Table 4. Data collection methodology for questionnaire.

Participant Selection	People working with NHS Wales involved in microbiology, pathology, finance and contracting. Request included to share with known others (snowballing). Self-selecting people who were engaged with the study via the general distribution of the survey.
Survey Distribution	Link was shared via email through identified individuals based on their specialty, function, seniority and pre-assessed networks for distribution.
Survey Design	The survey provided a real-life scenario, followed by 19 multiple choice questions using 'Yes/No/Don't Know' or the Likert scale. The survey ended with an open question seeking a narrative response on thoughts around different approaches to the contracting of microbiology services.
Survey Format	Microsoft Forms

Data Analysis methodology

This will include thematic analysis of the narratives provided through interview transcriptions and the questionnaire responses. This approach is suitable for research that includes large amounts of subjective data because it allows the data to be divided and categorised, providing the opportunity to identify themes and the richness of the contributing data.

The literature review will help guide the development of the questions for both the interviews and the questionnaire, however the approach to coding will be inductive, with no pre-established coding. Instead, coding will emerge from the transcripts and written data based on semantic level, i.e., what is explicitly stated by the respondents.

Literature Review

The following table and figures present the methodology of the literature search.

Table 5. Methodology for literature review.

Activity	Detail
Literature Search - Key words and phrases	Value in Pathology / Microbiology / Laboratory testing Allocative value in healthcare Microbiology Testing and Cost & Volume Microbiology & Pathway Improvement Microbiology and Incentivisation Microbiology & Allocative Value Microbiology & Stewardship Diagnostic Stewardship in Healthcare Healthcare Payment Incentives Diagnostic Stewardship + microbiology + Budget management
Repositories accessed	i-Find, ScienceDirect and Google Scholar
Search criteria 2	English Language, Open-access, and publications since 2000
Search criteria 3	Publications since 2020 and Peer-reviewed

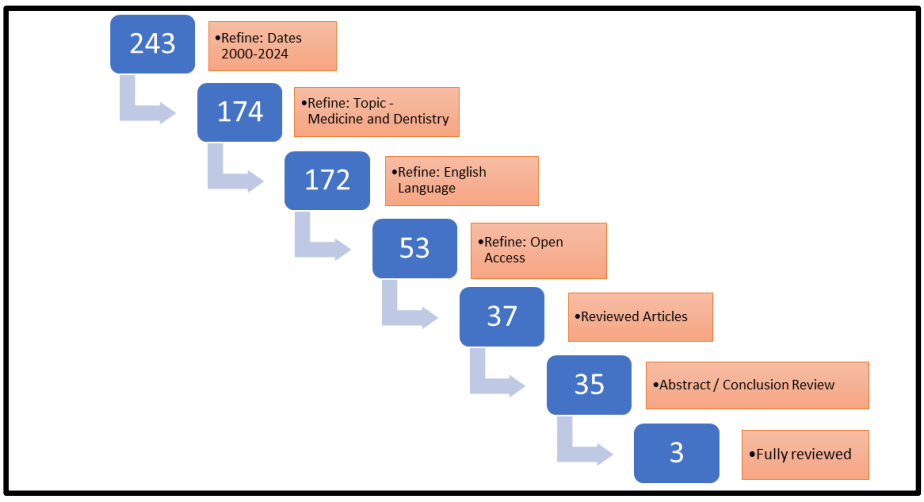


Figure 8. Example flowchart for literature review.
(Diagnostic Stewardship + Microbiology + Budget Management (ScienceDirect).

Following this process, 67 articles were fully reviewed, with over 50 more identified and subsequently reviewed through exploring their references.

The flow chart below presents the approach the researcher used.

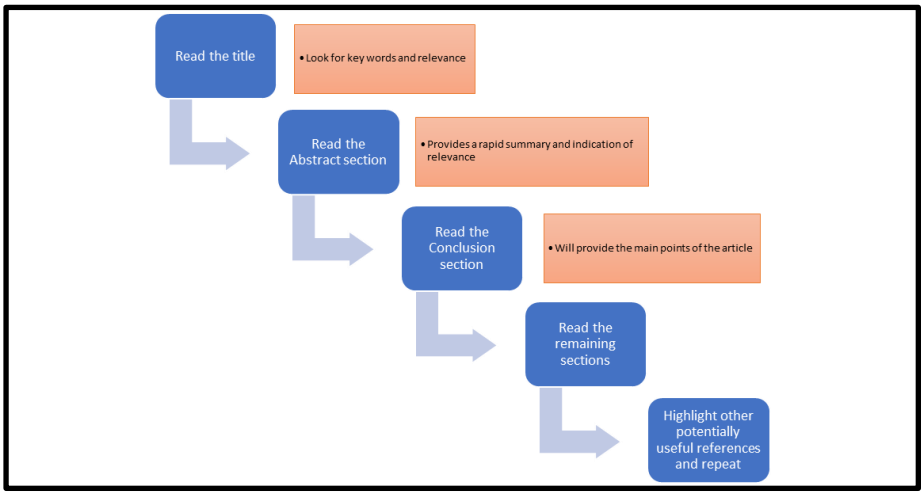


Figure 9. Flowchart for reviewing articles.

Investigation and Results

Interviews

Twelve senior NHS professionals were interviewed. Questions and scenario are presented in Appendix C.

Table 6. Interviewees by professional group.

Professional Group	Number of representatives
Clinician	3
Scientist	2
Finance	5
Payer	2
Total	**12**

Thematic analysis was undertaken using the process presented in Figure 10.

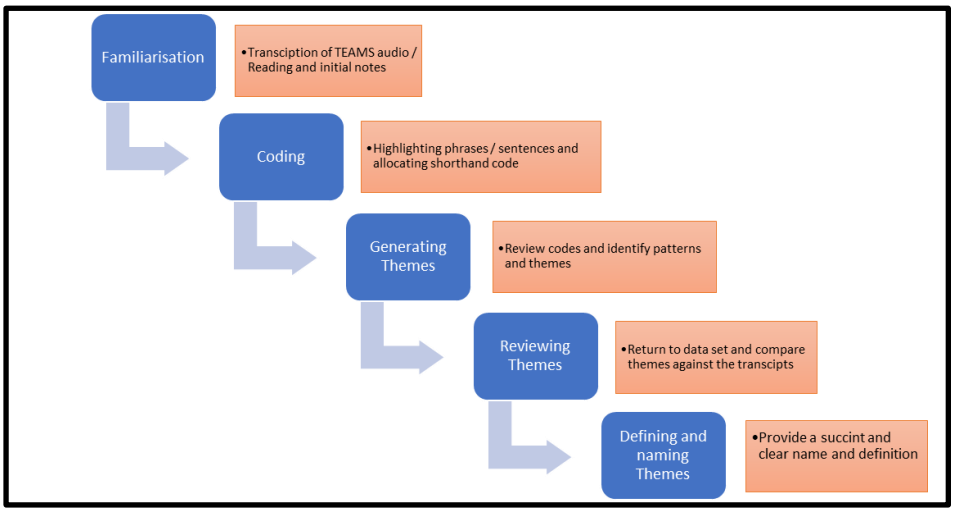


Figure 10. Methodology for thematic analysis.

Table 6 presents the eight identified themes, complete with definitions and examples. These are ranked in order from highest to lowest rate of inclusion in the interviews. Examples of comments from Interviewees are in Appendix D.

Table 7. Themes, Definition and Examples from interviews.

Theme	Definition	Example
Realisation	Activities, behaviours, or processes that support successful and desired outcomes	Trusted relationships Acceptance of complexity Culture of benefit realisation Use of incentives and constraints Capacity for engagement and communication
Barriers	Behaviours or processes that hamper processes to change allocative value	Linear expectations Limited view of 'big picture' Non-cash releasing changes are low priority
Stewardship	The use of expert knowledge and associated processes to secure optimal value to a pathway and outcome	Data and evidence availability Diagnostic overuse Engagement with clinicians
Finance	Budget allocation, priorities, and processes to manage finances	"Cash saving is king". Budget management is simplified. Block contracts v. Stepped costs v. Fixed costs
Misalignment	When two or more processes or behaviours that should complement but are instead out of synchronisation and negatively impact one or the other.	Disassociation between clinicians, payers, and providers. Budgets not reflecting clinical pathway. Clinicians manage by symptoms not budgets
Productivity	Where activity is aligned to the desired outcome rather than simply doing more	Reward for activity not outcome. Being busy not same as optimal working Output over outcome
Risk	Risk appetite and tolerance to try different approaches to secure desired outcomes	Risk sharing. Balancing risk of harm v. cost Support fast thinking to manage risk. Fail fast and learn
Outcomes	The benefit to a patient / population or sub-population because of the changes (or not) to allocative value	Individual benefit from a process versus population benefit Pathway value is greater than individual steps

The strongest themes were calculated as a percentage of the total coded phrases or sentences, or the number of times a theme appeared across the 12 transcripts, using the coding associated with the final themes.

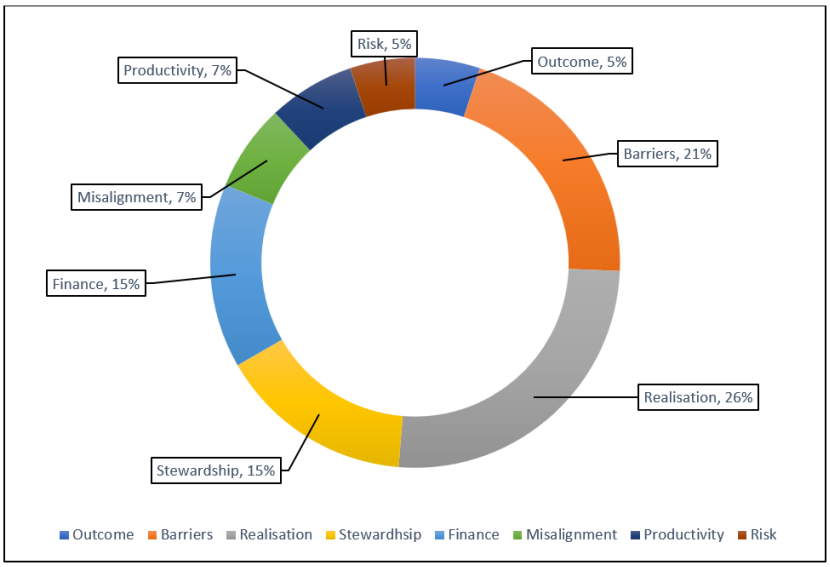


Figure 11. Theme percentages appearing in interviews.

Questionnaire – General

Key points

Table 8 below provides a summary of the key points extrapolated from the questionnaire.

Table 8. Summary of key points from questionnaire.

Aspect	Comment
Role and employment	Most respondents were from Public Health Wales. Clinicians accounted for over a third of respondents.
Microbiology services	There is a strong consensus that microbiology services play a critical role in improving patient outcomes and service efficiency. Opinions are mixed on whether the value of microbiology services is understood by the NHS system.
Budget and payment responsibility	A significant number of respondents are budget holders for microbiology services.
Contract and payment models	Majority of respondents knew that the current model was cost and volume and did not include any incentive-based payments.
Effectiveness of Cost and Volume Approach	Opinions are divided on whether the cost and volume approach is effective at realizing the value of microbiology services. There is a general agreement that it is challenging to make investments in microbiology that release value elsewhere along the clinical pathway.
Sample Value and Clinical Decision-Making	Many respondents believe that a proportion of samples received by microbiology offer limited value to clinical decision-making and outcomes. There is strong support for investing more in clinical engagement, pathway design, and education to reduce low-value samples.
Financial Stability and Incentives	Respondents recognize the potential financial disablers of processes that reduce the number of samples. There is strong support for financial incentive frameworks to support education and engagement activities that improve the value of samples.
Alternative Payment Models	Providing a percentage of the overall contract based on positivity rates is viewed favourably. Introducing supplements for direct clinical engagement is supported. Payment based on two prices for a test, with a higher cost for a narrative report, is seen as a potential improvement.
General sentiments	There is a high level of agreement on the importance of microbiology services and the need for better financial and operational models to support their value.

The following figures present the high-level results from the 19 questions. Themed analysis by professional groups was also undertaken, and this is explored further in the discussion section.

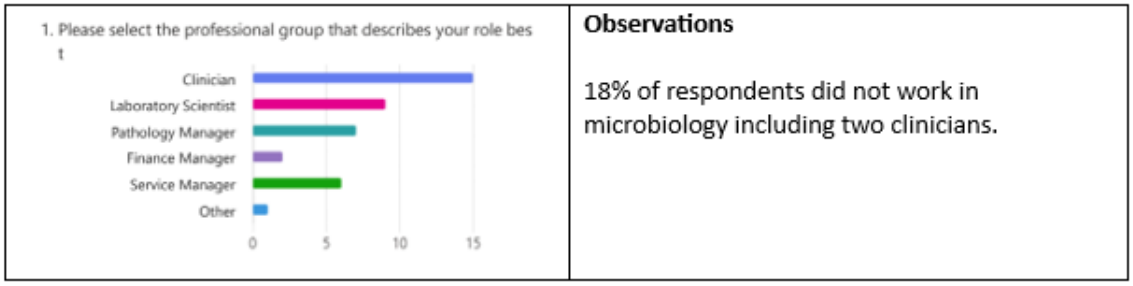


Figure 12. Question 1. Which professional group best describes your function.

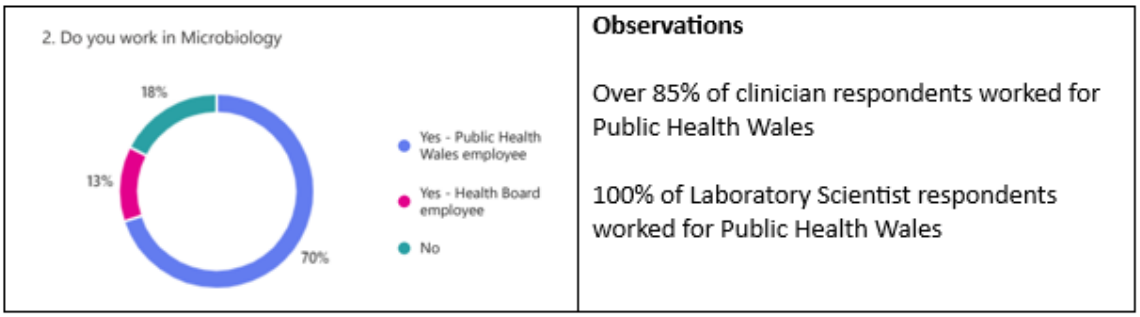


Figure 13. Question 2. Percentage of respondents working with Microbiology (Public Health Wales or Health Board).

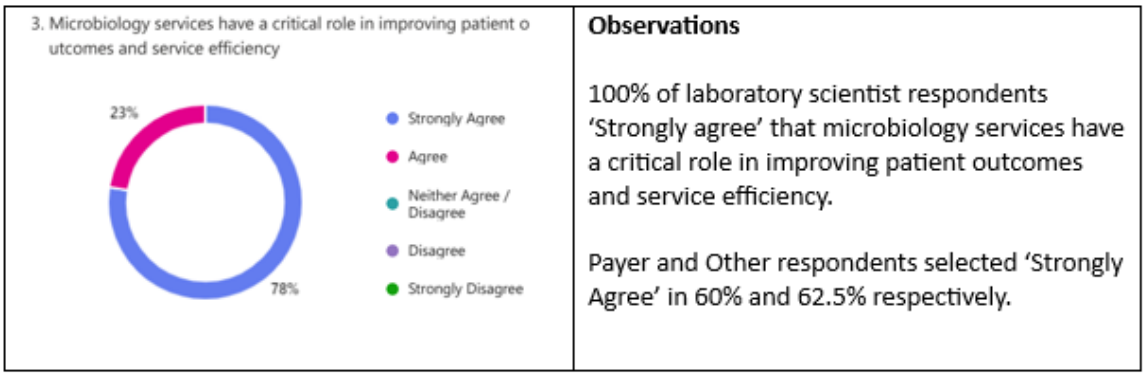
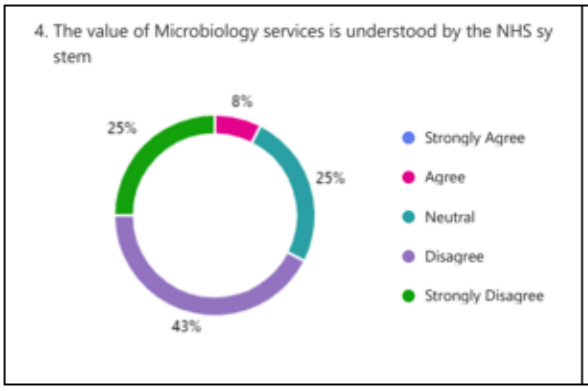


Figure 14. Question 3. Microbiology services have a critical role in improving patient outcomes and service efficiency.

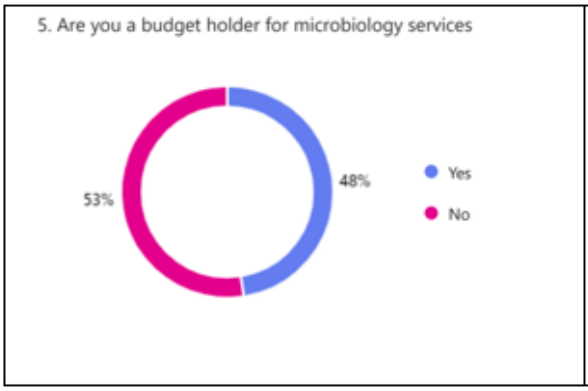


Observations

12.5% of Other respondents 'Agreed' that the value of microbiology is understood by the wider system.

The highest rate of 'Disagree / Strongly Disagree' was from Laboratory scientist (87.5%) The lowest rate of 'Disagree / Strongly Disagree' was from clinical respondents (60%)

Figure 15. Question 4. The value of microbiology services is understood by the wider NHS system.

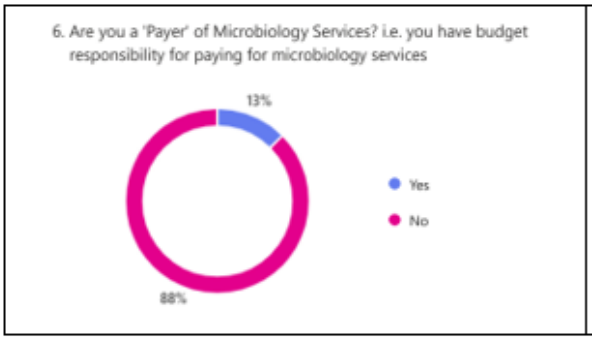


Observations

69% of 'Other' respondents identified as budget holders for microbiology services. This includes microbiology service managers.

Only 13% of laboratory scientist respondents identified as budget holders for microbiology services compared to 33% of clinical respondents.

Figure 16. Question 5. Are you a budget holder for microbiology services.



Observations

33% of clinical respondents identified as 'Payers' of microbiology services.

Figure 17. Question 6. Do you have budget responsibility for paying for microbiology services?

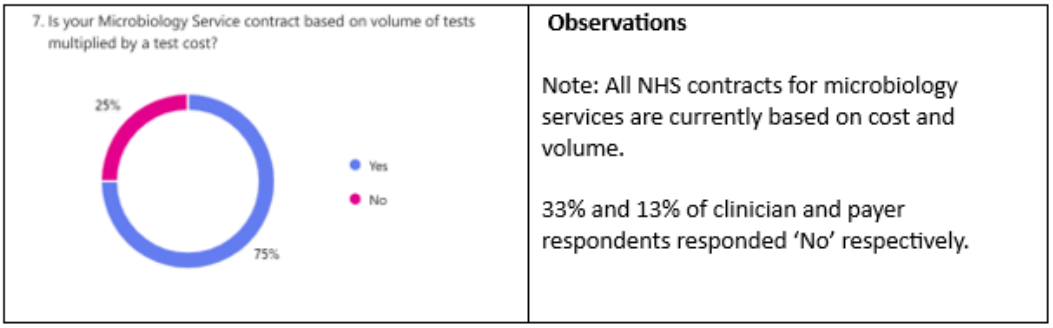


Figure 18. Question 7. Is your Microbiology Service contract based on volume of tests multiplied by a test cost?

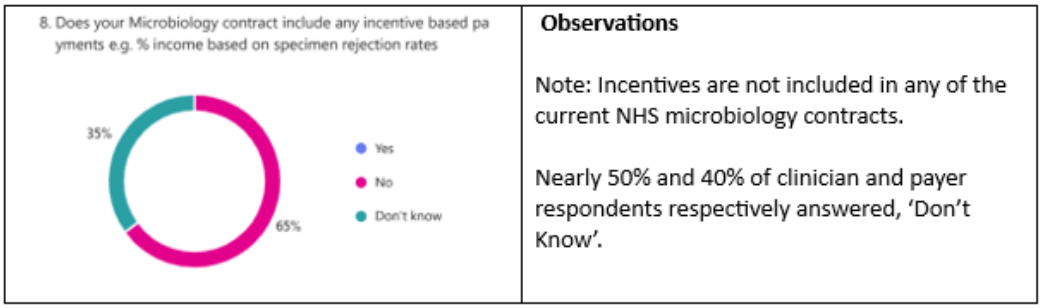


Figure 19. Question 8. Does your Microbiology contract include any incentive-based payments e.g. % income based on specimen rejection rates.

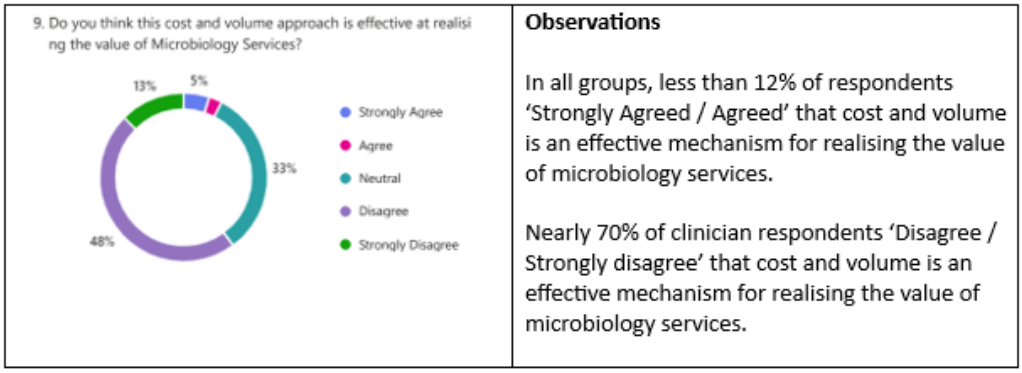
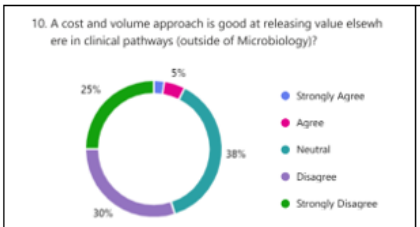


Figure 20. Question 9. Do you think this cost and volume approach is effective at realising the value of Microbiology Services?



Observations

20% of both clinician and payer respondents 'Strongly agreed / Agreed' that the cost and volume approach is good at releasing value elsewhere in the clinical pathway (outside of microbiology).

Except for laboratory scientist respondents, between 27% and 60% of the respondent groups 'Neither agree / disagree' on cost and volume being good at releasing value elsewhere in the clinical pathway.
100% of laboratory scientists 'Disagree / Strongly disagree' that a cost and volume approach is good at releasing value elsewhere in the clinical pathway.

Figure 21. Question 10. A cost and volume approach is good at releasing value elsewhere in clinical pathways (outside of Microbiology)?

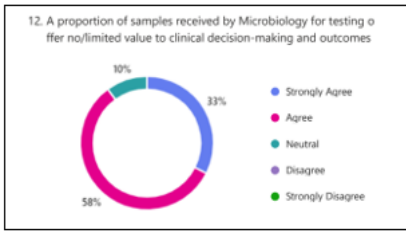


Observations

40% of payer respondents 'Strongly agreed' that it was easy to make investment in microbiology that releases value elsewhere along the clinical pathway.

100% and 67% of laboratory scientist and clinician respondents respectively 'Disagree / Strongly disagree' that it is easy to make investment in microbiology that releases value elsewhere along the clinical pathway.

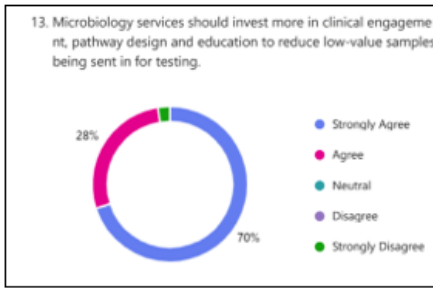
Figure 22. Question 11. It is easy to make investment in Microbiology that releases value elsewhere along the clinical pathway?



Observations

Over 80% of all respondent groups 'Strongly agree / Agree' that a proportion of samples received by microbiology for testing offer no/limited value to clinical decision-making and outcomes (this rose to 100% for laboratory scientists).

Figure 23. Question 12. A proportion of samples received by Microbiology for testing offer no/limited value to clinical decision-making and outcomes.



Observations

While almost 100% of respondents 'Strongly agree / Agree' that microbiology should invest more in clinical engagement, pathway design and education, 87.5% of laboratory scientist respondents 'Strongly agreed'.

Figure 24. Question 13. Microbiology services should invest more in clinical engagement, pathway design and education to reduce low-value samples being sent in for testing.

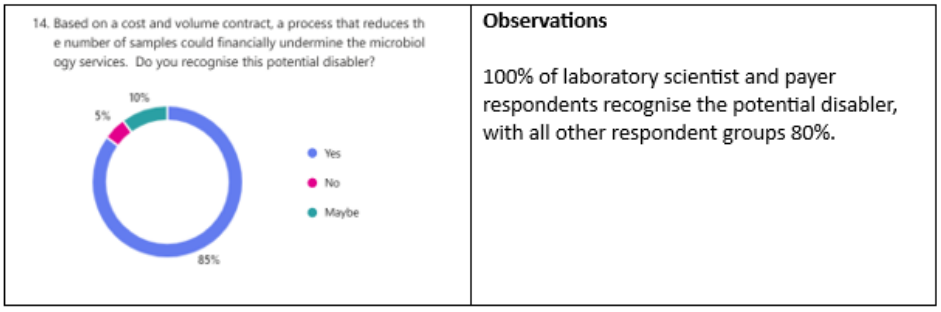


Figure 25. Question 14. Based on a cost and volume contract, a process that reduces the number of samples could financially undermine the microbiology services. Do you recognise this potential disabler?

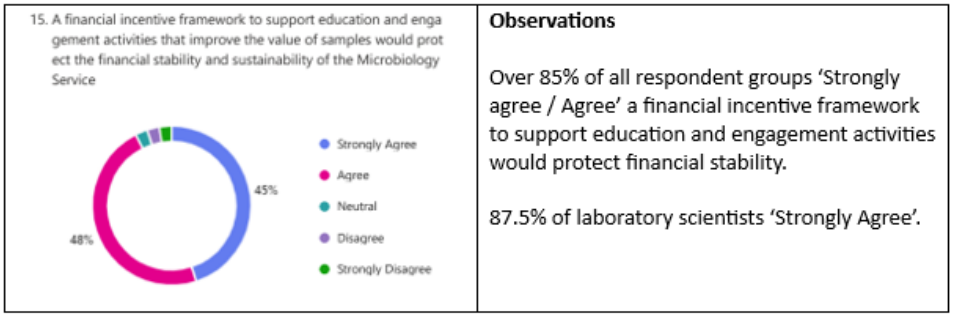


Figure 26. Question 15. A financial incentive framework to support education and engagement activities that improve the value of samples would protect the financial stability and sustainability of the Microbiology Service.

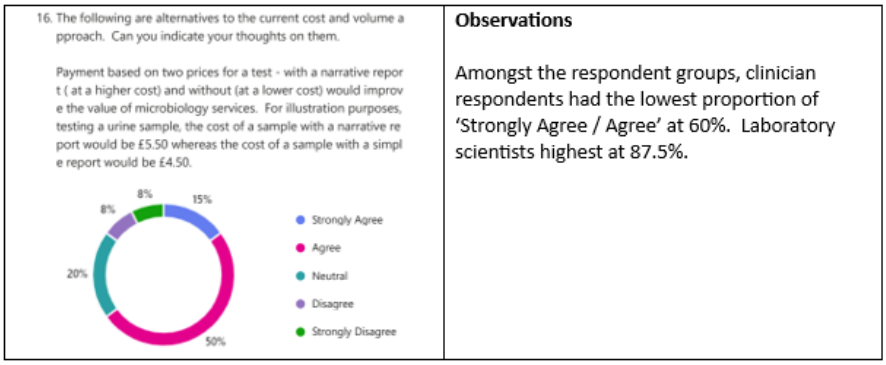


Figure 27. Question 16. Payment based on two prices for a test - with a narrative report (at a higher cost) and without (at a lower cost) would improve the value of microbiology services. For illustration purposes, testing a urine sample, the cost of a sample with a narrative report would be £5.50 whereas the cost of a sample with a simple report would be £4.50.

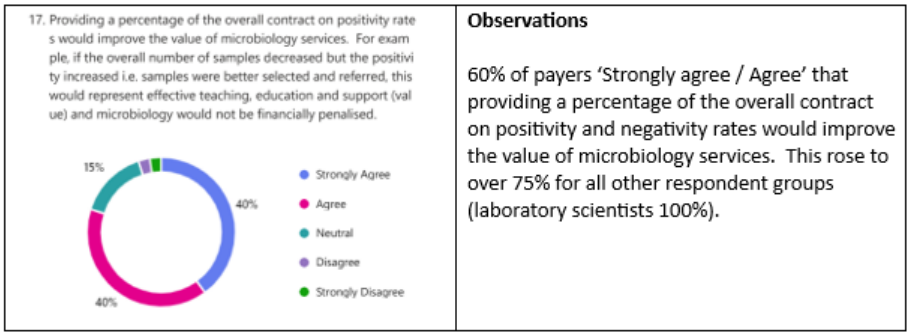


Figure 28. Question 17. Providing a percentage of the overall contract on positivity rates would improve the value of microbiology services. For example, if the overall number of samples decreased but the positivity increased i.e. samples were better selected and referred, this would represent effective teaching, education and support (value) and microbiology would not be financially penalised.

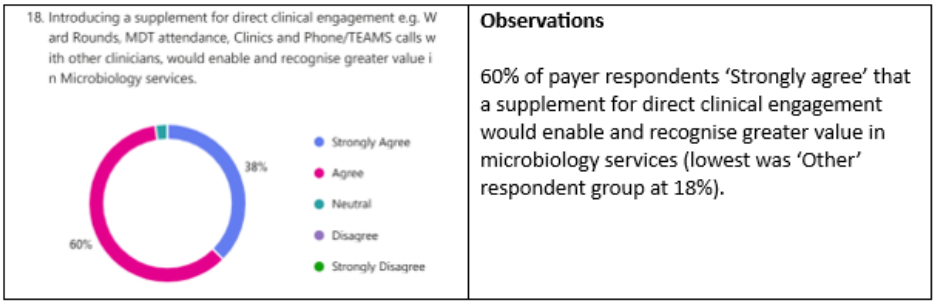


Figure 29. Question 18. Introducing a supplement for direct clinical engagement e.g. Ward Rounds, MDT attendance, Clinics and Phone/TEAMS calls with other clinicians, would enable and recognise greater value in Microbiology services.

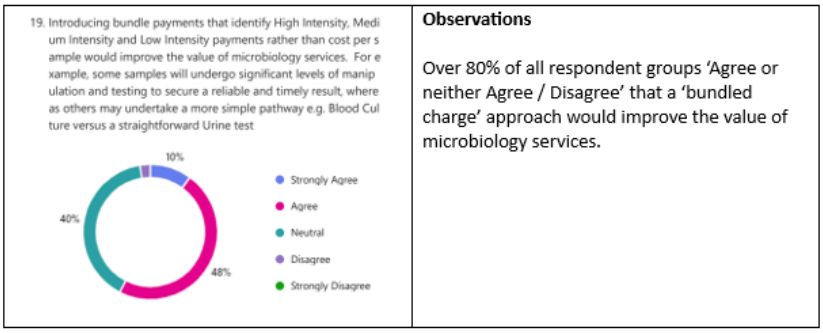
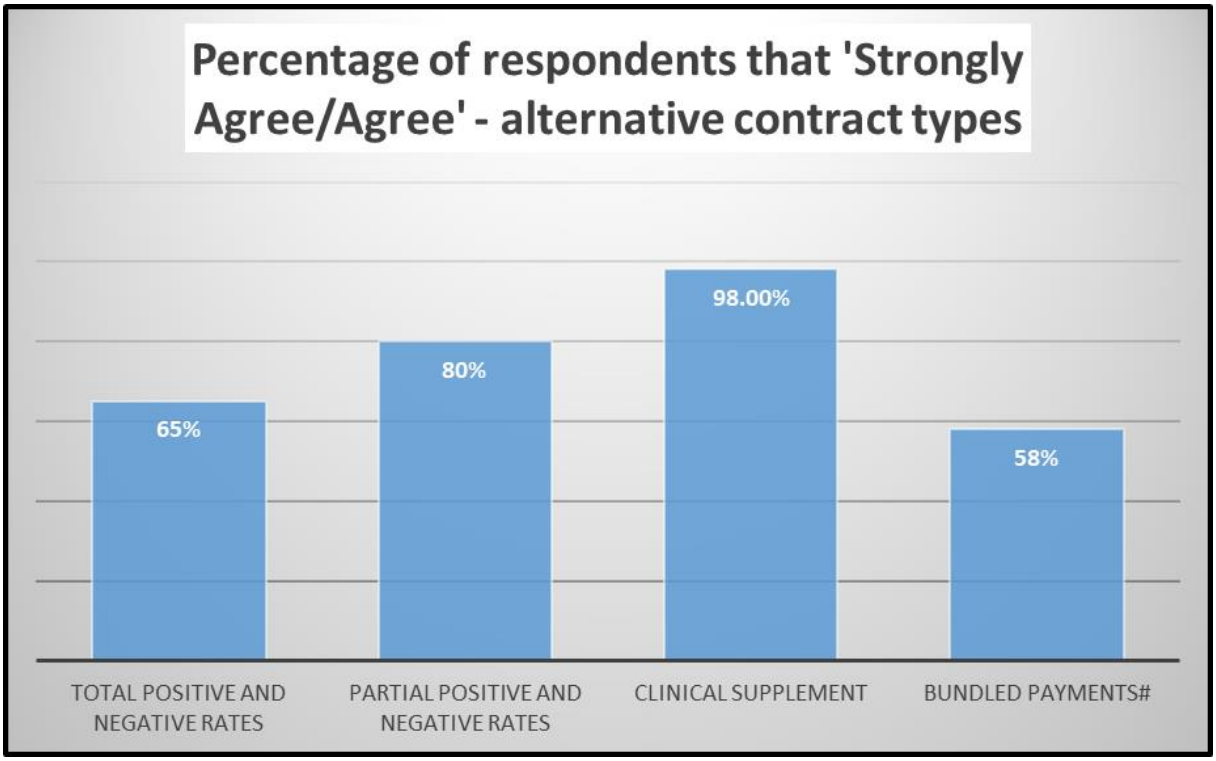


Figure 30. Question 19. Introducing bundle payments that identify High Intensity, Medium Intensity and Low Intensity payments rather than cost per sample would improve the value of microbiology services. For example, some samples will undergo significant levels of manipulation and testing to secure a reliable and timely result, whereas others may undertake a more simple pathway e.g. Blood Culture versus a straightforward Urine test.



Observations

Respondent	Highest	Lowest
Clinicians	Clinical Supplement (100%)	Bundle (47%)
Laboratory Scientist	Partial Positive & Negative (100%) Clinical Supplement (100%)	Bundle (63%)
Payer	Clinical Supplement (100%)	Bundle (20%)
Other	Clinical Supplement (83%)	Total Positive & Negative (56%)

Figure 31. Support for different alternatives to Cost and Volume contract approach.

Questionnaire – Open comment section

The questionnaire was designed using Microsoft Forms (Appendix B) and received 40 responses.

Respondents were also asked if they had any further comments, and 16 comments (excluding “no”) were received. These were reviewed and themes identified using a similar approach to that for the interviews. Table 9 summarises the themes and example comments.

Table 9. Themes and comments from the questionnaire.

Theme	Comment
Population Testing Rate	Determine an appropriate testing rate for each test (annually or less frequently). Implement a tiered pricing model: centrally funded or lower rate up to a certain threshold, then higher/punitive rates beyond that.
Pre-Analytical Process Investment	Increase investment in pre-analytical processes, including user engagement events and training. Develop systems to better track and analyse requesting practices.
Separation Between Contract Team and Clinical Users	Address the disconnect between those making referrals and the cost implications. Enhance direct engagement and influence over referral practices.
Survey Design	Include a "Don't know" option for questions where respondents may not have enough information to answer accurately.
Microbiology Service Appreciation	Recognise the varying levels of appreciation for infection services within the NHS. Ensure accurate billing to balance financial books while addressing underfunded aspects.
Budget Ringfencing	Consider ringfencing some or all of the budget to incentivize efficiency and savings, with the potential for reinvestment.
Value of Tests	Acknowledge that all tests have value, but their importance varies among different stakeholders.
Service Improvement Opportunities	Explore opportunities to improve microbiology services by adopting practices from radiology, such as result interpretation. Utilize technologies like Healthy.io for wound advice.
Staff Training and Respect	Ensure that staff involved in clinical engagement have adequate medical training and respect the expertise of medics.
Internal Cross Charging	Implement internal cross-charging within Health Boards (HBs) to provide service users with a better understanding of costs.
Point-of-Care Testing (POCT)	Consider easier access to testing for frontline users via POCT, while emphasizing the added value of microbiology services.
Cost and Volume Understanding	Simplify cost and volume metrics to highlight efficiencies and scale benefits, passing savings to customers once fixed costs are covered.
Pooled Budgets	Explore pooled budgets as a risk-sharing mechanism for changes and investments.
Frustration with Funding	Address the frustration of professionals who see opportunities for improvement but face funding constraints.
Measurement and Interpretation	Ensure that any changes are easy to measure and interpret to demonstrate their impact.

Analysis and discussion of the main findings from the research

Analysis of the data

The researcher identified and compared themes from both the interviews and the questionnaires.

Table 10. Summary of analytical approach.

Interview Analysis	The transcripts were reviewed and coded according to the themes that emerged. These were compared to the literature for validity and to assess any outliers.
Questionnaire Analysis	The multiple-choice questions were analysed using Microsoft Forms and utilised the generated graphical outputs. The answers to the quantitative question were reviewed and coded according to the themes that emerged. Themes were selected based on the frequency that they were mentioned by participants.
Generalisation	The ability to generalise the findings is restricted to Wales and other nations with similar publicly funded health services with similar purchaser-provider context.

Discussion

The high prevalence of chronic conditions, aging populations and new endemics have increased the pressure on health services. Expenditure for health care is expected to rise due to an aging population with increasing years of ill health and co-morbidities, corresponding with an increase in utilisation of health services.

Khalil and Kynoch provide a very good summary of the current context for health services, stating *"The changing and evolving healthcare environment means organisations are under increasing pressure to deliver value-based, high-quality care to patients through enabling access, reducing costs, and improving outcomes. These factors result in an increased pressure to deliver efficient and beneficial interventions to improve patient care and support sustainability beyond the scope of the implementation of such interventions".*

Articles evaluating cost and volume contracting to secure value in healthcare are limited but there is more information on approaches to securing value and incentivisation.

When exploring the aspects of 'volume', articles tended to refer to associations between patient-level higher volume and better outcomes, based on the development of more effective skills by treating more patients rather than volume associated with population level.

A strong message from representatives of the Finance and Payers groups was that "Cash is King" and that for them, cash-releasing activities were a priority over longer-term improvements in value. This reflected in-year financial pressures and the need to secure savings within each financial year.

With the use of local examples, another area of concern was the realisation of improving value. Several examples were provided where the evidence was strong that the financial cost of the future model would be less than the current model and with improved outcomes for the service users. However, these improvements were rarely fully realised. Reasons provided included:

- Demand for the service outpaced and overtook the anticipated resource savings.
- Using average length of stay as an example, marginal reductions in several specialties might accumulate into whole beds but demand at the 'front of the hospital' swamps these opportunities.
- The changes were not sustained, and behaviour reverted to the original model due to the absence of any constraints.
- Changes such as new tests became additive rather than replacement as clinical practice did not change.

  "The system is plugging as many of the little holes in the dam, as quickly as possible, but the rain and water continues to rise despite best endeavours."

There was Cost and Volume contracting was routinely seen to have several advantages including familiarisation, (relative) low cost to undertake and being very simple. However, there was universal agreement that cost and volume contracting in healthcare is unlikely to secure improved value in terms as per the Porter's (2013) 'Value equation'.

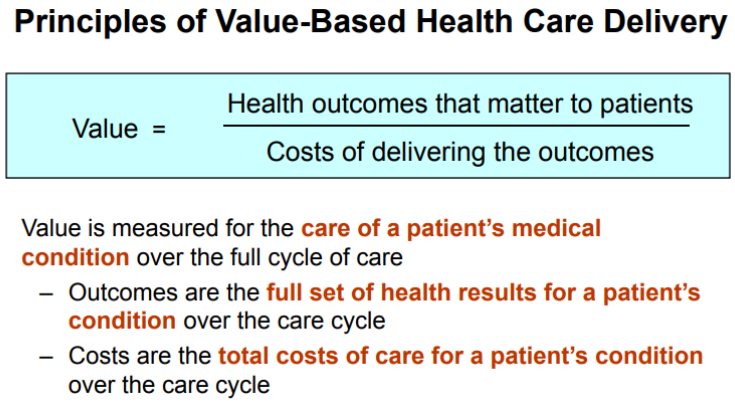


Figure 32. Principles of Value-Based Health Care Delivery.

Underlying issues related to this included:

- A misalignment between how budgets are set and allocated and how clinical services fundamentally function. According to clinician feedback, budgets are allocated in a very simplistic manner, designed to make monitoring easy rather than aligned to the management of symptoms. For example, a patient presenting with shortness of breath, could be due to several reasons - heart failure, infection, anaemia or a lung problem.

  "Budgets should be allocated for common pathways rather than specialties / services."

  "Clinical care is driven by symptoms, but budgets are in silos that are to make financial management easier."
- There is an incentive for the provider to increase income by not gatekeeping increasing activity.
- The provider is paid regardless of whether the test made a difference to the patient's outcome. Some extreme failures such as not acting on a result might result in a complaint or serious adverse incident investigation, there is no financial consequence for the provider.
- There continues to be a perception that doing more is better and that activity is not the same as productivity but is considered the same. As such, the system continues to focus on outputs rather than outcomes.

The separation between the referrer (the clinician requesting a test) and the payer (budget holder) was also commonly identified as a barrier to improving the value of testing. The current financial arrangement for several Health Boards is that the budget for microbiology testing is held by the Pathology Department. Typically, the users are clinicians associated with other services e.g. general medicine or orthopaedics (and budget arrangements). In some cases, there is a cross-charging mechanism but not all. This can mean that all the financial pressure is on a pathology department that has little capacity to challenge and influence practice.

> *"The current model encourages the provider to seek more income and the payer to spend less, but neither party has sufficient control or influence on the users (referrers)."*

Budget allocation to services and the aligned accountability were also identified as a significant barrier to changing allocative value. According to interviewees' feedback, there is pressure on individual budget holders to balance their budget, and there is little appetite for positions that might benefit the wider system but at the cost of a local budget.

> *"Personal (financial) performance is measured in silo's rather than systems."*

The interviews also discussed silo management and responsibility from a 'limited big picture' view. A common discussion point centred on the absence of time and resource, as well as responsibility, for potential influencers to see the bigger picture and "join the dots."

Director of Finance interviewees recognised that while they had the ability and processes (positional power) to change allocations, it was not an easy process for others to pursue and that where success had occurred it was driven by passionate professionals with well-established relationships.

Risk adversity was also commonly raised in discussions. From a clinical perspective this tended towards the overdependency on algorithms to order diagnostics rather than rely on history and seeking a differential diagnosis. Examples were given of tests being pre-ordered upon admission to an emergency department. It was recognised that this was potentially more efficient for processing attendees, it took little account of wider value and aspects such as pre-test probability and not testing routinely when this is low. It does, however, nicely demonstrate that "value" is context based.

However, clinicians are primarily concerned with not missing something rather than saving money and this is likely to be reinforced with defensive medical practices.

> *"There is a Goldilocks point of not ordering too many tests such that there is waste and not ordering enough with things being missed."*

Risk sharing was a topic in most of the interviews and reflections on how to balance risk between different stakeholders to achieve a common goal. Aspects included increasing risk tolerance to 'fail fast' but tempered this with expectations that cash positions will retain primacy over value.

Related discussions and comments included proposals around the use of pooled budgets as a risk-sharing mechanism for changes and investments.

"Establish improvement funds with contributions from all stakeholders to bring about innovation."

Another option proposed was to ringfence some or all the budget, with savings retained in the service for reinvestment as an incentive. Four of the interviewees mentioned this as a comment from the questionnaire. Despite its attractiveness, it would necessitate consensus on rules governing basic aspects like what happens when no additional savings are possible, how to manage cost pressures like inflation and pay awards, and how to agree on the proportion to ring-fence.

Another common factor related to both realisation and stewardship was data and evidence to create 'intelligence'. Opinions were polemic – some interviewees felt that the system was poor at providing meaningful evidence that was robust and would support decision-making for innovative approaches. Others however felt that the requirement for absolute evidence was unhelpful and did not fully appreciate the complex nature of the health system. A better approach would be to enable safe experimentation. Opinions were split across professional groups and appeared to reflect personal experience and outlook rather than specific professional group. Exploring this further, returned to the concerns relating to realisation i.e. the lack of constraints to retain the changes and that the NHS has historically been poor with benefit realisation.

All interviewees however identified that the more comprehensive use of data would be highly beneficial. Pathology services data is collected via the Laboratory Information System and is accessible via what is known as the 'Cube Data'. This can provide highly granular data including individual referrer test requests. So, it would be possible to get more information, like dashboards showing testing rates by person, practice, or department, and compare these to rates for the whole population and among peers. All parties thought this would be worth pursuing but identified lack of resources (people with the skills and time to produce, integrate and utilise the knowledge to effect change).

Historically, laboratory improvement activity has focused on improving the analytical phase within the laboratory, such as increasing volume throughput and decreasing turn-around times i.e. the time taken from a sample being receipted in the laboratory to producing a result from that sample as requested by the referring clinician (Price et al 2016).

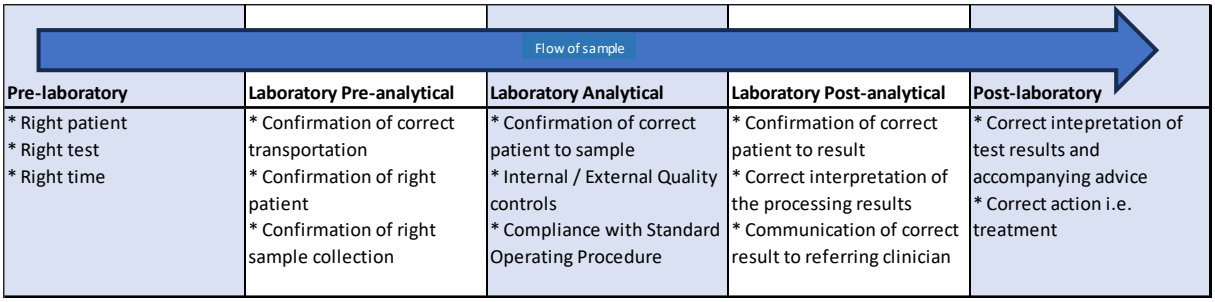


Figure 33. The different phases of processing a sample.

One of the principles of Prudent Healthcare is to only do what is necessary. Table 10 shows a summary of I) sources of harm related to the inappropriate use of laboratory testing (Moynihan et al 2012) and II) A classification of the causes of diagnostic harm (Epner et al 2013).

Table 11. Sources of harm and classification of diagnostic errors.

Sources of harm related to inappropriate use of laboratory testing and / or test results.	Epner et al (2013) classification of causes of diagnostic error related to testing.
1. Inappropriate medical interventions undertaken due to misdiagnosis. 2. Unnecessary treatment or additional diagnostic procedure following a false detection of a disease. 3. Failure to receive appropriate intervention or treatment associated with a false negative test result.	1. An inappropriate test is ordered. 2. An appropriate test is not ordered. 3. An appropriate test result is misinterpreted or misapplied. 4. An appropriate test is ordered but is delayed or misrouted within the testing process and is not available where it is needed at the time it is needed. 5. The result of an inappropriately ordered test is inaccurate.

There has been a shifting emphasis on improving the phases outside of the laboratory to improve the overall value of a defined clinical pathway.

The number and complexity of clinical laboratory tests is rapidly expanding, presenting clinicians with challenges in accurately, efficiently, and safely ordering and interpreting diagnostic tests (Causes 1 -3 of Epner's classification). This challenge can be summarised as diagnostic stewardship.

With regards to microbiology, diagnostic stewardship focuses on ensuring correct diagnosis of infectious diseases whereas antimicrobial stewardship aims to optimise antimicrobial treatment. Both aim to improve patient outcomes. Diagnostic stewardship involves interventions that reduce testing in patients with low pretest probability, optimise a test's likelihood ratio, and seek to warn providers when suboptimal test results might have been reported.

As identified above, laboratory testing is critical to securing a differential diagnosis but needs to be utilised appropriately. The 2009 Lewin Group report on the value of laboratory tests noted that, "to improve outcomes, a laboratory test must be appropriately ordered and conducted, and the results must be returned and retrieved on a timely basis and correctly interpreted and must affect a decision for further diagnosis and treatment that directly improves outcome." Centor et al (2019) described making a clinical diagnosis as an "iterative process that involves information gathering, interpretation, integration, and revision of a list of possible diagnoses (e.g., a differential diagnosis)".

In their paper 'Patient-Centered Laboratory Medicine', Ducatman et al (2020) suggested five areas of work to improve diagnostic stewardship and the value of laboratory testing, including the improved utilisation of existing and new tests. This incorporated the following:

1. Development of interventions to support appropriate test requesting.
2. Correct sample collection, storage and transport.
3. Effective communication of test results.
4. Agreement on clinically appropriate triggers for critical result notifications, and
5. Consultative services and comments to ensure that results are properly applied.

Resources were also identified as a significant challenge to enabling services to provide more effective diagnostic stewardship. Several of the interviewees were aware of a recent improvement activity in microbiology regarding the sampling and testing for superficial wound infection. The sustainability of the improvement, and the ability to spread this were limited due to its dependency on a limited and self-driven / passionate workforce.

Sullivan (2022) identified a major challenge with educational interventions is sustainability given the significant resources required. Some organizations have therefore opted to use their electronic health records to deliver educational messaging as electronic health record–based messaging is low cost and reliable. For example, Keller et al (2018) built a best practice advisory (known colloquially as a "pop-up" message) that advised providers to avoid ordering urinalysis and urine cultures in asymptomatic patients.

There is a very strong consensus that microbiology services play a critical role in improving patient outcomes and service efficiency, which is unsurprising given the role of the respondents. Similarly, while

there was some variation, there was a strong consensus was that the wider system does not understand or recognise this value.

The literature review also identifies these themes, articulating the value of pathology in and out of the laboratory, but recognising that measuring such value is not straightforward given the complexity of clinical pathways.

Laboratory testing influences a significant proportion of medical decisions, particularly in initial diagnosis, treatment, and post-treatment monitoring. In 2006, the Review of NHS Pathology Services in England stated, “It is estimated that 70-80% of all health care decisions affecting diagnosis and treatment involve a pathology investigation.” This statement was frequently applied in subsequent policy and research articles however, further scrutiny by Hallworth (2011) did not identify evidence that confirmed the 70% claim. However, Rohr et al (2016), using extrapolating from cardiology and oncology patients, proposed that laboratory tests influenced an average of 64% of medical decisions.

Anonychuk et al (2012) stated that improved outcomes related to laboratory testing included:

- faster or more accurate diagnosis
- improved treatment selection
- avoidance of misdiagnosis or adverse treatment consequence
- improved patient flow, and
- improved patient satisfaction or quality of life

Hallworth et al (2015) suggested that “true outcome studies are difficult to do. This is because the measured outcomes may be many steps beyond the test’s performance and influenced by many other intermediate variables”.

Reviews by Kost and Hale (2011) and ngh et al (2013) suggested that “Alert fatigue” has been shown to have a high impact on patient outcome. The alerting of abnormal but not critical results can be regarded as “noise” that drowns out the “signals”. As such, recommendations were made regarding standardisation of reporting results and focusing on results that direct action.

Research by Epner and Astion (2012) identified that “appropriate ordering depends on effective clinician education and support, and the laboratory has a key role in designing clinician – laboratory interface procedures that make it easy to order the right tests in a defined situation and more difficult to request inappropriate ones”. The use of Electronic Test Requesting was raised by several interviewees, citing examples of how the current system can be easily bypassed with handwritten request that may simply have the patient identification details and a simple “?UTI” written on the request form. This provides no context for the laboratory receiving the sample nor the microbiology clinician subsequently considering the results and interpretation.

Misinterpretation or misapplication of results (cause 3) can “also result from a failure to understand the limitations of the test (sensitivity, specificity, effect of interfering substances) or the lack of essential information needed to interpret the result in the appropriate clinical context”.

Payer models

As identified by the OECD 2022 report, “provider payment models are a key component in delivering value-based care”. Glied (2021) describes the “value of payment models is mainly linked to their ability to control spending growth while improving the quality of care though:

- enhancing efficiency in service delivery.
- improving coordination of service delivery among providers.
- supporting quality – in particular patient experience with care – and access.
- being sustainable to payers and providers”

The following table has been adapted from Jenkins & Maheswaren (2020) that provides a high-level picture of payment systems in the NHS.

Table 12. High level payment systems in use by the NHS.

Payment System	Advantages	Disadvantages
Block contract payments are often paid at regular intervals throughout the year in advance of the delivered service. Payments are independent of the level of activity or number of people treated. In recent years, there has been an increase in the use of block contracts for acute organisations to enable better financial planning as it is predictable and forecastable.	• Predictable income and expenditure • More amenable to integration/considering pathway options and models of care. • Useful in areas where activity levels are difficult to measure. • Lower transaction costs	• Lack of transparency and accountability • Inevitably leads to increased waiting lists as no incentive to increase work / efficiency. • Changes in cost during contract are not accounted for. • Block contracts may lead to lower responsiveness as increases in activity are discouraged.
Activity based funding is a funding model where an agreed fee is paid for each item of work done. An increase in work done leads to an increase in funding and vice versa.	• Increase activity and can reduce waiting lists. • Encourages efficiency as the tariffs are calculated using average costs, which encourages those hospitals with higher-than-average costs to become more efficient.	• Difficult to budget for both sides (Final cost/payment depends on activity) • A barrier to integration – as organisations need numbers to generate income, so may be less willing to consider options whether their activity would be reduced i.e. (community-based options) • Organisations are less willing to stop income generating work (mainly elective) work, despite other pressures. • There is a risk that providers are less focused on quality in exchange for volume.
Fee for performance where income is based on definable aims, outcomes, or targets. Meeting the target results in payment and vice-versa.	• Encourages quality improvement. • Ability for payers to target specific areas for improvement.	• Budgets are often calculated on the assumption that payment will be received and can be seen as a penalty if not achieved. • Targets can change, and providers will need to invest each year to maintain against original targets while also investing to achieve the new targets.
Fee for service - Providers are paid retrospectively per unit of activity undertaken.	• Providers are paid for all treatment they choose to provide. • Supports quality and comprehensive care as the provider has no incentive to withhold or skimp on care. • Once new treatments and technologies are on the reimbursement list can be rapidly rolled out as they are paid for.	• Difficult to financially control and plan for. • No incentive for efficiency. • Commissioners pay for increasing costs. • No incentive for prevention or collaboration. • Costly to implement and administer.
Pathways of care - A calculated fee is paid per person based on the anticipated cost of providing care across a pathway for a particular condition.	• Recognizes interdependence of care across Community and secondary services • Paid in advance so predictable rather than outcome dependent.	• Payments are stratified by how resource heavy the anticipated care (rather than actual care) was. • Risk of underpayment linked to unanticipated complications, with the healthcare provider bearing this cost.
Blended payment - Complex contracts with elements of block contracts, payment by results and performance-based approach.	• Can be tailored to need or emphasis. • Can be highly responsive.	• Complex and costly to administer. • Can change year on year. • Dependent on accurate budget and forecasting data

When asked if a cost and volume model is effective at realizing the value of microbiology services, most respondents selected 'neither agree/disagree' or 'disagree'. Replacing 'microbiology services' with the 'wider system' resulted in a greater number of respondents selecting 'neither agree or disagree.' Upon reflection during the interviews, this theme relates to the challenge of recognising shifts in allocative value and assessing the impact elsewhere in a clinical pathway.

In Wales, providers are paid for the activity they perform. They are generally paid via either of the following mechanisms:

- Per service (fee-for-service): Fee-for-service (FFS) schemes pay providers for a specific service they provide. Payments are typically based on an agreed price for individual services, with the definition of services based on established classification codes.
- Per patient (Diagnosis-related groups): In a diagnosis-related groups (DRG) system, providers are paid per patient treated. Patients are assigned to one diagnosis-related group, which should mirror the resource intensity of the patient's treatment. Like FFS, a DRG usually has a base rate that sets the overall price and a relative weight that tells you how many resources are used during a DRG compared to a normal treatment episode.

Both generally consist of a base rate supplemented by an agreed weight based on volume and/or intensity.

Some services for NHS Wales are paid for based on performance, for example contracts for primary care services.

A systematic review by Emmert et al (2012) suggested that evidence on the efficiency of Pay-for-performance is inconclusive. Campbell et al (2009) and Maynard and Bloor (2010) questioned the effectiveness of provider financial incentives to improve quality and safety of care. They identified that at the time, such approaches were being increasingly implemented without the structure to monitor and evaluate the success or shortcomings as well as questioning the cost of such incentives, for example the cost of implementing the Quality Outcome Framework in 2008 being approximately £1bn in England. One of the commonly identified advantages of the cost and volume model during the interviews was the perception that this model had, compared to other models, a lower cost to undertake given its simplicity.

There was a very strong consensus that there is a proportion of samples that offer little to no value received by microbiology services for testing. This was universal across the professional groups including payers. Interviews with payers also identified this theme and were part of the discussion around limitations in communication, engagement and education due to resource limitations. From a clinical perspective, commentary focused on the difference between different values by stakeholder, and the use of protocols and algorithms to 'over-test so as not to miss or speed up decision-making'.

"Acknowledge that all tests have value, but their importance varies among different stakeholders."

There is a very strong consensus regarding the recognition of disincentives for cost and volume contracts considering the scenario being explored and this is consistent with the advantages and disadvantages of fee-for-service payment models from the literature.

The OECD Report (2016) identified common disadvantages with a Fee-for-Service payment model:

- It sets incentives for overprovision of care, with increased activity securing increased payment for the provider.
- Does not have inherent incentives for providers to co-ordinate care.
- Generates high volumes of billable transactions that can result in high administrative costs.
- Providers are paid for the services they deliver, irrespective of the results obtained.

The same report goes on to recommend two different strategies to achieve value-based care:

- Utilise Add-on payments to address specific issues or certain quality, safety or efficiency targets ala Pay-for-performance.
- Bundle payments for episodes of care, generally for a particular condition. These can link providers / teams and make them collectively responsible for providing care to one patient or a cohort of patients.

One of the options for a different payment model that included a clinical supplement was to invest in more clinical engagement and education, which garnered strong consensus. This was also supported by some of the closing comments from the questionnaire:

- *"Increase investment in pre-analytical processes, including user engagement events and training."*

- *"Ensure that staff involved in clinical engagement have adequate medical training and respect the expertise of medics."*

Jacobs et al (2015) identified improved co-ordination and reduction in unnecessary activity such double consultations as benefits of bundled payment mechanisms. However, the response from both interviews and the questionnaire suggested that bundled payments were less attractive than other alternatives to cost and volume contracts. One possible reason may be the knowledge and understanding of a bundled payment approach.

Future Research

Further avenues of research could include discrete engagement with a specific pathway and its users such as superficial wounds or ear swabs, rather than a generic approach to samples. This may generate greater interest from specific service users / referrers.

Conclusion

There is a strong consensus from the interviews and questionnaire that the current Cost and Volume financial model for medical microbiology service in Wales does not enable a Value-Based Health Care approach.

The literature review regards Cost and Volume as overly simplistic, disincentivising demand management by the provider—any intervention that reduces activity currently results in a loss of income.

There is a recognition that while there is value in all that is done, its importance and relevance depend upon the stakeholder. However, there is strong consensus along with anecdotal evidence that some samples submitted for testing offer little to no value in terms of diagnostic or treatment decisions.

Proposed alternatives including the use of positive and negative rates (as proxies of pre-testing likelihood being applied), a clinical supplement and the bundling of payments were all positively received. The enablement of increased clinical engagement and education supported by a discrete supplement was favoured most strongly.

Such an approach would be consistent with improving Diagnostic Stewardship. The literature review shows that pathology specialists want and need to play a bigger role in helping with the processes before and after the lab to make things better for patients and staff. This would be in line with the ideas behind prudent healthcare and Value-Based Health Care, which say that we should use evidence-based methods to cut down on unnecessary variation and shift our attention to measurements that are related to outcomes and patients. There appears to be an appetite to explore and experiment with different payment models and approaches including discrete funding for projects and quality based 'Added Payments'.

Recommendations

The following are recommendations for action to deliver higher value microbiology laboratory testing in NHS Wales.

Recommendation 1

To undertake a discrete engagement with primary and secondary care clinicians who are the users of microbiology testing using a specific questionnaire and targeted interviews of peer-representatives.

The invitation to interview was unsuccessful in securing input from referring clinicians such as GPs and non-microbiology hospital consultants. These groups would have added a different perspective to perceptions of value with regards to testing and the balance between efficiency of ruling things out quickly versus avoiding waste.

Recommendation 2

Establish a working group with representatives from payers, clinicians, service managers, finance, and other appropriate stakeholders to review and agree on pilots of different approaches that could be run in shadow form or complementary to the existing Cost and Volume model.

There was appetite to explore alternative funding mechanisms for medical microbiology services and a willingness from current payers to investigate how to incentivise value without the risk of financial instability for either party. To achieve this, one must identify or develop common incentives.

Given the feedback from interviews and the questionnaire, this should include financial incentives to support clinicians to undertake specific engagement and education activities to achieve a desired result.

For example, the implementation of diagnostic stewardship for ear swabs in one Health Board and vaginal swabs in another (with agreed protocols and measurement process). For example, this could include (i) the funding of a time-limited project with the requirement to deliver bolus activity to enable a move to a new 'business as normal' level of referral or (ii) invest in an increased specialist workforce such as a Clinical Liaison Biomedical Scientist to secure a higher saving in non-pay through education and referral management.

Recommendation 3

Establish a Task & Finish Group to review opportunities to develop a dashboard that displays referral and utilisation data for common tests and organisms associated with medical microbiology services.

The use of referral and result data from the Welsh Laboratory Information System Business Intelligence Tool, known as 'The Cube' was identified as an area of opportunity to inform effort and activity. However, feedback was that pathology services including microbiology do not have the necessary resources to undertake such work given the demands associated with developing the new LIMS replacement currently.

This information can be interrogated to identify referral behaviours and patterns across the system as well as local, Health Board and National positivity and negativity rates for specific organisms.

Recommendation 4

Utilising Cube data, identify areas of high referral (compared to peers / national rates) and undertake specific engagement with them to understand the drivers for such referral rates and whether these are amenable to change through support, engagement, and partnership.

The diversity of testing availability and services is vast with current Service Level Agreements between Public Health Wales and Medical Microbiology offering over 120 tests, as well as send away testing for highly specialised tests. With limited resources (time and specialist scientists and clinicians) it is not feasible to take a universal approach and instead, effort should be focussed on areas that have the highest potential for change such as referrers who are significantly higher than national or local average.

Recommendation 5

Develop a Microbiology Value-Based Health Care group with intensive learning sessions supported by Swansea University.

This would provide the relevant stakeholders with consistent minimum level of knowledge and common nomenclature when considering Value-Based Health Care. It could encourage a collaborative approach, particularly with the involvement of senior leaders / executives.

Figure 34. Recommendations.

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Appendix A – Ethics Approval

Swansea University
Prifysgol Abertawe

Approval Date: 18/07/2024

Research Ethics Approval Number: 2 2024 9917 9321

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	Value-based commissioning of microbiology laboratory testing
Applicant name	MR DAVID HEYBURN
Submitted by	MR DAVID HEYBURN /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/ProjectIndex/11988

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Dyddiad Cymeradwyo: 18/07/2024

Rhif Cymeradwyo Moeseg Ymchwil:

Diolch am gwblhau cais moeseg ymchwil am gymeradwyaeth foesegol ac am gyflwyno'r ddogfennaeth ofynnol drwy'r platfform ar-lein.

Teitl y Prosiect	Value-based commissioning of microbiology laboratory testing
Enw'r Ymgeisydd	MR DAVID HEYBURN
Cyflwynwyd gan	MR DAVID HEYBURN /
Dolen i'r ffurflen gais lawn	https://swansea.forms.ethicalreviewmanager.com/ProjectIndex/11988

Page 1 of 2

Mae'r pwyllgor moeseg Humanities and Social Sciences wedi cymeradwyo'r cais moeseg ymchwil, yn amodol ar yr amodau a amlinellir isod:

Amodau cymeradwyo

1. Mae'r gymeradwyaeth yn seiliedig ar yr wybodaeth a roddir yn y cais, a gwneir y gwaith yn unol â hyn. Yr ymgeisydd sy'n gyfrifol am sicrhau bod yr holl reoliadau, polisïau a deddfau mewnol ac allanol perthnasol yn cael eu dilyn.

- Gall y prosiect hwn gael ei adolygu gan y pwyllgor o bryd i'w gilydd. Gellir atal neu ddirymu'r gymeradwyaeth ar unrhyw adeg os bydd yr amodau'n cael eu torri.
- Caiff unrhyw addasiadau sylweddol i'r cais a gymeradwywyd eu cyflwyno i'r pwyllgor moeseg cyn i'r fath newidiadau gael eu rhoi ar waith.

Amodau penodol ynghylch y cais hwn:

Barnwyd bod y cais yn risg Low i'r Brifysgol.

Dim amodau ychwanegol.

Datganiad o gydymffurfiaeth

Penodir y pwyllgor yn unol â'r trefniadau llywodraethu ar gyfer pwyllgorau moeseg ymchwil. Mae'n cydymffurfio â chanllawiau Ymchwil ac Arloesi yn y DU (UKRI) a'r concordat i gefnogi uniondeb ymchwil.

Cadeirydd Ymchwil a Moeseg, Humanities and Social Sciences

Prifysgol Abertawe.

Os oes gennych ymholiadau ynghylch yr hysbysiad hwn, yna mae croeso i chi gysylltu â gweinyddwr moeseg ymchwil eich cyfadran.

- Ar gyfer Gwyddoniaeth a Pheirianneg, e-bostiwch FSE-Ethics@abertawe.ac.uk

- Ar gyfer Meddygaeth, Iechyd a Gwyddor Bywyd, e-bostiwch FMHLS-Ethics@abertawe.ac.uk
- Ar gyfer y Dyniaethau a'r Gwyddorau Cymdeithasol, e-bostiwch FHSS-Ethics@abertawe.ac.uk

Appendix B – Questionnaire

Increasing Value in Microbiology Services - FINAL

I am seeking insight across the system regarding the value of pathology services in NHS Wales. The hypothesis: the current budget allocation in NHS Wales does not incentivise pathology services to increase value through implementing changes that will reduce activity and therefore the budget allocation.

For example, a change in pathology services may require an increase in spend in the Pathology department but this will release savings in other parts of the system. However, the current processes may not facilitate this easily or in a timely fashion.

1. Please select the professional group that describes your role best

- Clinician
- Laboratory Scientist
- Pathology Manager
- Finance Manager
- Service Manager

2. Do you work in Microbiology

- Yes - Public Health Wales employee
- Yes - Health Board employee
- No

3. Microbiology services have a critical role in improving patient outcomes and service efficiency

- Strongly Agree
- Agree
- Neither Agree / Disagree
- Disagree
- Strongly Disagree

4. The value of Microbiology services is understood by the NHS system

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

5. Are you a budget holder for microbiology services

- Yes
- No

6. Are you a 'Payer' of Microbiology Services?

- Yes
- No

7. Is your Microbiology Service contract based on volume of tests multiplied by a test cost?

- Yes
- No

8. Does your Microbiology contract include any incentive based payments e.g. % income based on error rates

- Yes
- No
- Don't know

9. Do you think this cost and volume approach is effective at realising the value of Microbiology Services?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. A cost and volume approach is good at releasing value elsewhere in clinical pathways (outside of Microbiology)?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

11. It is easy to make investment in Microbiology that releases value elsewhere along the clinical pathway?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. A proportion of samples received by Microbiology for testing offer no/limited value to clinical decision-making and outcomes

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. Microbiology services should invest more in clinical engagement, pathway design and education to reduce low-value samples being sent in for testing.

- Strongly Agree

- Agree
- Neutral
- Disagree
- Strongly Disagree

14. Based on a cost and volume contract, a process that reduces the number of samples could financially undermine the microbiology services. Do you recognise this potential disabler?

- Yes
- No
- Maybe

15. A financial incentive framework to support education and engagement activities that improve the value of samples would protect the financial stability and sustainability of the Microbiology Service

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16.The following are alternatives to the current cost and volume approach. Can you indicate your thoughts on them.

Payment based on two prices for a test - with a narrative report (at a higher cost) and without (at a lower cost) would improve the value of microbiology services. For example, for testing a urine sample, the cost of a sample with a narrative report would be £5.50 whereas the cost of a sample with a simple report would be £4.50.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

17. Providing a percentage of the overall contract on positivity rates would improve the value of microbiology services. For example, if the overall number of samples decreased but the positivity increased i.e. samples were better selected and referred, this would represent effective teaching, education and support (value) and microbiology would not be financially penalised.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

18. Introducing a supplement for direct clinical engagement e.g. Ward Rounds, MDT attendance, Clinics and Phone/TEAMS calls with other clinicians, would enable and recognise greater value in Microbiology services.

- Strongly Agree

- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Introducing bundle payments that identify High Intensity, Medium Intensity and Low Intensity payments rather than cost per sample would improve the value of microbiology services. For example, some samples will undergo significant levels of manipulation and testing to secure a reliable and timely result, whereas others may undertake a more simple pathway e.g. Blood Culture versus a straightforward Urine test

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Appendix C – Interview Questions

Interview – Improving Value in Microbiology Laboratory Testing through allocative value

Scenario

Public Health Wales provides clinical and laboratory medical microbiology and infectious disease services to NHS Wales Health Boards. The services are contracted based on cost and volume.

There is growing evidence that a proportion of samples offer limited / no value and represents 'waste'. However, the reduction in this is dependent upon improved education for service users and this requires more time from microbiology clinicians. This has been studied as part of a previous Bevan Exemplar for Narrative Reporting. This work suggested that over time, the use of narrative reporting could reduce the number of samples, influence antimicrobial prescribing, and reduce resistance rates. The experience also identified financial benefits, with savings for service users through less samples, better prescribing.

Delivering this utilised novel funding from Welsh Government to create a team of clinical liaison biomedical scientists, and lost income for the PHW Microbiology services – in effect a double whammy, despite creating savings elsewhere in the system.

Two lines of questioning:

a) What are the processes that allow the system to calibrate to manage / share the risk of cost and savings e.g. value across a pathway – is this about finding data to demonstrate value (is this synonymous with quality?)
b) Cost and volume approaches based around cost centres are not effective in securing value i.e. not measuring what matters - the outcome due to the use of the result rather than the output (processing the sample to get a result) – Rubbish in, rubbish out.

Questions

1. How would you describe value in this scenario?
2. Do you think this type of scenario is common across the NHS system? (Why/Why not)
3. What do you think are the strengths and weakness of the current cost and volume approach to Service Level Agreements
4. Do you think that there are effective mechanisms to easily change allocative value across care pathways to secure better overall value?
5. In your opinion, what do you think are the current enablers to deliver such change?
6. What do you think are the current barriers?
7. How comfortable and 'safe' do you think it is to undertake such discussions such that no party involved is financially compromised? (There is a risk that by indicating a potential saving opportunity, the payer may feel it needs to force the savings without securing the resources to release it).
8. Would you prefer to pay / be paid for service using a different measure? Alternative examples include:
    a. Positivity and negativity rates – if sending in less but increased positivity, this could represent successful education, training and referral management? Advantage – it would offer a differentional (and is something that we found with narrative reporting.)
    b. Bundle payment for a positive or negative, regardless of sample type
    c. Mixture of cost and volume with an allocation based on positivity rate (to support education and referral management)

Appendix D – Summary of interview responses

MSc Interviews	Question							
Interviewee	How would you describe value in this scenario?	Do you think this type of scenario is common across the NHS system? (Why/Why not)	What do you think are the strengths and weakness of the current cost and volume approach to Service Level Agreements	Do you think that there are effective mechanisms to easily change allocative value across care pathways to secure better overall value?	In your opinion, what do you think are the current enablers to deliver such change?	What do you think are the current barriers?	How comfortable and 'safe' do you think it is to undertake such discussions such that no party involved is financially compromised?	Would you prefer to pay / be paid for service using a different measure?
A	Variable by stakeholder Patient perception important but not always sought Not always link to patient outcomes	Yes Especially with support and diagnostic services Limited oversight to the patient	Weakness: - Doesn't challenge unthinking guidelines - Encourages activity over productivity for income - Rubbish in, Rubbish out Strengths: - Simple	With rare exceptions, No. Requires very strong . Budget silos are obstacles Absence of an agreed common currency	A growing understanding of complex adaptive systems.	The same complex system! Behavioural change isnt reinforced and made the 'new' normal behaviour.	Personally comfortable but can understand that others may not feel so comfortable due to linear thinking.	Need to separate out fixed (core) and variable costs.
B	Low. Depends on each party.	Yes.	Strengths: Simple Weakness: No consequence linked to patient outcome	No. Budget and clinical responsibility are not aligned and prevents meaningful changes.	Very limited.	Clinical care driven by symptoms but budgets are in silo's that are to make financial management 'easier'.	It depends on individual relationships, but generally it isn't an easy undertaking.	Yes - Core services should be protected with variable and stepped cost agreements. Top-ups linked to outcomes and clinical activity.
C	Poor but variable depending on the stakeholder	Yes	Simple	No. Its very challenging. Layers of scrutiny and oversight.	Good clinical relationships.	Compliance processes rather than governance to enable timely decisions. Pathways to decisions and decision-makers aren't clear / convoluted Low risk appetite for change / reverse change	Relationships are complicated and drivers are different across the different functions - clinical, financial, etc.	Yes. Need to have cost and volume but should be augmented with core funding and stepped costs.
D	Doesn't directly measure or reference the patient-related value. Good for the system	Yes	Strengths: Simple Weakness: No financial relationship between the user and the payer. No constraints	No. Very difficult to implement, and maintaining the change such that it becomes the new normal is really difficult. There arent sufficient incentives or constraints	Relationships between individuals.	Insufficient capacity for oversight and scrutiny. We don't use data collaboratively. Clinical algorithms encourage testing and diagnostics. Impatience for cash savings Do not understand the complexity and unintended consequences	It can be challenging, as there are different pressures and expectations. The current model encourages the provider to seek more income and the payer to spend less, but neither party has sufficient control or influence on the users.	Unsure as the system understands Cost & Volume. Alternatives are more nuanced.
E	There is no measuring of value from a clinical perspective. Review the financial cost.	Yes. People are focused on tasks rather than value. For example, waiting list initiatives to clear backlog. No discussion about capacity, just do it and charge us. Limited understanding of infrastructure requirements. No one is responsible for an enture pathway or system.	Strengths: Simple Weakness: Doesn't account for fixed and variable costs	No. We have made changes historically but they are not resilient and behaviours rebound.	Strong advocates of the change who champion and keep pushing the change.	No actual process or constraints that are out in place and held in place. Expectation of a transaction that means something has been done e.g. Leaving the GP with a test or script The split between referrer and payer. The wrong owners of the finance. The focus on cash savings asap prevents longer-term improvement in VFM	Not always. Depends on relationships. Look for win:wins	Need to continue with Cost & Volume but add in other elements. We need to understand our own costs better including fixed and variable costs and aspects such as EQA and UKAS. Need to include points of stepped cost or stepped changes e.g. automation.
F	Unclear on the value to the individual but possibly to the population. Financial value is low	Yes, in particular with diagnostic / support services. Resources are directed at activity rather than outcomes.	Strengths: Its simple and familiar and easy to monitor / forecast. Weakness: Little incentive for the provider to challenge volume	Yes but only when the right people with influence and big picture view are involved alongside the clinical and technical staff. For example, the DoF or Deputy.	Key individuals able to look across the system / pathways. Although not enough.	Contractual arrangements with areas such as primary care mean they get paid for doing activity and sending in tests that might not strictly add clinical value. No disincentive as the money isnt aligned to clinical outcomes. Bit like a 'Free Bar'. Insufficient capacity to analyse and engage with colleagues. Behaviour that uses diagnostics to capture everything rather than target a differential diagnosis.	It is easy and also a requirement of our roles to secure best value. Involves good relationships and also accurate data / evidence that we can share and collaborate on.	Would like to see additional measures and not just C&V. Need to 'reward' and enable good diagnostic stewardship and outcomes. Whatever we do, we need to align data collection and budget responsibility with it.
G	Uncontrolled and not deliberate.	Yes	Strengths: Simple Weakness: No disincentive around volume for the provider which is in control. It receives the sample, it processes it and charges for it regardless of what happens to the result. Doesn't easily allow for nuances such as fixed or stepped costs	Not really. Can be very difficult and seems to be influenced by individuals.	Cross-charging mechanisms	Insufficient constraints Misaligned responsibility between user and payer The wider system is stressed and needs to have answers asap to make decisions but also find cash savings. They tend to conflict. Everyone's interested in their budget position not the entire pathway. Oversight capacity	Can do it but it can be very difficult and often not pursued if not going to be in-year cash saving	Yes - Keep C&V but add some further elements that share the risk of delivering change. Separate out fixed, stepped and variable costs.
H	Not great.	Yes. Patients do not present aligned to budgets but to symptoms.	Very simple to manage. However it does not provide mechanisms to pursue or secure additional value related to productivity and outcomes. Clinicans drive the activity not the payers.	Depends on the situation, the individuals and the scale of opportunity. Cash releasing will attract more attention than efficiency / productivity due to the financial climate	Oversight through national groups including forums such as Medical Directors and Directors of Finance. Establishment of Value Teams in all organisations to identify opportunities.	Critical mass that enables the realisation of value. Minimum requirements can prevent or hinder 'efficiency' and productivity gains. Different contexts e.g. Rural centres versus university hospital have different opportunities. Due to pressures can be dragged into cash not value. Unable to release and constrain at the right points at the right time. Policy is too linear and detached from the realities of delivery. There's also far too much of it. Low risk tolerance / appetite that prevents trying and experimenting (little success in reverting)	I think its safe to have these conversations. Nothing is agreed until it is and that involves a lot of scrutiny.	Cost and Volume has its place. Need to consider mechanisms such as risk sharing and pooled budgets.
Interviewee	Testing more provides greater certainty for outcomes but has more potential for waste	Yes - we have a risk adverse system, we don't want to be wrong and so continue to test. We do not easily understand or able to define the balance between acceptable risk and acceptable cost.	Strengths Both parties have greater certainty on cost and income . Weakness Competing incentives for payer and provider	No easy mechanisms	Good relationships but these can be strained	Rarely cost releasing so no true opportunity for redistribution. Any change can be consumed by pressures elsewhere as nothing is in isolation. We tend to do addative rather than replace / displace Held to account on silo performance not system / pathway	Variable depending upon context and stakeholders.	Could consider punative elements to incentivise change (so long as there was rich data to drive behavioural change). Consider risk share of incentives.
J	Depends on what you are measuring but probably quite low. It doesn't represent the mazimum value we could get.	Yes	Strengths: Its consistent, familiar and simple and easy to resource (to manage it) Weakness: Based on outputs not outcomes	No. Its not very easy to achieve and fails more often than not.	Limited. Some positions like DoFs have the ability to easily move money based on different parts of the service.	Focus on throughput and activity rather than productivity and value. Insufficient appetite to try and experiment. Don't have good mechanisms to revert / transfer back and so people hesitant to try. Silo responsibility e.g. Service or Division, not pathway or system. Easy to access data, that is consistent and meaningful - not typically available or universally available. Need to change our philosophy and way of thinking across the system.	Depends on mandate and oversight from senior individuals but generally 'safe'. May not always have the forums or opportunity for the discussions with the right people.	Can't remove volume as that is a value in itself but need to add other aspects that are linked to outcomes.
K	There is value but not sure how much and that would depend on definition. Definitely not optimal value.	Yes, especially when there are multiple stakeholders	Strengths: Well-established and familiar. Can have very detailed data (if people then have time to go through it) Weakness: Focus is on output rather than outcomes Price doesn't always reflect cost Price can hide aspects of fixed, variable costs. Separation between users and payers	Not generally although most people agree it should happen. Often conflicting 'here and now' challenges that can disincentivise such behaviour.	Trust and good relationships between individuals rather than organisations. Reflects system complexity.	No consequences for producing waste. No link to outcomes. Risk aversion	I think it is safe but that is probably influenced by the right individuals involved and that isnt always clear.	Should include incentives for productivity and outcomes on top of cost and volume. Too difficult to move away from cost and volume completely.
L	There is some value by doing the tests for patients but it isnt a lot.	Yes - we allocate budget in a way that make it easy for the system to understand and manage rather than how clinicians behave.	Strengths: Its familiar and well-understood Weakness: Includes perverse incentives for providers who could also impact value.	I think there are options that could be used but aren't fully explored including risk-share and pooled budgets.	Relationships and increasing discussion around value.	Insufficient capacity to get into the detail and understand the data and what that could mean. We budget vertically within a specialty or service rather than horizonatally for a set of symptoms or syndrome. Policy doesn't necessarily encourage changes in allocation as well as it could. Cash releasing is the major challenge for organisations, rather than value, and within tight timescales.	Depends on trust and relationships rather than systems and processes.	Cost and volume here to stay but could look at converting parts of the funding to be pooled budgets / ring-fence to enable outcome related value.

"The Impact of Art-Based Practices on Well-being: Perspectives from Artists"

HAIKAELI GILLIARD KINYAMAGOHA

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Abstract:

Background: Art therapy is a well-established form of psychotherapy that uses creative expression, particularly visual and tactile media, to support emotional processing, self-awareness, and personal growth. Conducted by certified art therapists, it adheres to strict ethical guidelines, making it a profession with clear standards. In contrast, "Arts and Health" or "Arts for Health" encompasses a broader range of creative activities aimed at enhancing well-being, which may not necessarily involve a certified therapist. While art therapy is more formalized and has been developing since the 1960s, Arts and Health is a newer, evolving discipline that integrates artistic practices into health settings to improve the quality of life, often through community engagement and social prescribing. Both approaches promote well-being but differ in their professionalization and scope. This report examines the perceptions of Art and Health practitioners regarding the use of art and professionalism in their practices related to well-being.

Methodology: The study employed a mixed-method approach and was conducted in two phases, featuring ten (10) artists: five from Tanzania and five from the United Kingdom (UK). The study was conducted in two phases to collect both qualitative and quantitative data. Quantitative data was analyzed using EXCEL to generate descriptive statistics, while qualitative data underwent thematic analysis to identify key themes.

Conclusions: The findings from both Phases I and II underscore the significant role art plays in improving well-being, particularly for individuals with disabilities and special needs. In Phase II, both artists emphasized the therapeutic power of art to promote emotional and physical health, though challenges related to professional identity and sustainability emerged. The artists were cautious about adopting the title of "arts and health practitioner" due to concerns about healthcare expertise and multidisciplinarity. They also highlighted issues of securing long-term funding and overcoming bureaucratic barriers.

Key Recommendations: Strengthen collaboration between artists and health professionals (art therapists, doctors, physiotherapists), pursue formal training in art therapy, and expand funding opportunities.

Keywords: Artists, Arts and health practitioners, well-being, art therapists, art for wellbeing, Tanzania, United Kingdom (UK)

List of Tables and Figures

Figure Number	Description
1	Literature review (Author's own)
2	Table of years of experience in using art in well-being context (Author's own)
3	Bar charts for settings where artists run their practice. (Author's own)
4	Compilation table on professionalism questions. (Author's own)
5	The use of the title art and health practitioner. (Author's own)

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Introduction

Art therapy is a form of psychotherapy that uses visual and tactile media as a means of self-expression and communication. It aims to support the processing of complex and confusing feelings while fostering self-awareness and growth (BAAT, 2024). Additionally, the American Art Therapy Association (AAAT) defines art therapy as an integrative mental health and human services profession that enriches the lives of individuals, families, and communities through active artmaking, creative processes, applied psychological theory, and human experience within a psychotherapeutic relationship (AATA, 2024). While the definition of art therapy varies slightly across different regulatory bodies, it is clear that art therapy is a profession guided by ethics and professional conduct. For an art activity to be considered therapy, it must be conducted in the presence of a certified art therapist or art psychotherapist. The term 'creative therapy' encompasses various art therapy disciplines such as dance therapy, music therapy, expressive art therapy, and poetry therapy (McNiff, 2013).

Arts and Health, also known as 'Arts in Health,' 'Arts for Health,' 'Arts–Health,' and 'Arts into Health,' is an umbrella term that refers to the use of arts-based activities and events to promote or improve wellbeing in different settings and populations. These activities include both arts engagements for recreational purposes and art therapies (Davies & Cliff, 2022). In contrast, the art therapy profession is well established and has been developing since the 1960s and 1970s, whereas Arts and Health is a relatively new discipline (McNiff, 2013). The Welsh Arts Council report on Art and Health attributes the organic growth of this practice to the forward-thinking attitudes of artists, art organisations, and health workers who have infused the arts with health and wellbeing since the 1970s (Art Council Wales, 2018). The report highlighted several practices such as storytelling for arts, social prescribing, arts in healthcare environments, and artists in residence in hospital settings, homes, art centres, or care homes (Art Council Wales, 2018). It also identifies the benefits of art and health projects for participants, including the pleasure derived from participating in the arts, boosting patients' confidence and self-esteem, fostering a sense of community, developing coping mechanisms, and increasing mobility and physical strength for elderly individuals in dance projects, among others.

Literature Review & Project Aims

There are conflicting views between art therapists and art and health practitioners regarding their practices, specifically about who can or cannot perform certain tasks, and the trajectory of their professions—whether they should remain distinct or become more integrated (McNiff, 2013; Moss, 2016). This divergence hinders practitioners' ability to collaborate effectively for the benefit of health service users and creates artificial barriers between the two professions (ibid).

The following table outlines key areas of contention between art therapists and art and health practitioners, focusing on how art is used and their professional identities.

Contested ares	Author(s)	Title of research	Findings	Challenge	Implications	Potential solutions
Use of Art	Kalmanowitz & Potash, 2010)	Ethical considerations in the global teaching and promotion of art therapy to non-art therapists	Art can be utilized across a spectrum ranging from recreation and leisure to therapeutic and support to therapy/ psychotherapy ..	Artists or other practitioner s often call themselves art therapists without formal training, especially in regions lacking art therapy programs. The misuse of the term therapy for any activity that has therapeutic benefit.	It can be confusing for both practitioners and clients to understand the needed training and the difference between therapy/ psychotherapy and leading creative activities.	For non-art therapy professional s to identify skills gained in their own fields, such as using art in their social work practice. . The author prefers training participants already active in their professions (nurses, artists, teachers, mental health therapists),

						assuming they will respect professional boundaries and not call themselves art therapistss

Contested ares	Author(s)	Title of research	Findings	Challenge	Implications	Potential solutions
	McNiff (2013)	Developing arts and health within creative-arts therapy or separately?	The arts are healing and have always been, they go beyond the constraints of creative therapy and are available to all	-The arts and health has grown separately from the creative arts therapy field, which is focused primarily on mental health.	The increased focus on mental health in training and professional standards makes it difficult for creative therapists to embrace comprehensiv e health services.	- To Broaden the scope of creative art therapy beyond mental and physical health to cover other healthcare, public health, mind and body and other forms of wellness.
	White et al, 2021	It's not therapy; I'm not a therapist": Exploring the perspectives of Arts Health Practioners on how arts on referral can improve psychosocial outcomes in adults with health conditons.	- Arts health practitioners were aware of their competence boundaries, understood the difference between their practice and therapy, and made this clear to participant	- Inadequate funding was seen as a potential threat to the practice and the safe space created.	- The interventions helped participants learn new skills, form social connections, and spend less time ruminating about their health conditions	
Professionalis m						
(a)Practitione rs' perceptions of each other's professions	Moss (2016)	Arts and Health: A New Paradigm	Art therapists and art and health practitioners often view each other through different, sometimes negative, lenses.	Some practitioner s in art and health do not view art therapists as artists since their main focus is therapy. Some art therapists distrust the work of artists in healthcare, deeming it dangerous and unsuitable	The creation of artificial and defensive barriers between the professional groups which is problematic and not useful.	- To recognize that none of the two approaches is better than the other; however, they offer specific benefits that fulfil different needs of the health service user in their health and wellbeing. journey

Contested ares	Author(s)	Title of research	Findings	Challenge	Implications	Potential solutions
	Kalmanowitz & Potash, 2010)	Ethical considerations in the global teaching and promotion of art therapy to non-art therapists	There is strict regulations that defend the art therapy professional title in countries like UK and the US.	- There are other parts of the world where there are no art therapy training programs, or they are unregulated.	- The context of art therapy on other part so the regions where art therapy is not highly regulated will depend on local understanding.	-Practitioners teaching in other regions should recognize that art therapy is a Western concept and remain mindful of indigenous cultures and local skill sets.
(b) Training requirements	McNiff (2013)	Developing arts and health within creative-arts therapy or separately?	- There is a hard-earned qualification and a developed academic industry for art therapists, in contrast to what is required of art and health practitioners in healthcare — namely, art interest and skills.	- The art therapists profession are protective of what they have worked hard to obtain (training qualifications and certification)	- Arts therapy professional bodies strictly limit who can offer arts and health services, in contrast to arts and health organizations that broaden participation and funding, appealing to the public and donors.	Share established resources in training and accreditatio n for creative therapy instead of duplicating them for arts and health. Creative art therapists should lead in supervising arts and public health services alongside other health professional s and artists. Clearly define what art therapists and arts and health practitioner s can and cannot do to ensure they work in harmony.

Contested ares	Author(s)	Title of research	Findings	Challenge	Implications	Potential solutions
	Moss (2016)	Arts and Health: A New Paradigm	The gap in training requirements whereby arts and healthcare practitioners have less training compared to rigorous training on art therapists	- Artists and arts in health practitioners lack training and support for delivering services in healthcare settings.	- This leaves the sector vulnerable regarding training and standards of practice	- Ensure that artists working in healthcare settings are trained and sensitive to the vulnerability of patients and other service users

(C) Professional Benefits	Moss (2016)	Arts and Health: A New Paradigm	-Inequality and divide that exists between art therapists and arts and health practitioners in terms of compensation, recognition and other professional benefits.	The health service employs art therapists with salaries, while arts and health practitioner s rely on bursaries or one-off grants. Arts and health practitioner s are often overlooked and unrecognize d in healthcare settings Some websites and journals only publish intervention s from arts and health practitioner s, and others only from art therapists.	- Creating a further divide between the two professions and professional insecurities	
(D) ethical consideratio n	Kalmanowitz & Potash, 2010)	Ethical considerations in the global teaching and promotion of art therapy to non-art therapists	- Non art therapist using art are not held accountable by the profession code of ethics	There is no way to ensure that non-art therapists will use skills gained from art therapists responsibly.	- Professional standards adopted by art therapists to protect the public cannot be extended to practitioners in other disciplines.	Art therapists should ensure they know the backgrounds of those they train and choose trainees wisely

Figure 01; Literature review (Author's own)

This report aims to contribute to the dialogue by exploring the perceptions of Art and Health practitioners about these two major contested themes (the use of art and professionalism) around their practice. Most research and position papers on this matter have been done by art therapists, not art and health practitioners.

Findings and Discussions

Participants Selection and setting

This mixed-method study was conducted in two phases, featuring ten (10) artists: five from Tanzania, four from the United Kingdom (UK), and one originally from El Salvador, with experience working in the UK. Of the ten artists who participated in the study, seven were visual artists (four painters, two photographers, and one jewellery artist), while the remaining three were performing artists (one music teacher, musician, and composer; one dancer; and one clown doctor). An equal number of male and female participants (five each), ranging in age from 18 to 70.

Phase one involved completing a survey administered through Qualtrics, from which ten (10) participants' responses guided the semi-structured interviews that followed. Due to logistics and time constraints, the second phase only featured (2) artists both of whom are from Tanzania. The investigator received ethical approval from Swansea University to conduct the study, which was distributed via email and WhatsApp links. For this research, an artist is defined as an individual who creates, expresses, or demonstrates creativity and imagination through various mediums, such as painting, music, literature, performance, jewellery making, or illustration. Well-being is understood as a combination of mental, emotional, and

physical health, along with a healthy lifestyle. It encompasses more than just the absence of illness, including how individuals feel about themselves and their lives, and their perceptions of meaning and purpose (NHS Wales, 2021).

The inclusion criteria for the artists required that they have experience working on or running wellbeing projects in their communities. According to the definition of arts and health practitioner, these artists met the criteria for inclusion. Most participants were identified through organizations conducting well-being projects, referrals from other artists and practitioners, and the investigator's experience as a curator, having previously interacted with some artists and their projects.

Phase 1 Survey Feedback

During Phase 1, the artists were asked general questions aimed at understanding their perspectives on art practice for well-being, their interactions with other professionals, particularly art therapists, and the challenges they face. Two key trends emerged from the survey. First, there was a strong consensus among the artists that art positively impacts individuals' well-being, with 70% strongly agreeing, 20% agreeing, and only 10% strongly disagreeing. Secondly, 60% of the artists strongly agreed that collaboration with other practitioners (such as art therapists, artists, and the community) ensures the well-being of their participants. A minority of 10% strongly disagreed, while the remaining 30% agreed. These findings align with Moss (2016), an art therapist and music and health practitioner, who argued that neither art therapy nor art and health practices are superior to one another; rather, they offer specific benefits that meet the different needs of health service users on their health and well-being journey. She was a strong proponent of collaboration; in an example she highlighted how the presence of a music therapist can provide a safe space to explore difficult emotions that may be evoked during music-listening sessions conducted by an artist.

More than half of the participants have been using art in the well-being context for more than ten years, which may imply that they are experts in the area. The rest of the participants were at different experience levels, from early career to intermediate, potentially contributing a variety of perspectives.

Q1: How long have you been using art in a well-being context?

TIME (years)	PERCENTAGE (%)	COUNT
Less than 1 year	20%	2
2 - 6 years	10%	1
7 - 10 years	30%	3
More than 10 years	40%	4

Figure 02: Table of years of experience in using art in well well-being context (Author's own)

Q2: In what type of setting do you primarily practice (Select all that apply)

In their respective areas of practice, more than half of the artists (60%) have experience working with adults (18-64 years), 20% with children (0 - 12) and the remaining 20% with adolescents (13- 17 years). Of all the artists we worked with none had experience working with seniors.

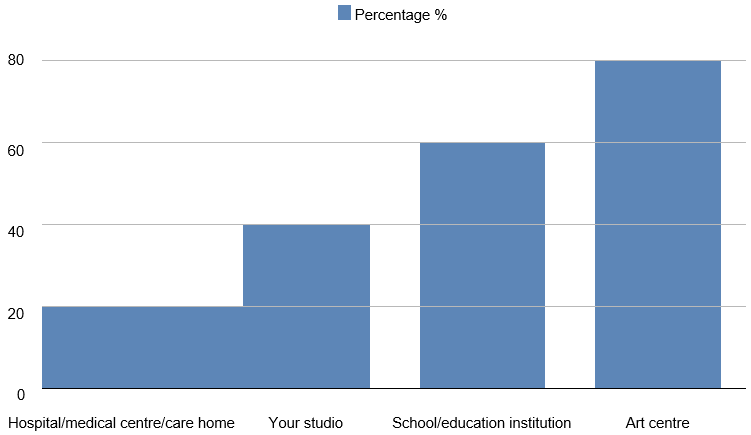


Figure 03: Bar charts for settings where artists run their practice. (Author's own)

Q3 - Q6: The following four questions explored the professionalism side of the conversation, highlighted as an area of contention in the literature review. The focus was on the perceptions of what art and health practitioners can do versus what an art therapist can do, the use of the word "therapy" in describing their practice, recognition of their practice and related benefits.

Question	Strongly disagree	Disagree	Neutral	Agree	Stongly Agree
Only individuals with accredited training in art therapy should be authorised to use the title 'art therapist	20%	20%	40%	10%	10%
Strict professional boundaries maintained by art therapists are necessary to ensure the integrity and safety of therapeutic practices	10%	20%	0%	40%	30%
Question	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Stongly Agree**
Should artists who run well-being activities/interventions be recognized as professionals as it is with mental health practitioners?	11%	22%	22%	33%	11%
Do you refer to your well-being practice as "therapy"/therapeutic?	10%	10%	10%	50%	20%

Figure 04: Compilation table on professionalism questions. (Author's own)

Concerning the use of the term "art therapy," about 40% of the artists disagreed that the term should only be used by individuals with accredited training in art therapy, 40% were neutral, and only a minority of 20% agreed. This may explain why more than 70% of the artists refer to their wellbeing practices as therapy or therapeutic. At the same time, the artists agree that strict professional boundaries set by art therapists are necessary for the safety of participants. The artists also wanted recognition for their well-being interventions similar to that of mental health practitioners.

Do you refer to yourself as an Arts and health practitioner?

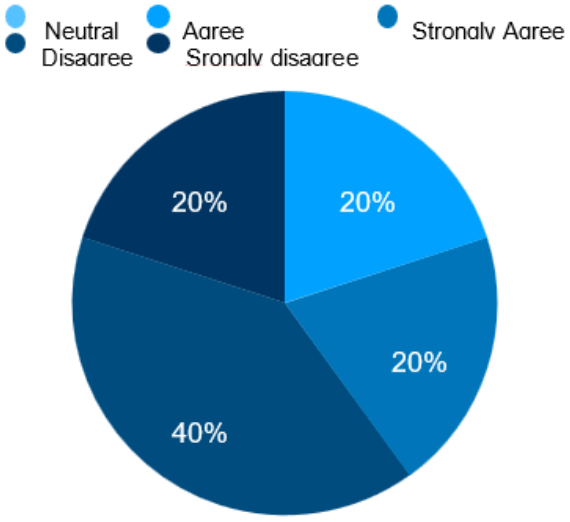


Figure 05: The use of the title art and health practitioner. (Author's own)

More than half (60%) of the artists didn't refer to themselves as Arts and Health practitioners; the remaining artists agreed to use the title. I speculate that, due to the growing Arts and Health profession in the United Kingdom, those who agreed to use the term are more likely based in the UK. The two artists from Tanzania that I engaged with in Phase II didn't refer to themselves as Arts and Health practitioners, even though they fit the definition and have been working in the industry for more than 10 years.

Phase II Semi-structured Interviews

This phase features two male artists who have been using art for well-being practices for more than ten years in Tanzania. Both have experience working with children and adults. Of the two, **Artist A** is a music expert, who uses music in his practice and has extensive experience working with children and adults living with disabilities and special needs(autism, cerebral palsy, down syndrome and others). **Artist B** is a visual artist and arts teacher, who mostly uses painting or drawing as his medium for his sessions.

The semi-structured interview consisted of three main questions: the first about their journey and how they started using art for well-being; the second, whether they use the title "arts and health practitioner"; the third, the challenges they face in their practice, followed by an open-ended question that allowed them to contribute anything they felt could add to the dialogue. The interviews were conducted over phone calls, each lasting a maximum of 20 minutes, recorded on voice memos and then transcribed and thematically analyzed.

The following is the thematic analysis and key themes identified from the interviews:

Theme 1: Therapeutic and Healing Power of Art and Music

There was a highlight of how art and music as powerful tools for emotional and physical healing, especially for individuals with disabilities, special needs or mental health challenges such as stress and coping with life hardships.

Art has been demonstrated to be highly useful for children with disability tolerant of different skills.

> *"We have been teaching her different skills while playing music, and it has been easier for her."……since she was more receptive to music and dance and enjoyed it we also suggested to their physiotherapist to use music in sessions. (Parent using music for daughter with Down syndrome) - Artist A*

Furthermore, reflecting on art and well-being projects they conducted in 3 schools for children with special needs and those living with disabilities. Artist ***A*** reflected on the changes in behaviours and participation by the autistic children who initially didn't want to talk, dance or even be touched and were confined to their chairs.

> *"By the end of the sixth week, they would stand up and welcome us when we arrived." ……. and they would stand introduce themselves, go in the middle of a circle and dance….something the parents have never seen all their lives and were surprised and brought parents emotional/ crying. (Music's impact on children with autism) - Artist A*

> *"I haven't done any formal research on this, but it's evident that colours influence people's lives, ease the mind, and affect your senses … also it has a huge role in children's set expression, self-esteem and building their confidence such as when we exhibit the work made by the children to the public- (Artist B reflecting on the therapeutic effects of art)*

The benefits of Arts and Health projects align with the NHS priorities by focusing on patient centered care, and prevention and enabling people to take charge of their well-being (Art Council Wales, 2018). Another study conducted by Kaimal et al (2019), on art therapy and the effects of colouring sessions, demonstrated that even brief sessions of colouring were useful in improving the well-being and a form of self-care for caregivers of cancer patients while also distracting them from stress associated with taking care for patients.

Theme 2: Challenges of Professionalization and Identity

This theme captured the tension between informal and formalized roles in the arts and health fields. The interviewees expressed hesitation in using the formal title of "arts and health practitioner," while also recognizing the potential for more professionalization, such as incorporating art therapy into their work.

> *"I've never used the title 'arts and health practitioner.' I don't call my sessions 'therapy,' as I am not trained in it."… I know in the US and Europe it is a formalized profession - Artist A*

> *What I know is that music is good for our health such as building motor and cognitive abilities but I don't know for sure when we do a certain dance which muscles as engaged or exercised as physiotherapists……..What we try to do is to work with the teachers who know the children's strengths and weaknesses and if they have any issues with creating movements so that we don't cause more harm with the dance movements - Artist A*

The concern that using the terms arts and health practitioner can be limiting to one's practice as an artist;

> *"For me, I am an artist first, and I can do many things. I'm multidisciplinary, and I don't want to box myself in with that title." …….From my understanding, the people who use the term arts and health practitioners are the first healthcare professionals who have chosen to use art as their medium. But I am an artist first and I don't have healthcare training, my skills can be used in health campaigns but why happen after they end? - (Artist B discussing professional identity)*

Both artists demonstrated an understanding of the gap in their skills, one expressing the need to pursue art therapy training, and another one collaborating with teachers and other practitioners to complement their skills.

> *"I've been wanting to read more about art therapy so I can use it more in my work with children...I want to be an actual art therapist." (Artist B with a desire to formalize expertise in art therapy)*

Theme 3: Barriers to Sustaining and Expanding Art-Based Programs

This theme addresses the practical challenges faced when implementing and sustaining art and music-based programs, including lack of funding, limited resources, and bureaucratic hurdles. Despite these obstacles, there is a growing demand for such programs in various educational and social settings.

> *"People often want us to do these classes for free, which makes it difficult to run many art sessions .. as a result, I am selective with the institutions I volunteer with" (Artist on the financial difficulties in offering art workshops for free - Artist B)*

> *"After the grant we had ended we've been trying to find more funds so we can expand the project since it was very beneficial for both the students and our dancers and musicians." (Efforts to expand successful projects - Artist A)*

> *"The challenge was that the teachers said they couldn't do the sessions to the same level as our music and dance teachers, but at least they were doing something." (Challenges in sustaining art programs after initial projects -Artist A)*

These findings link what was argued by McNiff, that the art therapy profession has resources (formalized courses and knowledge systems) that can be used by the arts in health practitioners (non-therapist) rather than creating a new profession entirely (McNiff, 2013). However, there are challenges in this process as there are conflicting views within the creative therapist profession regarding training non-art therapists highlighting that it could pose a danger to the patient, and issues of ethical implications which hold art therapists accountable but do not apply to non-therapists, and concern about profession integrity (Kalmanowitz & Potash, 2010).

Conclusion

The findings from both Phases I and II highlight the multifaceted role that art plays in enhancing well-being, particularly for individuals with disabilities and special needs. In Phase II, both artists, despite working in different mediums—music and visual arts—shared a belief in the therapeutic and healing power of art, promoting emotional and physical health. However, challenges related to professional identity, and the sustainability of art-based programs also emerged. The tension between viewing oneself as an artist versus an "arts and health practitioner" reflects a broader issue in the formalization of art for well-being practices. This makes the conversation more nuanced, as the literature suggests there is ongoing debate over titles, roles, and responsibilities between art therapists and arts and health practitioners (refer to Figure 01). What happens when an artist fits the description of an arts and health practitioner but does not adopt the title?

It is evident from Phase II that both Artist A and Artist B recognize the potential for further professionalization, yet they remain cautious about labelling themselves. Their concerns stem from their lack of healthcare expertise and the fear that adopting such a label might limit their multidisciplinary abilities.

Sustainability also remains a significant barrier, as identified in the literature review. Both artists expressed concerns about securing long-term funding and resources, the undervaluation of their work, which leads some people to request free services, and the bureaucracy involved in the process. Despite these challenges, both artists are optimistic about the future of art for well-being practices and express a desire to continue their work, enhance their impact through professional training, and collaborate with others in the field.

Recommendations

The following are recommendations:

Strengthening Collaboration Between Artists and Health Practitioners

Collaboration between artists and trained health professionals could enhance the effectiveness of art-based interventions. For example, Artist A mentioned how integrating music into physiotherapy sessions yielded positive results for a child with Down syndrome. Building on such interdisciplinary efforts, artists could collaborate with psychologists, physiotherapists, or social workers to create a more holistic approach to therapy.

These collaborative efforts can help to curb the skills gaps in their practices and benefit the participants. For example, local organizations and government bodies could facilitate these collaborations by reducing the bureaucratic processes that artists have to go through to host their well-being sessions in public schools and institutions. Also, they can host workshops and networking events, bringing together artists and health professionals to share best practices and foster partnerships. Collaborative training sessions that combine the expertise of both fields could also be developed, ensuring that artists feel confident in the therapeutic aspects of their work, and health practitioners become more attuned to the creative possibilities of art-based interventions.

Professional Development and Training

A key recommendation for both artists and practitioners in the field of art for well-being is to pursue formal training in related fields such as art therapy. While both Artist A and Artist B possess extensive experience and knowledge in their respective practices, neither has formal credentials in therapeutic arts. Obtaining such certifications could enhance their credibility, increase their opportunities for collaboration, and potentially attract funding from organizations interested in supporting evidence-based approaches to well-being. Moreover, training in art therapy would empower them to deepen their understanding of the psychological and emotional dimensions of their work, which could further benefit their participants, especially those with special needs.

Art therapists can also provide short courses or training to artists who want to expand their practises and have demonstrated that they can respect professional boundaries. This is an acknowledgement that art therapy training can be long and tedious, and also, some artists may still choose to do arts for arts and not box themselves as arts and health practitioners. This way, we can have more arts and health practitioners in the community, embracing both general and specialized practice. The UK Arts and Health scene is more vibrant than that of Tanzania, and partnerships between the two countries' artists and organisations can help exchange best practices and support the artists. Along the same lines, a partnership with international organizations and universities that specialize in art therapy could help bring such opportunities to local practitioners. These initiatives could also build a more formalized infrastructure for art and well-being practices in Tanzania, addressing both the knowledge gap and the professionalization challenges that were highlighted in the interviews.

Developing a Supportive Policy Framework

Governments and policymakers need to recognize the role of art in promoting public health and well-being, especially in underserved populations like those with disabilities and special needs. There is a growing body of evidence that supports the use of art as a therapeutic tool, and as such, it should be integrated into national health and education policies. This would help create sustainable support systems for artists and

organizations working in this space. For example, dedicated funding streams could be established to support art-based health interventions in schools, hospitals, and community centres.

Expanding Funding and Resource Opportunities

One of the most significant barriers to sustaining art well-being projects, as discussed by both artists, is the lack of financial resources. To address this, several strategies could be pursued:

- **Government Grants and Subsidies**: Governments could establish grants specifically for art and well-being initiatives, making it easier for practitioners like Artist A and Artist B to secure long-term funding. This could include annual grants for arts-based education in schools, community outreach programs, and health-based interventions.
- **Corporate Sponsorship and CSR Initiatives**: Corporations, particularly those with strong corporate social responsibility (CSR) programs, could be encouraged to sponsor art-based well-being programs. Businesses that are invested in promoting community health or education could provide both financial support and in-kind resources like materials, space, or marketing.
- **International Collaboration**: Given the increasing recognition of arts and health practices and their global applications, international NGOs and development organizations could be valuable partners. These organizations could fund projects, provide resources, or offer grants for research and program development, ensuring that successful programs like the one mentioned by Artist A can continue to grow.
- **Crowd funding and Community Fundraising**: Artists and organizations could also turn to community-driven methods like crowdfunding to support specific initiatives. Crowdfunding platforms allow for small donations from a large number of people, which could be effective if projects are clearly defined and communicated well.

Raising Awareness and Advocacy

Efforts should be made to raise public awareness about the benefits of art for well-being, particularly among parents, educators, and healthcare providers. Both artists discussed how their work with children with special needs had transformative effects, yet these stories are often not well-known beyond their immediate circles.

A national awareness campaign could showcase success stories, share research on the effectiveness of art-based therapies, and advocate for the inclusion of art in mental health and well-being initiatives. This could include public exhibitions of work created by children or adults in arts and well-being programs, media coverage of successful interventions, and public talks or workshops led by artists and health professionals. Once more individuals and organisations are widely aware of the benefits of art for well-being there could also be easier reception and support offered to artists.

Building Networks and Peer Support

Finally, artists working in the field of well-being could benefit from stronger peer networks. These networks could serve as support systems, spaces for knowledge sharing, and forums for collaboration. For example, the likes of Wales Arts and Wellbeing Network (WAWN) which offer support to artists working on welling projects in Wales.

Organizations like national artist unions or NGOs focused on health and wellbeing could help create these networks, hosting regular meetings, conferences, or online platforms where practitioners can exchange ideas and resources. By building a sense of community among artists working in health and well-being facilitating collaborative projects and offering opportunities for collective advocacy, making it easier to push for institutional change.

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Examining Barriers to Incorporating Biophilic Design into Cancer Healthcare Settings.

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Abstract:

This research project considers the barriers to incorporating biophilic design, plant-based materials and plants in secondary and tertiary healthcare and cancer care facilities within the Welsh NHS. The research compares the perspectives of two key stakeholder groups: Infection Prevention and Control (IP&C) staff and Architects and Designers specialising in healthcare. Biophilic design draws on the theory that improved access to nature has positive effects on human well-being and therefore use natural elements in the design and creation of spaces to realise this benefit. While research suggests potential benefits for patients, concerns regarding infection control and cost have limited its implementation in healthcare settings. A mixed-methodology approach was used through questionnaires distributed to both stakeholder groups to seek their views on the challenges of incorporating biophilic design into healthcare and cancer care facilities. While both groups recognise the potential benefits of biophilic design, concerns regarding the availability of empirical evidence, infection control and cost remain significant barriers. Addressing these concerns and developing clear policies to support biophilic design implementation are crucial actions for policy makers to address if they want to realise the benefits of biophilic design within Welsh NHS.

Keywords: biophilic design, biophilia, healthcare design, cancer care design, infection prevention and control

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INTRODUCTION

BIOPHILIC DESIGN

Biophilic design can be defined as the movement which "encourages the use of natural elements and processes as design inspiration in the built environment" (Kellert, 2008, cited in Gillis and Gatersleben, 2015). The theory on which it is justified is that exposure and access to natural elements and environment has a positive impact on physical and mental health and well-being. There is much research to support this (Bowler, et. a. 2010) however the quality of this is disputed in some circles, as discussed later in this paper.

NATURE AND BIOPHILIA IN HEALTHCARE

Biophilia (although a recently coined term itself) and the natural environment has a long history in well-being and healthcare globally. In the West, access to verdant green spaces were a key element of Georgian, Victorian and Edwardian medicine (Lexicon Medicum, 1839, cited in Totaforti, 2018; Hickman, 2013; Heggie, 2014). For example, the gardens in the Edwardian Whitchurch Asylum, north Cardiff, are notable for their intricate planting and furniture which "reflect the therapeutic philosophy of the time" (The Hestercombe Gardens Trust, 2024). Indeed, Kellert (2018) argues that humans have been practicing biophilic design "over the ages" on the basis of intuition – it just feels right to them.

Over the past decade, the concept of incorporating nature into infrastructure design has grown within architectural circles (Zhong, et. al., 2022). Since the Covid-19 pandemic, there has been a public "surge" of interest in nature and understanding of its impact on their wellbeing (ONS, 2021), which has also grown within healthcare circles in terms of improving staff and patient wellbeing (Zhao, et. al. 2022, and Tekin, et. al., 2022). This is despite, meanwhile, the operational focus remaining on infection control, as noted above. The design 'success' and proliferation of the Maggie's charity cancer support centres – a "paradigmatic architectural example in the provision of non-institutional cancer support" (Tekin, et. al., 2023) – is one example demonstrating the interest and possibilities of the inclusion of biophilia in healthcare design – where public budgets and guidelines (e.g. infection control) are not considerations.

This study will look at the motivations of those designing healthcare facilities – where such faciltiies refer to those utilised in secondary and tertiary (hospitals and cancer care centres, rather than GPs), as well as those working with Infection Prevention and Control within the Welsh NHS, to analyse what the barriers to incorporating biophilic design into Welsh healthcare facilities are today. In particular, this study aims to considers cancer care environments, where a large proportion of patients are immunocompromised as a result of their treatment.

LITERATURE REVIEW

Biophilia as a concept was described in Fromm's 'Heart of Man' (1964) and later developed by Wilson (1973). It is considered to have a biological basis – a fundamental relationship between humans and nature (the 'biosphere') – humans have an innate tendency to seek connections with the natural world. Building on this, Barbiero and Berto (2021) reflect on biophilic design as "considering the evolutionary roots of this architectural approach…an effective way of planning/designing interior and urban environments to stimulate the innate biophilia of the individual."

Healthcare environments can be stressful and anxiety-inducing for patients, families, and staff. The integration of natural elements into built environments within the healthcare sphere has drawn significant academic attention due to its potential to enhance patient well-being and recovery.

HEALTH AND WELL-BEING BENEFITS

Natural environments have been noted in much academic literature as being particularly appropriate and effective in providing "restorative experiences" to humans (Kaplan, 1995). Indeed, even in the early 1990s, Ulrich et. al. was able to emphasise cross-disciplinary cohesion on the matter, noting that "different conceptual perspectives converge to predict that if individuals are stressed, an encounter with most unthreatening natural environments will have a stress reducing or restorative influence" (1991). Such "positive emotions" are noted to improve recovery following incidents of stress (Fredrickson, et. al., 2000).

A meta-analysis undertaken by Bowler, et. al. (2010) however, concluded that research in this sphere had not been detailed or specific enough, noting that evidence "is primarily drawn from short-term tests on self-

reported feelings", and that "the validity of these psychological scores as measures of mental well-being is not clear".

Since then, considerably more literature has developed in this area. A literature review by Gillis and Gatersleben (2015) identified a number of themes within the psychological literature on the health benefits of biophilic design – both in terms of direct access to nature – e.g. the well-being benefits of natural light, water, plants, weather, and natural landscapes and ecosystems; and also indirect experiences of nature – e.g. images of nature, natural materials, natural geometries (i.e. shapes and patterns).

Yet, even writing in 2022, Zhong et. al. noted that "open questions and controversies remain regarding conceptualizing and addressing 'nature' in practice and research." Work may be required to develop research which measures outcomes in a manner meaningful to healthcare providers. Indeed, writing in 2021, Hung and Chang noted that "to date…there has been no well-done research on reviewing the health benefits of biophilic design" and a meta-analysis by Sal Moslehian et. al. (2023) found that studies considering the impact of the presence of plants within healthcare environments were plentiful, the majority were "mostly limited to assumptions about the healing process" rather than tangible health impact measures.

BIOPHILIC DESIGN ADJACENT TO HEALTHCARE ENVIRONMENTS

A meta-analysis of Maggie's centres (which are located on-site or near to clinical cancer care facilities but are not clinical settings themselves) found that whilst their design was critical to the wellbeing impact experienced by patients, the study's defined 'Biophilic Design Parameters' were not actually the critical 'umbrella' design parameters which delivered this. The authors recognised, however, that they were *informed* by those Biophilic Design Parameters, with a large number of these being considered highly important to patients. These included daylight, air, and "greenery-plants". Critically for this study, the clear differentiation between the clinical, hospital environment, and the Maggie's centres was highlighted – with those critical, umbrella design parameters being essential to achieving this (Tekin, et. al., 2023). Therefore, whilst this meta-analysis identifies useful biophilic design outcomes for cancer patients, it is unclear how successfully these design parameters could be applied to a clinical healthcare setting.

EXPERIENCE OF BIOPHILIC DESIGN IN HEALTHCARE ENVIRONMENTS

Despite the concerns noted above, numerous recent studies have identified positive results in recovery, mood, emotion and stress reduction amongst patients with access to some element of nature or biophilic design. A key and well-recognised study was that of Park and Mattson (2009) who found positive effects on patients' recovery from surgery as a result of viewing indoor plants. Their study ended conclusively as it "confirmed [emphasis added] the therapeutic value of plants in the hospital environment as a non-invasive, inexpensive, and effective complementary medicine for surgical patients" and recommended that "health care professionals and hospital administrators need to consider the use of plants and flowers to enhance healing environments for patients."

In recent years, advocacy for biophilic design in the healthcare sphere has increased (El Messeidy, 2019; Totaforti, 2018, Maghlakelidze, et. al., 2024), whilst the actual use of plants in the indoor healthcare environment has met with some push-back (detailed below). However, it is not just physical plants within a healthcare space which are considered to provide benefit. The way in which humans access the natural elements of biophilic design has been widely discussed in recent literature. Kellert (2018) notes that our experience of biophilic design is multi-sensory. This is support by a study by Qin et. al. (2013) on the effect of indoor plants on human comfort – which found that those plants which provided the most perceived benefits to the well-being of subjects were those with some fragrance – noting benefits beyond just the calming appearance of the plants. Further, the positive benefits of exposure to natural sound vs. urban environmental noise on stress recovery have been demonstrated (Alvarsson, et. al., 2010).

BARRIERS

A number of barriers to the incorporation of biophilic design and inclusion of plant-based elements in the design and construction phase of healthcare centres have been noted above:

- Lack of meaningful evidence and outcomes
- Lack of clarity on the impact of plants on patient infections

In addition, a number of studies and meta-analyses looking specifically into barriers in this area have noted the following barriers:

INFECTION CONTROL

Within the NHS in recent years, the importance of access to nature and natural elements in healthcare was pushed aside as medical progression favoured extremely clean, sterile healthcare environments and a pathogenic approach to healthcare was prioritised. This was exacerbated by the Covid-19 pandemic which placed infection diseases back at the forefront of healthcare concerns (Marlow, et. al., 2020, and Jung, et. al., 2021).

Prior to that time, research in the USA in the 1970s had claimed that flower vases in hospitals were "reserves of pathogens" (Taplin and Mertz, 1973), and in the mid-2000s, a purposeful study of nurses found that two-thirds thought that flowers in the hospital setting constituted an infection risk, despite a lack of empirical evidence at the time (Gould, et. al., 2004).

Of specific relevance to cancer care, and other healthcare facilities concerning immunocompromised patients, the NHS identifies aspergillosis as risk for such patients – caused by mould from plants (and other sources) (NHS, 2024). However, even in more recent years, there remains "limited evidence that links the presence of indoor plants to nosocomial infection [i.e. Apsergillus]" (Sal Moslehian, et. al., 2023).

RISK AND SAFETY CONCERNS

A lack of consideration of "the very sick and frail" (Blaschke, et. al., 2017) in biophilic design was noted as a particular barrier. Within the cancer care context, this may apply to those undergoing invasive treatments such as chemotherapy, which lead to the patient being immunocompromised. A separate study found that a third of cancer patients surveyed considered "appropriateness and safety" as key concerns in relation to the incorporation of biophilic design (Blaschke, et. al., 2018).

As noted above, the health risk of the presence of natural plants in healthcare environments is of most concern in relation to respiratory and lung-related infections – this is in relation to soil and spore contact which may lead to microbial infections – commonly Aspergillus (NHS, 2024) albeit the evidence is disputed (Sal Moslehian, et. at. 2023). However, where clinical priorities conflict with design matters, those clinical priorities must come first.

DECISION-MAKERS AND EXECUTIVE / STRATEGIC LEADS

A lack of prioritisation amongst decision-makers is noted as key barrier is noted in terms of biophilic design being incorporated into strategy:

> *"…the most important barriers to creating a biophilic healing environment are generated in the decision-making process before designing the healthcare settings. Decision makers did not prioritize nature-based opportunities or "'design thinking.'"* (Tekin, et. al., 2023.)

COST CONCERNS AND LACK OF RESOURCES

The budgetary pressures facing the Welsh NHS are well known, and healthcare pressures are certainly not unique to Wales, especially since the Covid-19 pandemic impact. Cost concerns are, therefore, an understandable barrier for decision-makers when it comes to incorporating or implementing biophilic design preferences (Tekin et. al., 2023). Such budgetary pressures means that the prioritising of stretched resources may leave gaps, and this has been noted in the literature, with a lack of resource particularly in early-stage healthcare design as another barrier relating to cost (Blaschke, et. al., 2017). Cost and maintenance concerns are noted as barriers to biophilic design more widely, i.e. in design and construction of non-healthcare buildings (Sadick, 2023).

A 2022 meta-analysis considering biophilic design within Western modern healthcare environments found that "emotional, mental, and spiritual health issues are typically disregarded, while the main foci are physical treatment and cost" (Tekin, et. al., 2022). Indeed, resources implications in relation to the amount of work generated to clean up from, and disposal of patient flowers on wards have been flagged as a concern by nurses (Gould, et. al., 2004) although this has not been quantified.

LACK OF KNOWLEDGE OR AWARENESS

A general lack of knowledge or awareness of the benefits of nature to the patient experience and recovery process were noted. This is supplemented by a secondary barrier whereby a lack of champions for biophilic design existing within the healthcare sphere (Blaschke, et. al., 2017).

DESIGN BARRIERS

Design-related barriers themselves were noted in two areas. Firstly, conflicts between design and "clinical functionality and efficiency" (Tekin et. al., 2023). Such conflicts, it is suggested, should not be realised at a later date, as a design would not be responsibility signed off if it did not meet clinical functionality requirements.

Secondly, the "inauthenticity of nature-based design elements… [considered] as a barrier to nature engagement such as fake plants, fake scents and tokenistic, and corporate design" (Tekin et. al., 2023). In terms of biophilic design and use of plant-based materials, it is considered that this barrier does not apply as it is not a true realisation of the concept.

POLICY AND GUIDANCE

Finally, Welsh Healthcare Building Notes provide guidance on the design and construction of healthcare facilities for the Welsh NHS. The guidance in general encourages the use of outdoor planting around healthcare facilities (e.g. patient gardens, pleasant views) (WHBN 04-01) (NHS Wales Shared Services Partnership – Specialist Estates Services, 2014), and the use of indoor plants in receptions, circulation areas, waiting areas and socialising areas (WHBN 00-01 (ibid., 2017) and WHBN 00-03 (ibid., 2013), no further guidance is provided and the use of specific indoor plants are not mentioned. Some of this guidance is over 11 years old and may be considered for a refresh given the increased research undertaken in this area in recent years. WHBN 04-01 Supplement 1 (ibid., 2014) relating specifically to pseudomonas does not reference the presence of plants.

KEY THEMES

In general, it is noted that whilst a large number of studies have been undertaken which have found positive outcomes for patients as a result of them having improved access to nature, biophilic design, and/or plant-based elements used in their healthcare environment, there remains a concern that the measures utilised by such studies are not always meaningful in a way in which healthcare practitioners and decision-makers are able to make use of. Improved data collection of meaningful metrics and better knowledge sharing is needed.

In addition to this, barriers to the actual implementation of biophilic design – utilising the assumption that it is wanted and that its implementation will be a net positive action for the healthcare body – are noted from the literature review above as falling into these key themes: Cost and maintenance concerns

- Health and safety concerns and infection control concerns – including pseudonomas, in particular Aspergillus
- Decision-makers motivation
- Uncertain policy and regulatory guidance
- Design concerns, such as space

These themes were included as barriers within the questionnaire utilised for this research project.

METHODOLOGY

Literature Review

To commence this research, a traditional review of the existing literature was undertaken. The findings of this helped to frame the questionnaire, in particular the barriers put forward for consideration.

Table 1. Literature review search criteria and repositories used

Activity	Detail
Literature search criteria	Key search terms included: biophilic design, biophilia, healthcare, cancer, hospital
Secondary search criteria	Not exhaustively, but a priority was given to articles published in peer-reviewed journals, books, or through academic institutions (e.g. domain name suffix of *.ac.uk* or international equivalents) as a marker of quality.
Repositories used	Swansea University Library, Google Schdar – these then linked to repositories such as ScienceDirect, JSTOR, Taylor & Francis and Sage Journals

QUESTIONNAIRE

A mixed methodology approach was used when devising the questionnaire – utilising both qualitative and quantitative questions to ensure that analysis of responses could provide both an illustrative, statistical outcomes as well as more in-depth detail.

> *"Because all methods of data collection have limitations, the use of multiple methods can neutralize or cancel out some of the disadvantages of certain methods. As well, the strengths of each approach can complement each other."* (Byrne and Humble, 2007.)

A method of purposive sampling was used, with participants being targeted specifically because of their profession are area of work. Purposive sampling is a useful tool to ensure a higher quality of results as a result of the "better matching of the sample to the aims and objectives of the research" which improves the "rigour of the study and trustworthiness of the data and results" (Campbell, et. at. 2020). Whilst the population to which the questionnaire was shared was large (though defined – see Participant Selection, below), the response levels were low, with 16 of each participant stakeholder group responding. No incentive was given for responding to the questionnaire. It is therefore essential to consider "whether data are interpreted from a prior frame of understanding (i.e. deductively) or not (i.e. inductively)" (Johnstone, 2004). In particular, given the low response rate, it may be considered that those who chose to respond would have some prior interest in the topic of the questionnaire. The author is open to the consideration that a feeling of 'duty' to respond may have been more keenly felt by those invested in the subject matter, and by those working within the public sector.

Two questionnaires were issued out: one to those working within Infection Prevention and Control within the Welsh NHS; another to those working within healthcare design. Participants were asked to identify whether they worked within the cancer care sphere or not. The questionnaire implemented a mixed methodology style, with questions being both qualitative and quantitative. The questionnaires build on those barriers identified in the literature review, seeking to identify: participant's views and experience of the impact of biophilic design on patients and within the healthcare system; ascertain their awareness of regulatory support for biophilic design; and to consider the impact of existing barriers, and finally input as free text any additional barriers to implementation, challenges to maintaining and improving existing biophilic design, and suggestions for overcoming such issues.

PARTICIPANT SELECTION

Participants were selected for input as follows:

- Those working within the Welsh NHS in the area of infection prevention and control – this covered: the Infection Control Lead (and, if different, Executive Lead) for each Welsh NHS Health Board and Trust; all other Infection Control roles (e.g. nursing) – identified through job titles.

- Those working within healthcare design – members of the Architects for Health forum (and participants of the European Healthcare Design conference). This was not restricted to Wales in order to ensure a wider enough field of participants.

The questionnaires were completed anonymously, and participants were assured of anonymity when invited. As the researcher is currently working on the development of a new cancer centre with biophilic design intentions, some participants were known to the researcher, and some prior discussions between designers and infection control staff had been held. Therefore, the anonymity was considered important in enabling participants to express their views with less inhibitions.

ETHICAL CONSIDERATION

Research ethical approval for the research study was acquired from the Swansea University Humanities and Social Sciences Ethics Committee (see Appendix A).

MAIN ANALYSIS

The questionnaires sought respondents' views on the barriers to biophilic design and the incorporation of plants within healthcare spaces. One questionnaire was issued to those working in Infection Prevention and Control (IP&C) within the Welsh NHS, and the second was issued to those working within healthcare architecture and design. Architects and designers tend to work on multiple projects throughout their career, across varying geographies, and therefore the scope for those working within healthcare design was broader than Wales in order to ensure a suitable level of respondents. Those registered under the Architects for Health forum were invited to respond and to share with their networks.

16 responses were received to each questionnaire (numerically, a coincidence). These will be analysed individually and then compared.

IP&C

16 responses were received from those working with IP&C in the Welsh NHS of which 3 worked within cancer care specifically. The majority of respondents worked within a non-cancer clinical setting.

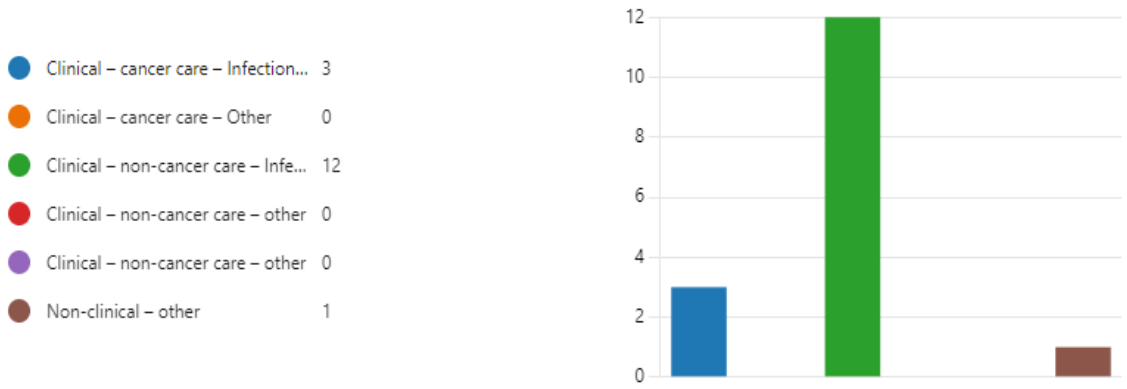


Figure 2. IP&C respondents' professional profiles

Generally, respondents were unsure (44%) of the impact of plant-based elements within a healthcare setting on the stress and anxiety levels of patients, however 50% felt that they had some impact – with 31% of the opinion that they had a significant (6%) or moderate (25%) reduction.



Figure 3. IP&C respondents' responses to "In your opinion, how does the presence of plant-based elements (such as live plants, natural materials (e.g. wood)) in the healthcare setting impact the stress and anxiety levels of cancer patients?"

Slightly less felt that there was an impact on recovery / rehabilitation – with 50% being unsure, and 44% suggesting some reduction (38% slight reduction, 6% significant reduction).



Figure 4. IP&C respondents' responses to "To what extent do you believe plant-based elements in the healthcare setting can impact the recovery / rehabilitation of cancer patients?"

In general, few IP&C staff had not experience patients expressing a desire for more natural elements within the healthcare environment (10 answering 'never / unsure'), despite the majority of staff scoring their current healthcare work environment as under 2 out of 5 (maximum) for 'integration of natural elements'.

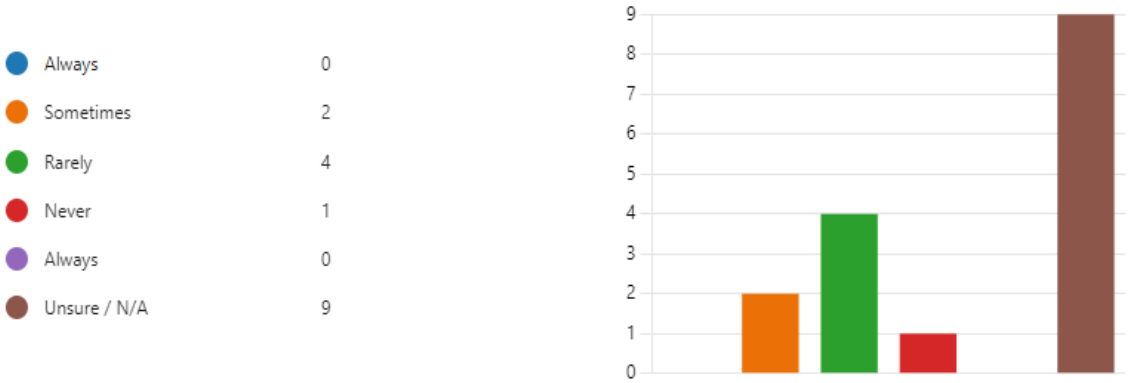


Figure 5 - IP&C respondents' responses to "In your experience, how often do cancer patients express a desire for more natural elements in their care environment?"

Additionally, the majority (81%) were unaware of policies or guidelines which would support incorporating nature into care environments, with no respondent answering in the affirmative.



Figure 6. IP&C respondents' responses to: "Are you aware of any current policies or guidelines in your healthcare setting that support incorporating nature into care environments?"

An indication that clarity might be useful in this area was found in the response from one participant, who was 'unsure' of any specific policies, but had been taught what may be an embedded position within their place of employment:

> *"I have been always taught that natural flowers or plants are prohibited within clinical areas. (wards and clinics)"*

In looking at barriers to incorporating plant-based elements into health facilities, both infection control concerns and health and safety concerns were highly ranked by IP&C respondents. Maintenance and cost were secondary concerns, regulations, management ambition and space limitation were generally ranked least important.

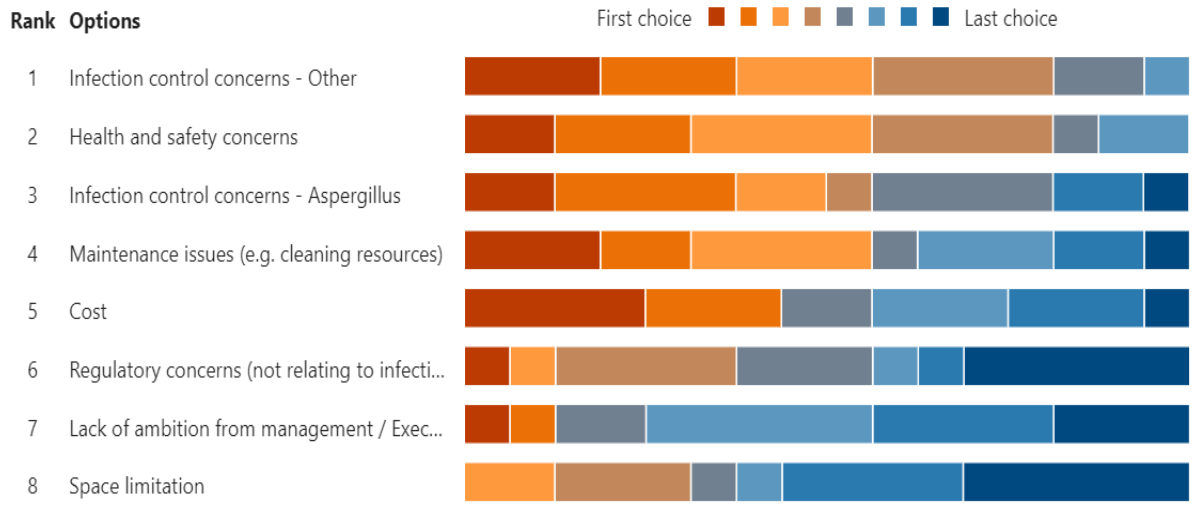


Figure 7 - IP&C respondents' ranking of barriers to integrating natural elements into cancer care settings

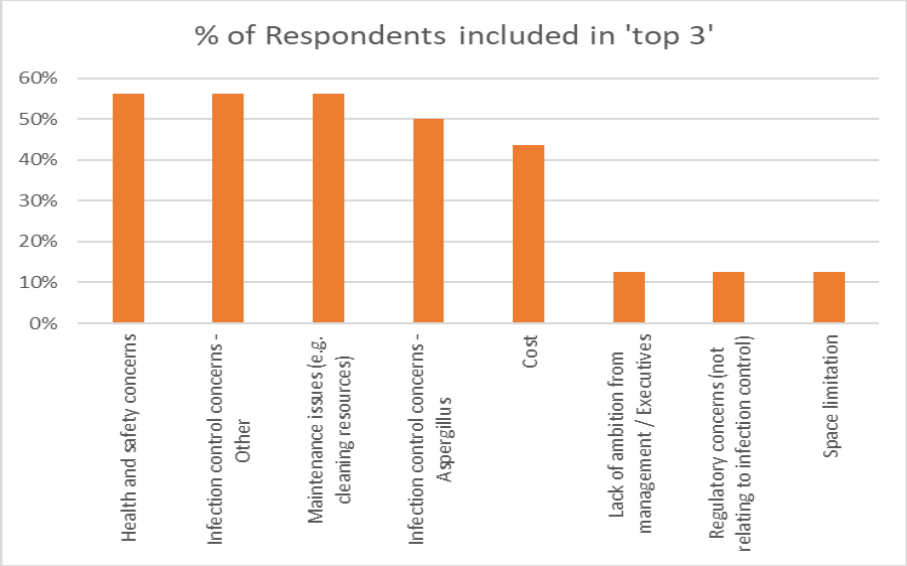


Figure 8 - IP&C respondents' barriers included in 'top three'

Two options were offered in relation to infection control – 'Aspergillus' (as noted by the NHS as being of concern in relation particularly to immunocompromised patients, such as those receiving chemotherapy treatment for cancer), and 'Other.' This, therefore, gave respondents two opportunities to select an option relating to 'Infection control' when ranking potential barriers. It is important to note that this may overrepresent the issue ('double counting' the issue), however this approach does allow for the specific issue of Aspergillus to be considered separately to other infection control concerns. There is also some merit in combining these two categories when analysing the results, in order to gain an overall picture of the importance of infection control and to avoid minimisation of other barriers at the expense of the similarity of these categories.

11 of the 16 ranked one or both Infection control concerns categories in their 'top three' barriers – with seven of those including both of them. Of those who did not include Infection control concerns in their 'top three' barriers, the focus was on Cost and Health and Safety – which remained key themes across all respondents.

The top ranked barriers to integrating natural elements into cancer care settings were noted particularly as:

Table 2. IP&C respondents' 'ranked first' barrier

Barrier	% ranked first
Infection control concerns – Other; Infection control concerns – Aspergillus	31%
Cost	25%
Maintenance issues (e.g. cleaning resources)	19%

Infection control concerns were prevalent at second- and third- ranking also:

Table 3. IP&C respondents' barriers included in 'top three'

Barrier	% ranked in top three
Infection control concerns – Other; Infection control concerns – Aspergillus	35%
Health and safety	19%
Maintenance issues (e.g. cleaning resources)	19%
Cost	15%

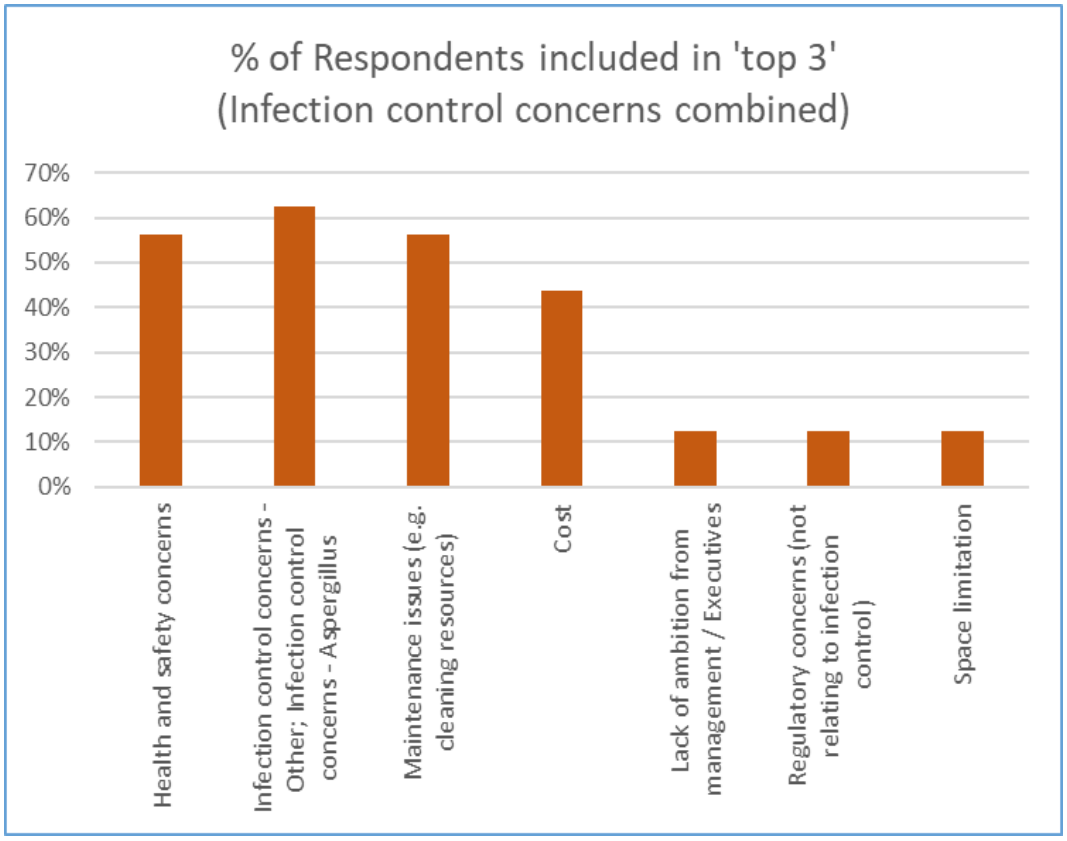


Figure 9. IP&C respondents' barriers included in 'top three' where infection control categories are combined

HEALTHCARE ARCHITECTS AND DESIGNERS

16 responses were received from those working with Healthcare Architecture and Design (hereafter referred to as 'Designers' for the purposes of brevity) – of these, seven were Healthcare Architects, two Healthcare Designers, three Healthcare design Technical Advisors, and four identified as 'Other' but with an interest in the field – including relevant academia, NHS planning, and healthcare R&D.



Figure 10. Designer respondents' professional profiles

All had experience within the UK NHS, with some also noting experience of the UK private healthcare sector, and a small number with additional experience in global healthcare (Australia, New Zealand, Canada, Peru, Cape Verde).



Figure 11. Designer respondents' primary work area

Generally, respondents felt that plant-based elements within a healthcare setting had a significant (44%) or moderate (44%) impact on the stress and anxiety levels of patients (total 88%), with only 6% suggesting a slight reduction and 6% being unsure.



Figure 12. Designer respondents' responses to: "In your opinion, how does the presence of plant-based elements (such as live plants, natural materials (e.g. wood)) in the healthcare setting impact the stress and anxiety levels of cancer patients?"

Slightly less, but still a clear majority, felt that there was an impact on recovery / rehabilitation – with 38% suggesting a significate impact, and 38% a moderate impact. 25% were unsure.



Figure 13. Designer respondents' responses to: "To what extent do you believe plant-based elements in the healthcare setting can impact the recovery / rehabilitation of cancer patients?"

It was noted by one participant that the wording of this question was not clear, and this is acknowledged by the author as an error in wording. It is proposed that for the duration of this paper, that the reading of this as a 'impact' being interpreted as 'positive' (i.e. a 'significant reduction' impact is a reduction in the time required for recovery / rehabilitation) – this was the intention of the question, the intent may be garnered from the context of the wider questionnaire questions, and the results align with those from the previous question.

69% of respondents noted that patients 'always' or 'sometimes' expressed a desire for more natural elements in their care environment. The remainder responded as 'Unsure / N/A' which may reflect that they do not interact with patients within their job role.

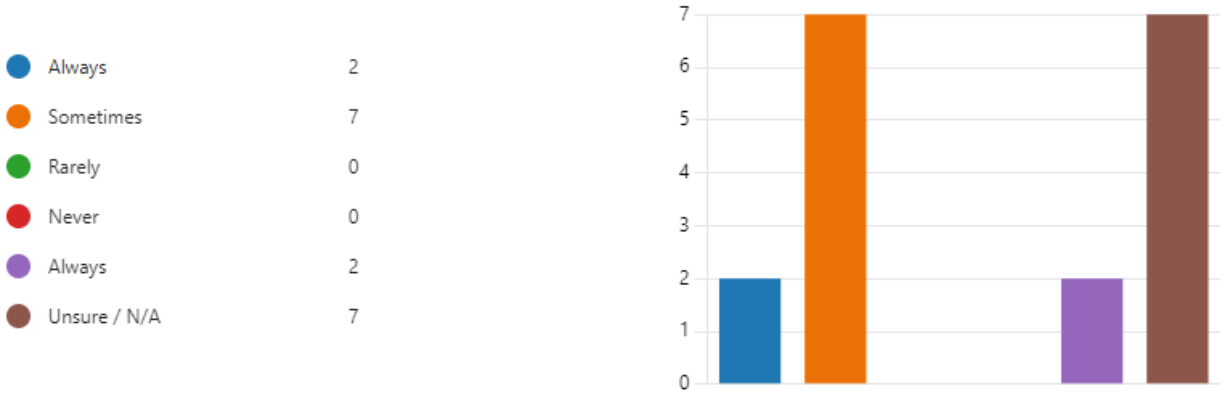


Figure 14. Designer respondents' responses to: "In your experience, how often do cancer patients express a desire for more natural elements in their care environment?"

Respondents were split in their awareness of policies or guidelines which would support incorporating nature into care environments. This may be down to interpretation of what policies or guidelines could be, and only one respondent provided specific referenced documentation, which specifically related to the use of timber in building construction. Others noted that whilst specific guidance might be lacking but that advocation by individuals and groups was sometimes present (such as hospital development 'Model of Care' documents, and the Journal of Biophilic Design).



Figure 15. Designer respondents' responses to: "Are you aware of any current policies or guidelines in your healthcare setting that support incorporating nature into care environments?"

On a similar theme to that raised by an IP&C respondent (noted above), one noted that IP&C policies "mostly state that plants cannot be used internally and also wood surfaces which cannot be cleaned with specific products cannot be used."

When asked to rank barriers to incorporating plant-based elements into health facilities, more decisive priorities were identified than the IP&C respondents. Infection control was, again, highly ranked, whilst Space limitation was clearly ranked as lowest priority, with 11 ranking it as lowest, and only one ranking it outside of their 'bottom three'.

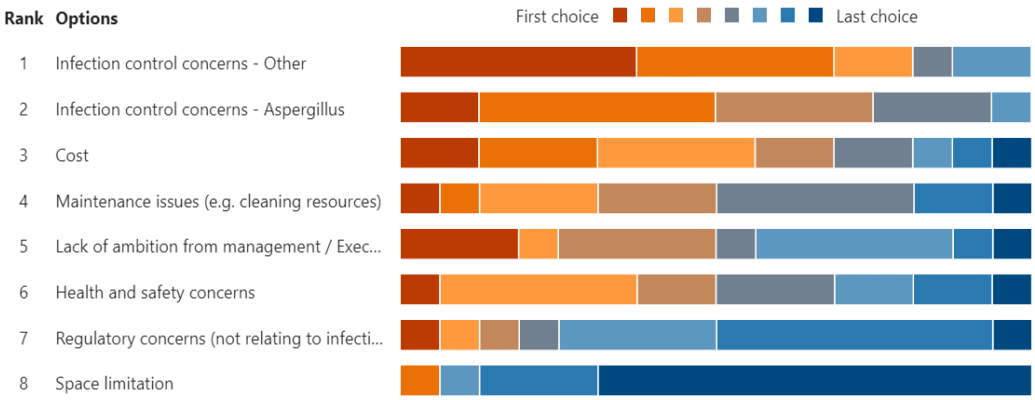


Figure 16. Designer respondents' ranking of barriers to integrating natural elements into cancer care settings

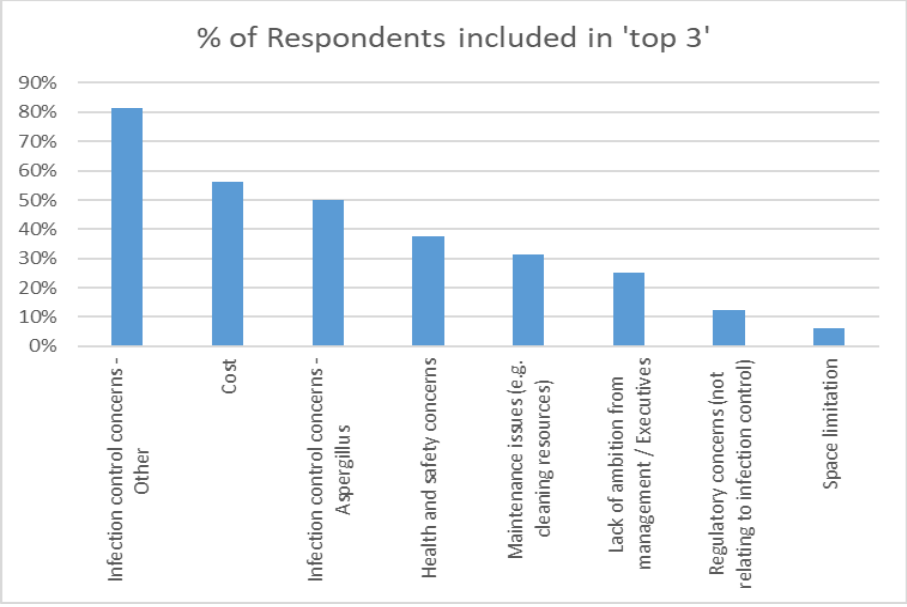


Figure 17. Designer respondents' barriers included in 'top three'

13 of the 16 ranked one or both Infection control concerns categories in their 'top three' barriers – with eight of those including both – both slight increases compared to IP&C staff.

Of those who did not include Infection control concerns in their 'top three' barriers, the focus was on Cost and Lack of ambition from management / Executives – themes which were generally spread relatively evenly across all ranks.

Table 4. Designer respondents' 'ranked first' barrier

Barrier	% ranked first
Infection control concerns - Other	38%
Lack of ambition from management / Executives	19%
Cost	13%
Infection control concerns - Aspergillus	13%

Respondents 'top three' noted Infection control concerns and Cost as highly ranked.

Table 5. Designer respondents' barriers included in 'top three'

Barrier	% ranked in top three
Infection control concerns - Other	81%
Cost	56%
Infection control concerns - Aspergillus	50%
Health and safety concerns	38%

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All respondents who included Infection control concerns – Other in their top three, also included Infection control concerns – Aspergillus in their top three. Therefore, in combining both these categories (as done with the IP&C results, above) the 'top three' themes are:

Barrier	% ranked in top three
Infection control concerns - Other; Infection control concerns - Aspergillus	81%
Cost	56%
Health and safety concerns	38%

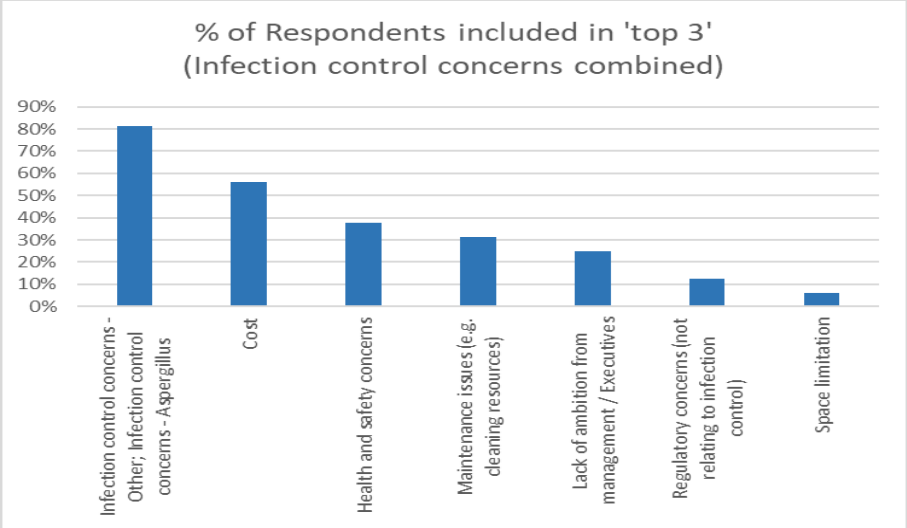


Figure 18. Designer respondents' barriers included in 'top three' where infection control categories are combined

BARRIERS PERCEIVED VS. BARRIERS EXPERIENCED

In comparing across the disciplines, it is clear that whilst IP&C perceive the main barriers to be fairly spread across cost, health and safety, infection control and maintenance; Designers perceive more clear barriers of infection control and cost – whilst health and safety and maintenance are lesser concerns. For both respondent groups lack of ambition from management / Executives, regulatory concerns and space limitation were not considered top barriers.

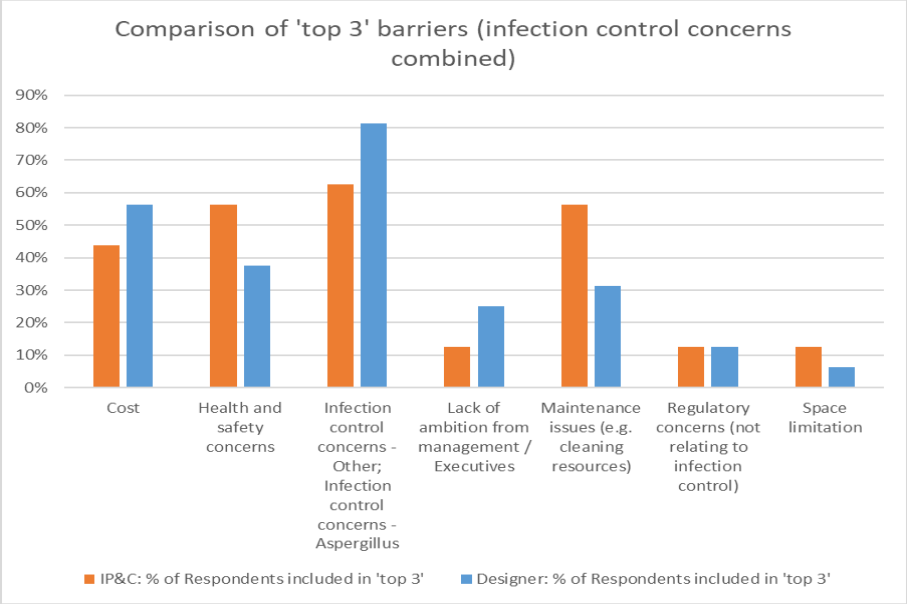


Figure 19. Comparison of respondents' 'top three' barriers

In addition to those outlined in the questionnaire, respondents were also asked whether there were additional barriers they perceived which had not been mentioned. There was a clear disparity in the responses from IP&C and Designers, with IP&C respondents noting water and soil contamination (i.e. Pseudomonas, E.coli etc) and infection risks and shelf life as additional barriers. Evidence-based research (the author interprets this as a lack of) was also mentioned, which was the only overlap with additional barriers noted by Designers. These were: a lack of knowledge amongst designers and clients, lack of expertise, lack of education and understanding. Additionally, one respondent noted a tendency to medicalise conditions and treat with drugs, rather than harnessing the benefits of nature to treat conditions and aid recovery.

In terms of actual challenges faced when trying to maintain or improve plant-based elements in the healthcare setting, the majority of IP&C respondents to this question (66%) stated that it was either not applicable to their role, or that they had not tried or considered implementing such things.

Of those who responded otherwise, three themes were identified:

- Recycling
- Cleaning – i.e. how to clean and disinfect surfaces appropriately, including whether current cleaning products would be suitable for different (plant-based) surfaces, and the cost of new surfaces and cleaning materials
- Infection control issues relating to water – noting that these bring a risk of pseudomonas which are a risk to extremely immunosuppressed patients such as those receiving chemotherapy

Designers had a lot more to say in response to this question, with 12 providing responses relating to barriers experienced in their work.

Table 6. Designer respondents' responses to: "What challenges do you face in relation to including plant-based elements when designing healthcare settings?"

Theme	Additional comments
Cost / cost cutting	Both capital and revenue (in terms of maintenance) Space restrictions
Infection prevention and control	
Culture, leadership	Culture of use in the UK Change management – i.e. day-to-day operational changes likely required – often meet with resistance Low priority
Lack of awareness and evidence sharing	Including amongst Execs and key decision makers Leads to being a low priority
Contractor resistance	
[Lack of] availability of products on the market	
Regulations and HTMs	

Designers were asked to provide details in response to an additional question: “Do you feel that these barriers and challenges vary by country, or healthcare system (e.g. NHS vs. private)?” These responses have been themed.

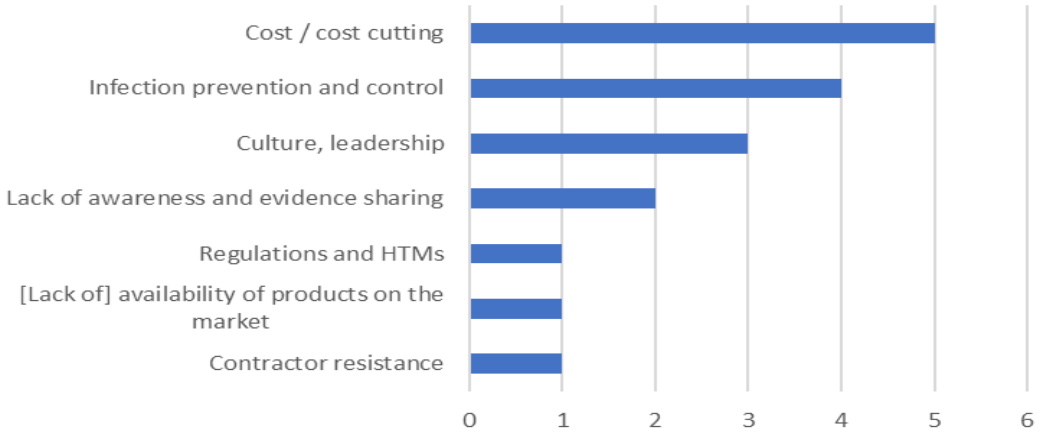


Figure 20. Designer respondents - frequency of themes mentioned in response to " What challenges do you face in relation to including plant-based elements when designing healthcare settings?"

Designers were also asked whether they had experienced these barriers and challenges varying by country or healthcare system (e.g. NHS vs private healthcare within the UK). Four noted that they were unsure or had only worked in the NHS, however 11 respondents provided detailed responses, which have been grouped into themes.

Table 7. Designer respondents' responses to: "Do you feel that these barriers and challenges vary by country, or healthcare system (e.g. NHS vs. private)? Please provide details"

Theme	Comments
Risk appetite	UK appears to be particularly "risk averse"; an example was given of a Canadian cancer centre which had (allegedly) been designed with some greenery included but was "completely removed" at the request of the IP&C team It was noted that appetites for risk "vary enormously" between countries.
Culture	A number of countries were noted as being more progressive in biophilic healthcare design: Nordics, Holland, France, Singapore, Australia. Singapore was noted a couple of times as being particularly progressive around the inclusion of plant-based design elements – they are "seen to be more respected"
Costs	Cost limitation noted for the public sector, whilst far less limiting for the private sector, who are able to prioritise design differently and opt for the more expensive options / products Also noted that the private sector is "far more open to new ideas", with the suggestion being that this is as a result of higher budgets
Politics	The risk appetites of each country are embedded in their differing legal and regulatory frameworks. It was noted that the public sector "struggle more" than the private sector, in terms of integrating biophilic design.
Geography	In environments were the weather is more extreme (in my experience heat), the need for 'protection' from that exterior is higher and the hesitation to use greenery, especially outside, is larger.
Research	It was felt that more is coming – one respondent cited good work being carried out by an English NHS body – they were unsure which, but the author suspects this may be Chelsea and Westminster (see Case Studies, below) given the volume of their work in this area.
IP&C	Infection Prevention Control policies mostly state that plants cannot be used internally and also wood surfaces which cannot be cleaned with specific products cannot be used.

In addition to the themed noted above, one respondent noted that, whilst unable to compare, they felt that the Welsh Government does not appear to practice the priorities of the Well-being of Future Generations (Wales) Act 2015.

SUGGESTIONS AND OPTIONS

Both sets of participants were asked to provide their suggestions on how to effectively incorporate more plant-based elements into cancer healthcare settings. There were some key areas of common ground – the identification and use of alternative options where the 'real thing' was not possible – for example, use of paintings and virtual images of nature. Additionally, both groups noted the need for improved information sharing and more research being undertaken and made available.

The IP&C cohort focused on alternative solutions – utilizing existing outdoor spaces, the use of paintings and images of nature in place of the real thing. However, they also kept a focus on the maintenance and infection control (hand hygiene) concerns raised earlier in the questionnaire responses.

Table 8. IP&C respondents' responses to: "Do you have any suggestions on how to effectively incorporate more plant-based elements into cancer healthcare settings?"

Theme	Further comments
Information availability	Availability/ distribution of supporting literature for relevant staff Further research
Alternative solutions	Utilising more paintings and pictures, rather than live plants Light, airy, modern environments with views to the outside
Use of outdoor space available	Plants at the entrance to healthcare settings, rather than inside Having access to a garden or courtyard Easy access to outside spaces from the ward *N.B. Cons noted:* Upkeep of these areas can be an issue Ensure not near drug preparation rooms Patients being too unwell to enjoy the garden
Alternative solutions	Utilising more paintings and pictures, rather than live plants Light, airy, modern environments with views to the outside
Hygiene	Importance of hand hygiene Patient safety must be the priority
Maintenance	Upkeep of outdoor areas Ensuring areas are managed and checked daily

The Designer cohort also suggested alternatives and easy wins, focused on utilizing evidence to influence key decision-makers.

Table 9. Designer respondents' responses to: "Do you have any suggestions on how to effectively incorporate more plant-based elements into cancer healthcare settings?

Theme	Further comments
Strong evidence base and knowledge sharing	Better evidence base to share with NHS and designers. Sharing knowledge of the benefits and demystifying the risks
Evidence-based updating of guidance	Research tied into infection control and lobbying of Government to update HBNs / HTMs Studies / updates and revision of HTMs / HBNs to give clear grounding / reassurance / basis of support. Feedback the evidence of the benefits into the development of guidance
Decision-makers training	Government / NHS should be more active in promoting bio-materials for health care buildings Secure endorsement from Welsh Govt and in particular PHW Encouraging leadership teams to think outside of the box to go above and beyond what is medicinal to improve their patients outcomes
Utilising supply chain (incl. designers)	Architectural and construction sector training would help. use contracted suppliers of green walls with maintenance contracts. Start with a substantial amount of daylight and an both a visual and actively physical relationship with an exterior environment. Greenery and plant based materials are then only sensible next steps.
Easy wins and alternative funding	Loose furniture, particularly in waiting areas, can be a very effective and easier way of incorporating plant-based finishes Receptions, hallways, other areas where infection control might not be as stringent Use virtual nature walls Use of charitable funds and "legacy" money

The theme of evidence and knowledge sharing is of particular note in this response. If a strong evidence base with a clear empirical base were to be developed, it may go some way to addressing the barriers noted in regard to infection control and health and safety. It may also influence decision-makers to support leadership direction and cost prioritisation in this area.

CONCLUSION

The questionnaire responses identify key barriers both perceived and experienced faced by healthcare architects and designers when trying to incorporate biophilic design and plant-based elements into healthcare facilities. These are, in particular, infection control concerns, and cost. The cost element may relate to the specific process of design in which this cohort is involved – which would include initial budgeting, design development, and value engineering. The budgetary side of design would be unlikely to include IP&C consultation.

Meanwhile, IP&C staff consider – understandably – infection control as a key concern and barrier to plant-based elements being further incorporated into healthcare settings in addition to health and safety matters. Additionally, they hold consider cost and maintenance to hold more weight as blockers to this than designers necessarily have experienced.

Whilst this paper sought to additionally consider the specific issues faced within the realm of cancer care, restrictions in terms of the numbers of respondents who work within this sphere are noted. Specific mention was provided by some IP&C respondents in particular of concerns which relate especially to patients who are immunocompromised. A large proportion of the immunocompromised patient population would be those undergoing cancer treatment, but it is recognised that this is something that also affects other patient communities and may therefore be applicable to the broader secondary and tertiary healthcare context.

In considering the suggestions to overcome such barriers and improve the incorporation of biophilic design and plant-based elements within a healthcare setting, the evidence gathered from the questionnaire notes a key gap in this area of design and study: clear, empirical evidence to support the incorporation of biophilic design and plant-based elements into healthcare settings, in particular where infection control is heightened, such as areas in which immunocompromised patients are treated. This lack of clear evidence was considered in the literature review, and upon reflection, there is a strong argument to be made for having included it as a barrier within the initial questionnaire.

Additionally, there is uncertainty by IP&C staff in the clinical spaces as to whether this is something patients want in their healthcare settings. Future study could look at whether this is something wanted more by designers than patients.

Should biophilic design and the use of plant-based materials be something that the Welsh NHS want to incorporate further into their healthcare facilities, there are some clear trailblazing projects which can be considered as examples of good practice. A table is provided below, referencing these examples.

In addition, clear consideration is needed to improve the quality of the empirical evidence based in order for it to give confidence to decision-makers to influence policy changes. Alongside this, improvements in information and knowledge sharing must be made.

The pathway to success for those who wish to incorporate plant-based materials and biophilic design into the healthcare sphere is therefore logical. The path can be trod concurrently with the implementation of easy wins, use of existing facilities, and continuation of good practice. What is important is ensuring that the empirical evidence obtained not only allays IP&C concerns, but assures in a meaningful way that there is a true prize to be realised in the implementation of biophilic design throughout healthcare facilities.

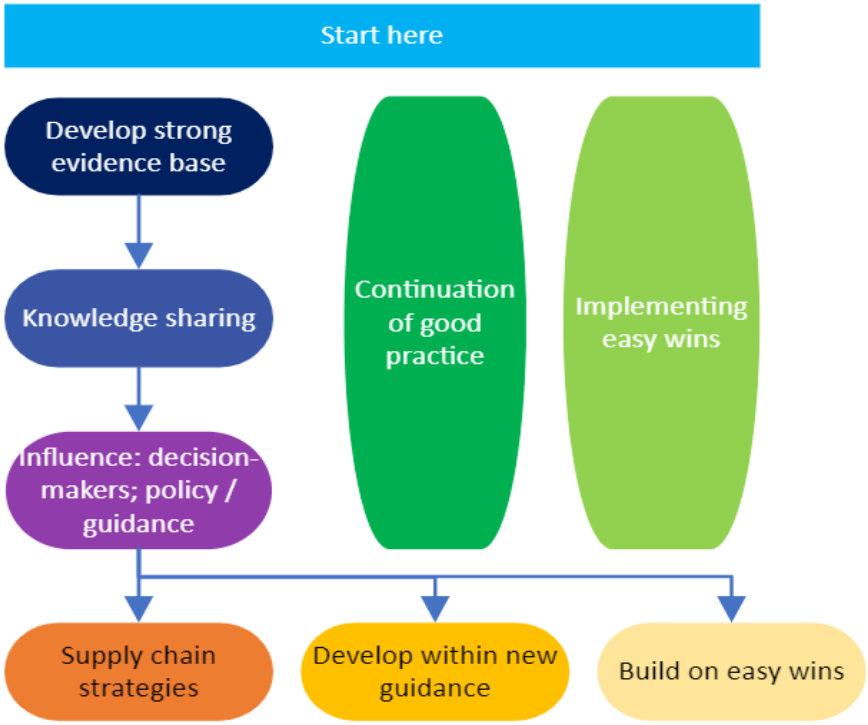


Figure 21. A logical pathway

TABLE OF GOOD PRACTICE

The following is a small sample of good practise exemplars and studies available to the reader. Further reading is provided in the Bibliography.

Table 10. Table of Good Practice

Project	Detail and Reference
Case Study: Kho Teck Puat – Singapore	Referenced by a number of respondents, the design of Khoo Teck Puat hospital in Singapore incorporates considerable self-sustaining and practical gardens. The building "questions the reductive nature of restricting planted areas" offering instead an alternative: a "hospital in a garden, garden in a hospital". These gardens enable patients to seek privacy, engage with nature, exercise and socialise, whilst also offering biodiversity benefits, opportunities for water reuse and food production (Schröpfer, 2015).
Case Study: Chelsea and Westminister Greenhaven	Closer to home – and with a more similar climate to that of Wales, Chelsea and Westminster Hospital, the Greenhaven indoor garden was created with infection control in mind, ensuring plants were safe and pest-free. This space provided stress relief and helped staff and patients connect with nature, improving overall mental health and recovery. (Dobson, 2022.)
Information and Knowledge Sharing: 'Obstacles to research translation: Piloting a new method to advance healthcare environments research'	A "methodological innovation aiming to deliver a comprehensive understanding of how research is sourced, generated, and applied in architectural practice; to identify the obstacles to implementing evidence in the healthcare design process; and prototype strategies to improve research translation, including through closer collaboration between architectural practitioners and academic researchers." (McLaughlan, 2024.)
Information and Knowledge Sharing: 'Identifying barriers and facilitators of translating research evidence into clinical practice: A systematic review of reviews'	This review seeks to "synthesise existing literature to elucidate the barriers and facilitators to the translation of health research into clinical practice." It thereby provides a useful reference in

	relation to influencing matters adjacent to clinical practice, including healthcare design. (Abu-Odah, et. Al., 2022)
Information and Knowledge Sharing: 'Knowledge management and innovation management: best practices in knowledge sharing and knowledge value chain'	A corporate perspective – a useful reference for harnessing the power of knowledge sharing as a tool to create a competitive edge – which can be implemented into healthcare settings to drive contiuous improvements. (Lee, 2016.)

RECOMMENDATIONS

From the review of the literature and questionnaire results, a numebr of key recommendations based on the emerging themes have been identified which are proposed to further the incorporation of biophilic design and plant-based materials within healthcare settings, included even those facilitating immunocompromised patients such as cancer care centres. These have been categorised into five themes, which can be considered both as a chronological action plan and also on their own.

IMPROVING THE MEANINGFUL EVIDENCE BASE

INCLUDE IP&C IN RESEARCH DEVELOPMENT

There is a clear need to improve the empirical evidence base to support biophilic design and the use of plants and plant-based materials within healthcare facilities, particularly in relation to tertiary case and areas in which immunocompromised patients are treated. This evidence must establish whether the following can be supported a) patient interest, b) patient benefit, and c) safety with regards to IP&C concerns relating to Aspergillus and pseudomonas.

In developing this research, the inclusion of IP&C colleagues should be direct from the start. Whilst much research has been developed in this area (particularly as relates to a) and b), above), it is not widely accepted within IP&C and therefore their input is essential in crafting and developing studies which can produce meaningful measurements in terms of results. An agreement as to the measurements and baselines for acceptability to progress research is essential to ensure that if studies produce findings in favour of increased plant-inclusion within a healthcare setting – these findings are accepted by those who need to professionally agree to the IP&C and health and safety elements of this.

DEVELOP ACTIONABLE OUTCOMES

Further research should be undertaken into confirming which plants and plant-based materials are safe for use within healthcare settings – i.e. which would have not adverse impacts on immunocompromised patients nor risk Aspergillus or pseudomonas. Again, this must be done in conjuction with IP&C teams to confirm a baseline level of acceptability. The production of a clear list of plants and products which can be utse within each sterility 'level' of healthcare areas would be a useful reference for IP&C teams and designers alike – and would be a strong tool to support decision-makers in refreshing national guidance, e.g. WHBNs/HBNs. A consideration of the maintenance requirements of each plant / material should also be given.

IMPROVING KNOWLEDGE SHARING

All the above must be widely shared in a methodolical way to ensure broad coverage amongst those working within all relevant spheres to this: decision-makers within government and the Welsh NHS, IP&C teams, designers across the healthcare landscape, and patients.

Lessons learnt and, in particular, in-person visits for teams looking to implement design changes in this area, are essential. Much creedence is given to the in-person experience within the existing literature, and IP&C teams must be included in design visits to exemplar projects. This enables a collective vision for the art of the possible, and ambitious co-design within IP&C tolerance limits.

CREATING STRATEGIC PRIORITISATION

EVIDENCE-BASED POLICY DEVELOPMENT

Once clear and agreed evidence has been developed, key policy decision-makers must be presented with this to inform updates to existing guidance. The framing of this may be done with a broader view in mind – where possible, campaigners should seek to identify how the increased incorporations of plant-based materials within healthcare settings can meet other policy goals – such as those of the Well-being of Future

Generations (Wales) Act, the Environment (Wales) Act, and the strategic emphasis of Value-Based Healthcare.

POLICY-BASED STRATEGY DEVELOPMENT

If movements to update policy and guidance have been successful, the next step will be to ensure that NHS planners and strategists are incentivised to include biophilic design and the inclusion of plants and plant-based materials within the Health Board / Trust's strategic direction. For example, inclusion within their Integrated Medium Term Plans, or within their Well-being Objectives or Sustainabilty Goals.

This then needs to be realised through action – with biophilic design as a core consideration in facilities development. Within the Business-As-Usual side of a Health Board or Trust this may apply in particular to Estates and Operational Teams rather than Clinical teams in particular.

REMOVING COST CONCERNS

UTILISING PROCUREMENT LEVERS

Key to the success of implementing biophilic design and plant-based materials will be ensuring that it does not have an adverse impact on already-stretched NHS budgets. Utilisation of key levers within procurement can help here. Guidance from government and within the NHS can require tenders to be drafted in ways which favour bidders with plant-based offerings.

IDENTIFYING NO-COST OPTIONS

To support organisations to implement priorities in this regard, effort should be made by policy-makers and Health Board / Trust strategists to help develop a resource detailing no- and low-cost options for incorporating plant-based materials into healthcare settings. These could include utilising existing resources with new focus – for example, Arts in Health Coordinator roles could be given a mandate to focus on plant-based activities and products. Value-Based Healthcare teams can undertake scoping exercises to consider the medium- and longer-term savings possible through various options based on predicted PROMs where the impact of access to nature is considered.

The use of charitable funds and other grant funding available where it is earmarked within a certain usage relevant to biophilic design and plant use may be considered also.

Is it essential that in the development of any options the ongoing revenue, maintenance and lifecycle costs are considered.

REALISING CULTURAL SHIFTS

LEARNING LESSONS TO ADDRESS CHANGE

Change management is a challenge for most organisations. Within high-pressure, high-stakes environments such as the NHS and patient care, change may be feared by staff already stretched to their maximum capacity. Considerable effort must be made to look to learn lessons from abrodad – particularly in countries noted by the designer respondents as being of a notably different culture to the Welsh NHS in terms of the use of plants in healthcare facilities and risk profiling. Of course, these should be considered in the context of patient outcomes and well-being measures to ensure.

Such lessons learnt should be contextualised into the prioritisies of the Well-being of Future Generations (Wales) Act to ensure strategic alignment across the Welsh public sector, governance, and the Welsh NHS.

A HOLISTIC JOURNEY OF CHANGE

A shift in culture is hard, and it is essential to ensure that those of whom the change is demanded are brought along for the full journey. Staff and patients must be included in the realisation of all the above recommendations to the greatest extent possible. Any update to guidance and policy must be done in the spirit of enabling and collaborating, not restricting. A focus must be on co-development, co-design, and a collaborative realisation of change. Only then will success be realised.

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Appendix D: Research Ethics Approval

Swansea University
Prifysgol Abertawe

Approval Date: 13/07/2024

Research Ethics Approval Number: 1 2024 10979 9665

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	Examining barriers to incorporating nature into cancer healthcare settings
Applicant name	MISS HANNAH MOSCROP
Submitted by	MISS HANNAH MOSCROP /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/13085

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Appendix B: Questionnaire issued to IP&C Professionals within NHS Wales



Examining Barriers to Incorporating Biophilic Design into Cancer Healthcare Settings.

This survey seeks the views of those working within Infection Prevention and Control in a healthcare setting about biophilic design.

Biophilic design is a concept used within the design and construction industry. It aims to increase connectivity to the natural environment for those using a building through the use of direct nature, indirect nature, and space and place conditions within that building's design.

This can include the incorporation of plants and natural materials (e.g. wood) into spaces.

* Required

1. I currently work in: *

- ◯ UK NHS – Wales, England, Scotland, Northern Ireland (HSC)
- ◯ UK Private Healthcare – Wales, England, Scotland, Northern Ireland
- ◯ Other healthcare system

2. If you selected 'Other healthcare system', please detail country/region:

3. I work in: *

- ◯ Clinical – cancer care – Infection prevention and control
- ◯ Clinical – cancer care – Other
- ◯ Clinical – non-cancer care – Infection prevention and control
- ◯ Clinical – non-cancer care – other
- ◯ Clinical – non-cancer care – other
- ◯ Non-clinical – other

4. In your opinion, how does the presence of plant-based elements (such as live plants, natural materials (e.g. wood)) in the healthcare setting impact the **stress and anxiety levels** of cancer patients? *

- ◯ Significant reduction
- ◯ Moderate reduction
- ◯ Slight reduction
- ◯ No impact
- ◯ Unsure

5. To what extent do you believe plant-based elements in the healthcare setting can impact the **recovery / rehabilitation** of cancer patients? *

- ◯ Significant reduction
- ◯ Moderate reduction
- ◯ Slight reduction
- ◯ No impact
- ◯ Unsure

6. In your experience, how often do cancer patients express a desire for more natural elements in their care environment? *

- ◯ Always
- ◯ Sometimes
- ◯ Rarely
- ◯ Never
- ◯ Always
- ◯ Unsure / N/A

7. How would you rate your current healthcare setting in terms of its current integration of natural elements?

5 = excellent, 1 = very poor

☆ ☆ ☆ ☆ ☆

8. Are you aware of any current policies or guidelines in your healthcare setting that support incorporating nature into care environments? *

- ◯ Yes
- ◯ No
- ◯ Unsure

9. If you answered 'Yes' to the above, please provide details:

10. What do you perceive as the biggest barriers to integrating natural elements into cancer care settings? Please rank from order of most important (1) to least important (8). *

- Cost
- Infection control concerns - Aspergillus
- Infection control concerns - Other
- Health and safety concerns
- Lack of ambition from management / Executives
- Maintenance issues (e.g. cleaning resources)
- Regulatory concerns (not relating to infection control)
- Space limitation

11. Is there anything you consider is missing from the above list (Question 10), and if so, where would you rank it?

12. What challenges do you face when trying to maintain or improve plant-based elements in your healthcare setting?

13. Do you have any suggestions on how to effectively incorporate more plant-based elements into cancer healthcare settings?

Appendix C: Questionnaire issued to Healthcare Architects and Designers



Examining Barriers to Incorporating Biophilic Design into Cancer Healthcare Settings

This survey seeks the views of those working within Healthcare Design and Architecture about biophilic design.

Biophilic design is a concept used within the design and construction industry. It aims to increase connectivity to the natural environment for those using a building through the use of direct nature, indirect nature, and space and place conditions within that building's design.

This can include the incorporation of plants and natural materials (e.g. wood) into spaces.

* Required

1. I currently work as: *

- ◯ Architect – healthcare
- ◯ Designer – healthcare
- ◯ Technical Advisor – healthcare
- ◯ Other

2. If you answered 'Other' and / or work in a particular design specialism, e.g. cancer care, please specify: *

3. My work is mostly based in (select all that apply): *

- ☐ UK NHS – Wales, England, Scotland, Northern Ireland (HSC)
- ☐ UK Private Healthcare – Wales, England, Scotland, Northern Ireland
- ☐ Non-UK country / countries / region (e.g. EU, Asia) – public healthcare
- ☐ Non-UK country / countries / region (e.g. EU, Asia) – private healthcare

4. If you answered 'Non-UK' to Question 3 - please detail countries / regions:

5. In your opinion, how does the presence of plant-based elements (such as live plants, natural materials (e.g. wood)) in the healthcare setting impact the **stress and anxiety** levels of cancer patients? *

- ◯ Significant reduction
- ◯ Moderate reduction
- ◯ Slight reduction
- ◯ No impact
- ◯ Unsure

6. To what extent do you believe plant-based elements in the healthcare setting can impact the **recovery / rehabilitation** of cancer patients? *

- ◯ Significant reduction
- ◯ Moderate reduction
- ◯ Slight reduction
- ◯ No impact
- ◯ Unsure

7. In your experience, how often do cancer patients express a desire for more natural elements in their care environment? *

- ◯ Always
- ◯ Sometimes
- ◯ Rarely
- ◯ Never
- ◯ Always
- ◯ Unsure / N/A

8. Are you aware of any current policies or guidelines in your healthcare setting that **support** incorporating nature into care environments? *

- ◯ Yes
- ◯ No
- ◯ Unsure

9. If you answered "Yes" to the above, please provide details:

10. What do you perceive as the biggest barriers to integrating natural elements into cancer care settings? Please rank from order of most important (1) to least important (8). *

- Cost
- Infection control concerns – Aspergillus
- Infection control concerns – Other
- Health and safety concerns
- Lack of ambition from management / Executives
- Maintenance issues (e.g. cleaning resources)
- Regulatory concerns (not relating to infection control)
- Space limitation

11. Is there anything you consider is missing from the above list (Question 10), and if so, where would you rank it?

12. What challenges do you face in relation to including plant-based elements when designing healthcare settings?

13. Do you feel that these barriers and challenges vary by country, or healthcare system (e.g. NHS vs. private)? Please provide details

14. Do you have any suggestions on how to effectively incorporate more plant-based elements into cancer healthcare settings?

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About the Author

Hannah Moscrop. Hannah works as a Project Manager for the new Velindre Cancer Centre Project within Velindre University NHS Trust. Their interests include innovation in healthcare design and social value.

Optimising Lower GI Referral Pathways in NHS Wales: Evaluation of Automation on Efficiency, Service Delivery, and Patient Outcomes

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Abstract:

The National Health Service (NHS) in the UK, known for its high-quality care and accessibility, faces increasing challenges due to rising patient numbers, a growing prevalence of chronic diseases, and demands for timely interventions. Referral pathways for specialised care, particularly in lower gastrointestinal (GI) services, are under immense pressure. In Wales, these pathways are often overcrowded and marked by inconsistent use of standardised templates and poor data sharing, leading to significant delays in diagnosis and treatment, particularly for conditions like colorectal cancer. Early intervention is critical, and inefficiencies in the referral process compromise patient outcomes and place a heavy burden on healthcare resources.

This study explores the potential benefits of automating lower GI referral systems within NHS Wales, a strategy that has already shown promise in streamlining both administrative and clinical processes in other healthcare contexts. Automation could mitigate inefficiencies by standardising referral templates, reducing human errors, and improving data-sharing capabilities between primary and secondary care. Drawing on stakeholder interviews, including healthcare professionals and patients, alongside a comprehensive literature review, this research identifies the current challenges in lower GI referral processes and the transformative potential of automation to enhance service delivery.

The findings highlight key areas where automation can improve the efficiency and accuracy of lower GI referrals, thus reduce administrative burdens and enable quicker triaging and prioritisation of high-risk patients. The analysis also underscores the importance of system interoperability, where integrating primary and secondary care systems is essential for the seamless sharing of referral data. Stakeholders identified cultural barriers, such as clinician resistance to new technologies, as a significant hurdle to automation adoption. To address this, the study recommends involving clinicians in the design and implementation process, coupled with comprehensive training and support.

Cost implications are also considered, as the initial investment in IT infrastructure and automation is substantial. However, long-term cost savings from reduced administrative overheads, faster diagnosis, and improved patient outcomes present a strong case for automation. Additionally, automation holds the potential to improve patient experiences by offering real-time updates on referral status, reducing anxiety related to waiting times and enhancing transparency.

The study concludes with a series of recommendations, emphasising the need for NHS Wales to prioritise system interoperability, invest in infrastructure, and ensure comprehensive training programs for clinicians. A focus on digital inclusion is also essential, ensuring that patients who may struggle with technology are supported. By addressing these challenges, automation has the potential to revolutionise lower GI referral pathways, improving both the quality of care and the efficiency of healthcare service delivery in Wales.

Keywords: Automation, Service Delivery, Patient Outcome, Efficiencies, Data Sharing, Interoperability, Colorectal Cancer, Referral Pathways, Healthcare Innovation, Primary Care, Secondary Care, Process Improvement, Patient Triage, Diagnostic Delay, Healthcare Transformation, Interviews, Cost Implication.

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Introduction

The UK's National Health Service (NHS) is a world-leading healthcare system, recognised for its professional excellence, cutting-edge diagnostic facilities, and accessibility to all communities free of charge. However, with a growing population, an increase in chronic diseases, and rising demand for timely and effective care, many key services within the NHS are under constant pressure (Adler-Milstein, Everson, & Lee, 2013). These challenges have drawn attention to inefficiencies inherent in traditional models of healthcare delivery, particularly in referral processes for specialised care, such as lower Gastrointestinal (GI) services. With increasing patient demand, referral pathways for lower GI issues are often overcrowded, the use of standardised templates is inconsistent, and there is poor data sharing (Buntin, Burke, Hoaglin, & Blumenthal, 2011). These issues can result in significant delays to diagnosis and treatment, which is particularly concerning serious conditions like colorectal cancer, where early intervention is crucial for patient outcomes.

As healthcare systems become more complex, innovative solutions are required to optimise workflows while maintaining high standards of care. One such solution is automation, which has already shown potential to streamline both administrative and clinical processes (Holden & Karsh, 2010). Lower GI services involve all segments of healthcare, starting from primary care (GPs) through to secondary care involving diagnostics, medical, and surgical units. Lower GI diagnostic services and treatments often require long-term management, meaning each patient adds to the service workload over several years. With recent advancements in machine learning and the use of big data, the lower GI referral process is well-suited for automation. The goal is to fast-track the diagnostic journey, identify key parameters to streamline the process, and prioritise service delivery according to patient needs and service capabilities. Automation has the potential to address current inefficiencies in the lower GI referral process by reducing manual workload and errors while enhancing overall efficiency (Topol, 2019).

This study reviews and analyses the challenges in lower GI referrals within NHS Wales, derived from data collected through Questionnaires and interviews with stakeholders including clinicians, patients, GPs, hospital staff, and management teams. The data collection aimed to identify key challenges in the current process, explore options for automation, and consider how it could improve lower GI referral processes and service delivery. The study provides a detailed report on the current referral process, the challenges identified through Questionnaires and interviews, and how automation could be implemented, with recommendations for future work.

Introduction to the Research Topic

The referral system for lower GI conditions is critical for timely diagnosis and treatment, particularly for serious diseases like colorectal cancer. In the UK, colorectal cancer is the fourth most common cancer, with over 42,000 new cases diagnosed each year (Cancer Research UK, 2023). In Wales, bowel cancer accounts for around 2,600 new cases annually, making it one of the most prevalent cancers in the country (Public Health Wales, 2022). Early diagnosis is vital, as colorectal cancer diagnosed at stage 1 has a five-year survival rate of over 90%, but this drops to less than 10% when diagnosed at stage 4 (NHS England, 2023).

The increasing number of cases places significant strain on the referral system due to inconsistent data submission and fragmented care pathways. These challenges are further exacerbated when diagnostic procedures are outsourced to non-specialist care providers. In 2023, cancer referral targets in NHS Wales faced notable difficulties. For urgent cancer referrals, only 70% of patients were seen within the target timeframe of two weeks, a decline from 78% in 2022 (NHS Wales, 2023). Additionally, delays in diagnostic endoscopy procedures, with only 42% of patients seen within the eight-week target in 2023, compared to 56% in 2022, reflect systemic issues (NHS Wales, 2023). These inefficiencies not only burden the healthcare system but also negatively impact patient experiences, causing delays and uncertainty for those who need urgent care.

Streamlining the lower GI referral pathway within NHS Wales is essential to ensure timely, high-quality care and to improve patient satisfaction. Automation in pathways can streamline data entry and triage, potentially saving up to 15% in operational costs by reducing administrative errors and shortening referral times. This efficiency has been demonstrated in similar systems, where the introduction of automated pathways has sped up diagnosis times, improved outcomes, and reduced costs (British Journal of Surgery, 2023).

This research focuses on identifying the key challenges within the current system and exploring the potential for automation to improve the referral process. It aims to propose actionable solutions that enhance healthcare service delivery and patient outcomes in Wales

Research Methodology

The study employed a two-pronged approach to understand the current challenges and opportunities for improvement in the lower GI referral process in Wales. This approach consisted of structured interviews with key stakeholders in the Welsh healthcare system, alongside a comprehensive review of existing literature on healthcare automation and referral processes.

The rationale behind using this dual method was to ensure a holistic understanding of both the practical, real-world challenges faced by healthcare professionals and the broader research context. Stakeholders such as GPs, colorectal surgeons, and gastroenterologists provided valuable insights into the operational inefficiencies, bottlenecks, and potential areas for technological intervention within the referral process. Meanwhile, the literature review helped to situate these findings within the context of research on healthcare digitisation and automation, offering evidence-based strategies that have been successful in other healthcare systems.

By combining qualitative data from interviews with existing research, this approach enabled the study to cross-validate findings and ensure that the proposed recommendations were both contextually relevant and supported by existing literature. Thematic analysis, as described by (Bernard and Clarke, 2019), was employed to identify key themes from the interviews, allowing the integration of stakeholder perspectives into the research findings. This method ensured that the study addressed not only theoretical challenges but also practical barriers to implementing automation in the lower GI pathway.

Stakeholder Interviews

The primary research method involved structured interviews with key stakeholders involved in the referral process, such as GPs, colorectal surgeons, gastroenterologists, Clinical Nurse Specialists (CNS) in secondary care, management staff, and patients. These stakeholders have direct involvement in the pathway and Important Impact on the Management and Processing of Referrals.

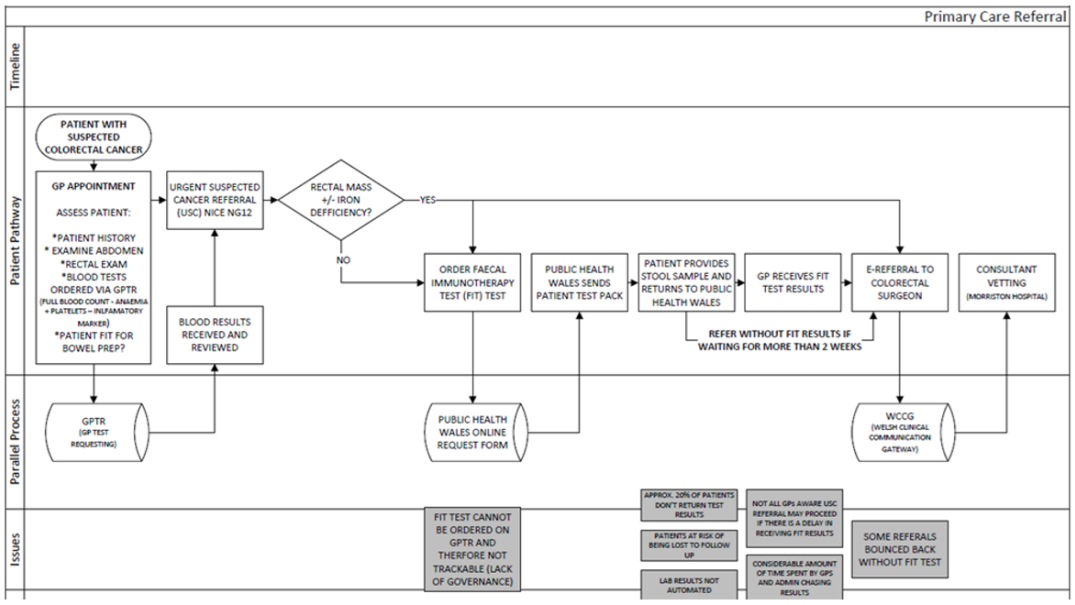


Fig1: Amgen consultancy, February 2024).

A process map of the Lower GI pathway (Fig 1), from primary to secondary care, highlights the complexity of this process, with each of these stakeholders contributing to various stages. Their direct involvement makes them the most appropriate participants for this research, ensuring a comprehensive understanding of the challenges and opportunities within the referral pathway. These interviews provided valuable insights into the inefficiencies of the system and potential areas for improvement. The questions were structured to focus on the following key areas.

Current Referral Process: Understanding how the current referral process operates, covering all stages involved in referring patients from primary to secondary care, and the tools and systems used for managing patient data. (Hysong et al, 2011)

System Challenges: Identifying pain points such as incomplete referrals, high patient volumes, inconsistent use of templates, and the fragmentation caused by outsourcing diagnostics. (Greenhalgh, T, 2004)

Perceptions of Automation: Gaining insights into stakeholders' views on how automation could be utilised in the referral process. This included thoughts on improving workflows, reducing delays, and where automation could most effectively be implemented. (Harno k, 2000)

Quality of Care: Emphasising the impact on patient care, with a focus on how delays in the referral process could adversely affect outcomes. Automation could help address this by streamlining elements of the process, such as referral triage or data validation, while maintaining patient safety and quality of care as top priorities. (Bodenheimer T, 2008)

Technological Alignment: Examining the need for better alignment between the various technological systems used within healthcare services. Challenges with integrating data from primary care systems (like electronic health records) and secondary care systems (like hospital management systems) were explored. The lack of interoperability between these systems leads to data fragmentation and delays in diagnosis and treatment pathways. (Furukawa, M., 2014)

Training and Adaptation: The importance of proper training and a culture of adaptation amongst healthcare professionals was highlighted. The research explored potential barriers, such as resistance to change or lack of technical skills, and suggested solutions to overcome these challenges. (Gagnon, M , 2014)

Recommendations for Improvement: Gathering practical suggestions from healthcare professionals on how the current system could be improved, with a focus on enhancing efficiency and improving patient outcomes. (Bates, D. W, Gawande, A. A. (2003)

These interviews provided essential details regarding the challenges affecting the lower GI referral process. They also shed light on how these challenges impact both healthcare professionals and patients, whose need for timely diagnosis and treatment is paramount. Stakeholder engagement was conducted through in-person interviews and written questionnaires, providing a comprehensive understanding of the key issues.

Literature Review

In addition to the interviews, a literature review was conducted using the ScienceDirect and Scopus platforms to search for relevant journals and published papers. The ResearchGate portal was also used to put the interview findings into perspective within the broader research on healthcare automation of referral systems. Alongside the automation of referral systems, the review explored criteria related to digitisation in healthcare, its impact on patient experience, and clinical risk monitoring through automated workflows. This provided a broader context of the challenges faced by the Welsh health system as well as highlighting possible solutions that have already been successfully implemented within other health systems worldwide. It provided an overview of the automation of health referral systems, in terms of challenges and opportunities that were seen, apart from lessons learnt from other regions.

The literature review focused on main themes: automation of healthcare, standardisation of data, interoperability of systems, cultural challenges in adopting automation, and recommendations on improving service delivery. It also analysed the existing referral pathways, key challenges, and barriers to smooth service delivery that will help in highlighting opportunities for transitioning to automation.

The insights identified through interviews and literature review were analysed in the context of lower GI service of NHS Wales. This research thus intends to present a comprehensive understanding of the current referral system along with the potential of automation regarding the identified challenges. The study also discusses real world implications for implementing automation in Welsh lower GI service delivery.

Analysis of the Responses and Literature Review

Results & Discussion

To provide a detailed analysis of the questionnaire responses and literature review concerning the automation of referral systems, primarily in lower gastrointestinal (GI) pathways within healthcare systems

like NHS Wales. It is essential to systematically dissect the benefits and challenges identified through stakeholder feedback and existing literature. The analysis will cover the key themes: operational efficiencies, clinical outcomes, data standardisation, system interoperability, cultural and implementation barriers, and patient experiences. Each section will examine both the insights gained from the questionnaire responses and how they align with or diverge from the broader academic literature on healthcare automation.

Referral Systems: Efficiencies and Accuracy

One of the dominant themes from the questionnaire responses and literature review revolves around how automation can improve referral system efficiencies and accuracy. In traditional, non-automated referral systems, errors and delays are often due to incomplete or inaccurate data submissions. The literature confirms that this is a widespread issue, particularly in lower GI pathways where timely interventions can drastically impact patient outcomes (Marshall et al., 2013). The potential to alleviate these inefficiencies through automation is one of the strongest arguments in favour of its implementation.

Stakeholder responses overwhelmingly indicated that many current referral systems are inefficient due to their manual nature, leading to significant administrative burdens. A clinician described the current system as “chaotic and unstandardised,” with communication often occurring in a “back-and-forth manner” (Respondent Gastroenterologist). This inefficiency contributes to delays, a problem confirmed by previous research, which indicates that automation can streamline data collection, ensuring all necessary information is captured in a more structured and standardised format (Topol, 2019) (Reddy et al., 2020).

The use of standardised referral templates, which are a common feature of automated systems, has been shown to reduce errors in data submission. In NHS Wales, the introduction of such templates reduced referral errors by 25%, highlighting the importance of uniformity in the referral process (O'Mahony et al., 2018). Several respondents to the questionnaire supported this, noting that automation could mitigate the “chaos” of non-electronic systems by ensuring that all relevant information is included at the time of submission. One nurse practitioner said, “Automation may result in the inclusion of all needed information, which could eliminate the need for subsequent requests and likely improve turnaround time” (Respondent CNS Nurse).

The potential for automation to enhance efficiency is not only a matter of reducing errors but also one of improving the speed of the referral process. NHS England, for example, experienced a 17% decrease in referral times following the implementation of automation systems (NHS Digital, 2021). The literature and stakeholder responses both underscore this point, agreeing that faster referrals mean earlier diagnosis and treatment, particularly critical in lower GI pathways, where early detection significantly improves survival rates.

Impact on Patient Outcomes

The second major theme identified in the analysis concerns the impact of automated referral systems on patient outcomes. Stakeholders and the literature align in suggesting that automation can lead to better patient outcomes by minimising delays in diagnosis and treatment. This is particularly relevant for lower GI conditions like colorectal cancer, where early intervention is vital for improving survival rates (Hamilton et al., 2020).

One common issue raised in the questionnaire was that incomplete or incorrect referrals often result in delayed diagnoses, as clinicians do not receive the necessary information to make timely decisions. Several respondents noted that automating the referral process could help prevent this by ensuring that all relevant diagnostic tests, such as faecal immunochemical tests (FIT), are completed before the referral is submitted. A gastroenterologist mentioned: “As long as the automated system assures all relevant investigations (e.g., FIT) have been done before referral, then no developments in NICE guidance need to be flagged” (Respondent Gastroenterologist).

The literature corroborates these findings, with multiple studies showing that automation leads to more timely and accurate diagnoses. Adler-Milstein et al. (2013) found that automated referral systems can reduce delays by streamlining the submission process and ensuring that high-risk patients are prioritised. Moreover, (Topol, 2019) emphasises that automation enables earlier self-implemented interventions, allowing healthcare providers to deliver higher-quality care and improving the likelihood of favourable patient outcomes.

This improvement in patient outcomes can be directly tied to the reduction of administrative delays, as quicker and more accurate referrals mean that patients can receive treatment sooner. For lower GI conditions, where early detection is critical, this can mean the difference between life and death. The consensus from both the stakeholder responses and the literature is clear: automation enhances the timeliness and precision of referrals, ultimately leading to better patient outcomes.

Completeness and Standardisation of Data

Data completeness and standardisation emerged as another significant theme from the analysis of both the questionnaire and the literature. In healthcare, and particularly in lower GI pathways, it is crucial that all necessary data are available and accurate at the time of referral. Errors or omissions in referral data can result in delays in care, leading to potentially harmful outcomes for patients.

Stakeholder responses highlighted that the current manual referral processes often suffer from inconsistencies in data quality, with many clinicians reporting missing or incomplete information. Automation, by contrast, ensures that all required fields are completed before a referral can be submitted. As one gastroenterologist explained: “Before you refer, make sure all necessary information is in place so we don't lose time with the referral process” (Respondent Gastroenterologist).

The literature strongly supports this view, with Liddy et al. (2013) finding that automated systems lead to a significant reduction in human errors and improve the flow of information between primary and secondary care providers. This is particularly important in lower GI pathways, where timely access to complete and accurate data is essential for making informed clinical decisions. Automation also ensures that referral data is standardised, making it easier for clinicians to interpret and act upon the information they receive.

The use of mandatory checklists and standardised templates, both of which are key features of automated systems, further enhances data completeness and standardisation. By ensuring that all relevant data are included at the time of referral, these systems reduce the need for follow-up requests for additional information, which can be time-consuming and delay patient care. As one nurse practitioner noted, “Automation will make it easier, especially if all the information is there, so multiple requests should not be needed” (Respondent Nurse Practitioner).

Reducing Administrative Burdens on Clinicians

One of the most significant benefits of automating referral systems, as identified in both the questionnaire responses and the literature, is the potential to reduce the administrative burden on clinicians. Manual referral processes are often time-consuming and labour-intensive, requiring clinicians to spend valuable time following up on incomplete or inaccurate referrals. This not only reduces the time available for direct patient care but also increases the risk of errors due to the complexity of the administrative tasks involved.

Several respondents to the questionnaire highlighted this issue, noting that automation could help alleviate the administrative burden by streamlining the referral process. By ensuring that all necessary data are included in the initial referral, automated systems reduce the need for follow-up requests, allowing clinicians to focus on providing care. One nurse practitioner stated: “Automation may result in the inclusion of all needed information, which could eliminate the need for subsequent requests and likely improve turnaround time” (Respondent CNS Nurse).

The literature supports this view, with Lui et al. (2020) finding that automating administrative tasks in healthcare can lead to significant improvements in efficiency, allowing clinicians to spend more time on direct patient care. This is particularly important in lower GI pathways, where the timely diagnosis and treatment of conditions like colorectal cancer can make a significant difference in patient outcomes.

By reducing the administrative workload, automated referral systems not only improve the efficiency of healthcare delivery but also enhance the overall quality of care by allowing clinicians to focus more on patient interactions. This is a key advantage of automation, as it helps to mitigate the strain on healthcare professionals and ensures that patients receive the attention they need.

Interoperability of Systems

While automation offers numerous benefits, one of the most significant challenges identified in both the questionnaire responses and the literature is the issue of system interoperability. For automated referral systems to function effectively, they must be able to communicate seamlessly with both primary and

secondary care systems. However, many healthcare systems, including those within NHS Wales, operate in silos, with different providers using incompatible systems that do not easily share data.

This lack of interoperability was a major concern among stakeholders, with one GP noting: “Only partially joined primary and secondary systems, more needed for automation to be truly effective” (Respondent GP). Without seamless communication between systems, the full benefits of automation cannot be realised, as data cannot flow smoothly between providers, leading to delays in patient care.

The literature confirms this, with (Raghupathi & Raghupathi, 2014) emphasising that the fragmentation of healthcare systems limits the effectiveness of automation. For automated referral systems to work as intended, significant investment in IT infrastructure is required to ensure that all systems can communicate with each other. This is especially important in lower GI pathways, where timely and accurate data sharing is critical for delivering optimal patient care.

(Reddy et al. 2020) highlight the importance of investing in system integration and interoperability, noting that without these investments, the benefits of automation will be limited. Stakeholders within NHS Wales echoed this sentiment, expressing frustration at the lack of integration between primary and secondary care systems. Addressing this issue will require significant financial and logistical support to ensure that all healthcare providers can effectively use automated referral systems.

Cultural and Implementation Barriers

One of the most challenging aspects of implementing automated referral systems, as identified in both the questionnaire responses and the literature, is overcoming cultural resistance from clinicians. Many healthcare professionals are hesitant to adopt new technologies, particularly when they perceive a risk of reduced human oversight in complex cases. This reluctance to embrace automation is a significant barrier to its successful implementation.

Several respondents to the questionnaire expressed concerns that increased automation could compromise the quality of care in more complex cases. As one GP noted: “Increased automation (particularly around more complex cases) may eventually see less human oversight” (Respondent GP). This fear of losing control over clinical decision-making is a common theme in the literature, with (Holden & Karsh, 2010) noting that clinicians often resist automation due to concerns about reduced autonomy.

To address these concerns, it is essential to involve clinicians in the design and implementation of automated systems from the outset. By engaging clinicians early in the process and providing comprehensive training, healthcare organisations can help to alleviate fears and encourage the adoption of new technologies. (Kossman & Scheidenhelm, 2008) suggest that pilot projects demonstrating the reliability and efficiency of automated systems can help to reduce resistance and build confidence among clinicians.

Stakeholders within NHS Wales echoed this sentiment, with one nurse noting that training should be “comprehensive and involve all multidisciplinary teams to ensure the system can be well adapted” (Respondent Matron). Providing ongoing support and regular updates will also be crucial to ensuring the long-term success of automated referral systems.

Enhancing the Patient Experience

Finally, one of the more subtle but equally important aspects of automating referral systems is the potential to improve patient experience. By providing real-time updates on the status of referrals and reducing waiting times, automated systems can make healthcare processes more transparent and less stressful for patients.

Many stakeholders suggested that patients would welcome automation if it led to faster care and greater transparency. However, there were also concerns that some patients might prefer a more personal touch and could be hesitant to embrace fully automated systems. One surgeon noted: “Patients that may balk at a fully automated system and would prefer human touch” (Respondent Surgeon).

The literature confirms that patient experiences can be improved through automation, particularly when it leads to faster care and greater control over health data (Lui et al., 2020). However, it is important to communicate the benefits of automation clearly to patients and to ensure that they feel comfortable with the new systems. Regular feedback mechanisms, such as patient surveys, can help to address concerns and ensure that automated systems are meeting patient needs.

Critical Analysis of Main Findings with Respect to Their Application in NHS Wales Lower GI Referral Process, Cost Benefits, Service Delivery Impact, and Patient Experience

The findings regarding automation in lower gastrointestinal (GI) referral systems provide valuable insights into the benefits of streamlining the referral process within NHS Wales. By integrating stakeholder feedback from interviews and secondary literature sources, this analysis discusses the advantages of automation over existing manual processes. It highlights improvements in efficiency, cost savings, service delivery, and patient experience, while also considering potential barriers and challenges. Automation offers an opportunity to transform the Welsh healthcare system, particularly in lower GI pathways where delays in diagnosis and treatment can have severe consequences. This discussion will focus on four key areas: efficiency and accuracy in the Welsh lower GI referral process, service delivery and integration, cost implications, and patient experience.

Efficiency and Accuracy in the Welsh Lower GI Referral Process

A key finding in both the literature and stakeholder responses is that automation can significantly enhance the efficiency and accuracy of lower GI referrals by standardising the process and minimising the risk of incomplete submissions. Currently, incomplete referrals are a common issue in NHS Wales, with missing information such as faecal immunochemical test (FIT) results being a major cause of delays. Secondary care clinicians often need to request additional details before proceeding with diagnosis and treatment, causing unnecessary delays. As one gastroenterologist noted, incomplete referrals "often result in delays and wasted time," as secondary care clinicians must follow up with primary care providers to complete the necessary information (Respondent Gastroenterologist).

The literature supports this observation. For example, (O'Mahony et al.,2018) found that the introduction of standardised referral templates in NHS systems reduced referral errors by 25%, leading to faster processing times. Automation further reduces errors by minimising human input, leading to more efficient care and fewer delays (O'Mahony et al., 2018). Similarly, (Lui et al., 2020) emphasised the importance of standardised templates in improving patient flow by reducing incomplete referrals, further supporting the claim that automation enhances system efficiency (Lui et al., 2020).

The figure below illustrates the process map of the referral pathway from primary care to secondary care, highlighting the integration of both paper-based and clinical systems along the way (Amgen Consultancy, 2024).

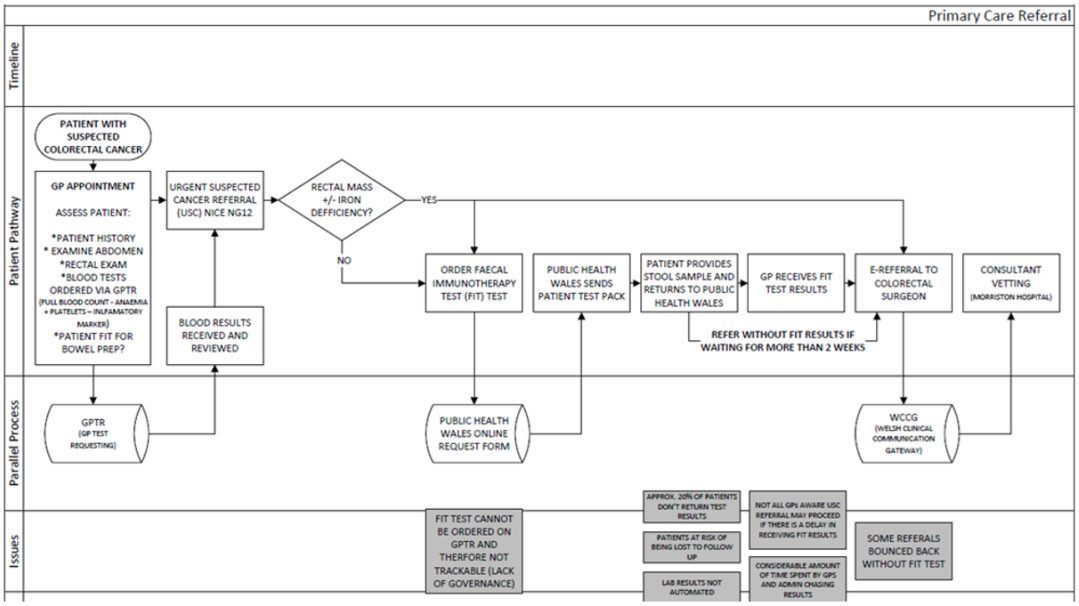


Fig 2: Adapted Amgen consultancy, (February 2024).

In practical terms, automation can ensure that all critical information is included in a referral before it is submitted, which helps to avoid delays caused by incomplete submissions. By reducing the need for

secondary care clinicians to chase missing data, automation speeds up the entire process, from initial referral to diagnosis and treatment. NHS England has already seen positive results from automation, with referral times reduced by 17% following the introduction of automated systems (Hill et al., 2015). If applied in Wales, similar efficiency gains could lead to substantial cost savings, improved patient flow, reduced waiting times, and optimised resource use (Lui et al., 2020).

Impact on Service Delivery and Integration

Another significant advantage of automation in lower GI referrals is its potential to improve service delivery by addressing bottlenecks in the current process. The volume of referrals, combined with incomplete data submissions, has placed significant strain on NHS Wales. One surgeon highlighted the challenge of managing the large number of referrals, noting that "we often have to sort through 20 referrals a day just for colorectal cases, and the incomplete ones slow down the entire process" (Respondent Surgeon).

Literature on healthcare system automation points to the role of technology in enhancing service delivery through more effective triaging of cases. Liddy et al. (2013) found that automated systems reduce the back-and-forth communication between primary and secondary care providers by ensuring that all required data is captured at the point of referral. This leads to quicker decision-making and more efficient allocation of resources, ultimately improving service delivery (Liddy et al., 2013).

In the Welsh context, automating lower GI referrals could bring several positive changes. Automation would improve the completeness of referral data and ensure that all critical information is included, allowing secondary care providers to triage cases more effectively. High-risk patients could be fast-tracked, while routine cases would be processed more efficiently. Furthermore, clinicians would have more time to focus on complex cases that require nuanced judgment, leading to overall improvements in the quality of care (Hill et al., 2015).

However, the success of automation in Wales will depend on the interoperability of clinical systems between primary and secondary care. Many Welsh healthcare systems are not fully integrated, leading to delays in information sharing and inefficiencies in patient care. Several stakeholders raised concerns about system integration, with one GP noting that "primary and secondary systems are integrated only partly, and further integration is needed for automation to be truly effective" (Respondent GP). Without seamless interoperability, the full benefits of automation will not be realised. Studies have shown that investment in IT infrastructure is essential to ensure that automated systems communicate effectively across different healthcare settings (Cline & Luiz, 2013). This integration will be crucial for Wales to fully leverage the advantages of automation in lower GI referrals.

Cost Implications of Automation

The potential cost benefits of automation are another key area of consideration. While the upfront costs of implementing automated systems, including training, infrastructure upgrades, and ongoing maintenance, are significant, the long-term savings are equally substantial. Automation reduces the administrative burden on clinicians, minimises delays in the referral process, and improves patient outcomes, all of which contribute to long-term cost savings (Wan & Alagar, 2015).

Healthcare systems that adopt automation typically see a return on investment through more efficient use of resources and reduced costs associated with delayed diagnoses. Boonstra and Broekhuis (2010) found that automating referral systems in large healthcare networks led to significant reductions in overhead costs and improved resource. (Boonstra & Broekhuis, 2010)

In the context of lower GI pathways, where early diagnosis and treatment are critical for conditions such as colorectal cancer, the potential for cost savings is particularly high.

For example, early detection of colorectal cancer through faster and more accurate referral systems can reduce the need for costly late-stage treatments, which are not only more expensive but also less effective. By speeding up the referral process, automation could lead to earlier interventions, improving survival rates and reducing the overall financial burden on the healthcare system.

However, there is a need to balance the long-term cost savings with the upfront investment required to implement automated systems. As one gastroenterologist pointed out, "the lack of resources and financial support is a significant barrier to integrating automation systems with existing technology" (Respondent Gastroenterologist). Careful planning and budgeting will be essential to ensure that the long-term benefits

of automation outweigh the short-term costs. NHS Wales will need to assess the financial feasibility of automation while ensuring that the necessary resources are available for successful implementation.

Impact on Patient Experience

Automation also has the potential to significantly improve the patient experience in Welsh lower GI pathways. One of the main complaints from patients in the current system is the lack of transparency and communication about the status of their referrals. Automation could address this issue by providing real-time updates to patients on their referral status, appointment schedules, and diagnostic results. Several stakeholders mentioned that patients would likely respond positively to an automated system if it improved communication and reduced waiting times. One GP suggested that "patients would adapt quickly if they saw the benefits of better and timely service provision" (Respondent GP).

By providing patients with timely updates and ensuring that high-risk cases are prioritised, automation could alleviate some of the anxiety and frustration associated with long waiting periods for specialist consultations or diagnostic procedures. This could lead to higher levels of patient satisfaction and improved overall patient experience. Lui et al. (2020) found that automation improved patient satisfaction by providing greater transparency and reducing wait times, further supporting the potential benefits of automation in the Welsh context (Lui et al., 2020).

However, there are also challenges related to digital inclusion and patient trust in automation. One surgeon expressed concerns that "a minority of patients may be concerned about a computer algorithm deciding their care, but most will accept it if they trust the system" (Respondent Surgeon). For patients who are less comfortable with digital technologies or prefer more direct interaction with healthcare providers, automation may initially be met with scepticism. Studies have shown that implementing digital systems must be accompanied by efforts to ensure that all patients, including those from digitally excluded or vulnerable groups, have access to support and are fully informed about the benefits of the new system (Fry et al., 2020).

Therefore, any move toward automation in lower GI referrals must be accompanied by a comprehensive communication strategy that explains the benefits of the system to patients and addresses any concerns about digital exclusion. By ensuring that patients are fully informed and supported, NHS Wales can maximise the benefits of automation while minimising any potential negative impact on the patient experience.

Conclusion

The automation of lower GI referral systems in NHS Wales has the potential to bring significant benefits in terms of efficiency, cost savings, service delivery, and patient experience. By standardising the referral process and ensuring the completeness of data submissions, automation can reduce delays, improve resource allocation, and enhance patient care. The literature and stakeholder responses support the idea that automation could lead to faster triaging, better prioritisation of high-risk cases, and improved outcomes for patients with conditions such as colorectal cancer.

However, for these benefits to be fully realised, NHS Wales must address key challenges related to system integration, cost, and patient trust in automation. Investment in IT infrastructure will be essential to ensure that automated systems can communicate effectively across different healthcare settings. Additionally, efforts must be made to ensure that all patients, including those from digitally excluded groups, are fully informed and supported as the healthcare system transitions to automation.

In conclusion, the potential benefits of automation in Welsh lower GI referral pathways are considerable, but successful implementation will require careful planning, investment, and a strong focus on patient engagement. By addressing these challenges, NHS Wales can harness the power of automation to improve the quality of care, reduce costs, and enhance the patient experience.

Recommendations for Automation in Lower GI Referral Service and Service Delivery in NHS Wales

The analysis of the lower GI referral systems in NHS Wales highlights the numerous benefits that automation could bring to the healthcare system, including enhanced operational efficiency, better clinical outcomes, cost savings, and improved patient experience. However, successful implementation requires

careful planning and a multi-faceted approach to address the challenges that stakeholders and literature have identified. Based on the findings from the questionnaire responses and literature review, the following recommendations aim to guide the adoption of automation in Welsh healthcare, particularly in the context of lower GI referrals.

Enhance Efficiency and Accuracy through Standardised Referral Processes

One of the primary benefits of automating lower GI referral systems is the potential for increased efficiency and accuracy. By introducing standardised templates for referrals, automation can ensure that clinicians include all the necessary information, reducing the number of incomplete submissions. This will prevent delays and avoid the need for follow-up communication between primary and secondary care providers, which currently slows down the referral process.

- Recommendation: NHS Wales should adopt standardised referral templates across all healthcare settings involved in lower GI referrals. This will ensure that essential data such as faecal immunochemical test (FIT) results are consistently included, preventing delays in diagnosis and treatment. As demonstrated by NHS England, automation could reduce referral times by up to 17%, allowing for earlier intervention and improved patient outcomes (Hill et al., 2015).
- Implementation Strategy: Introduce mandatory digital forms with built-in prompts to ensure all fields are completed before submission. These forms should integrate seamlessly with electronic health record (EHR) systems across primary and secondary care settings to minimise manual input and reduce errors.

Lower GI Referral Pathway Framework: translation into practise

As part of the research, in consultation with surgeons and gastroenterologists, a detailed pathway for Lower GI patients presenting at primary care has been proposed. This pathway complements the NICE guidelines and optimal colorectal pathway recommendations.

For example, if a patient aged between 50 and 59 presents symptoms such as changes in bowel habits (CBH), diarrhoea, or constipation, the primary diagnostic investigation would involve performing a Faecal Immunochemical Test (FIT), alongside TTG and TFT tests. If the FIT test returns a positive result, the patient should be automatically referred to the Straight-to-Test (STT) pathway under the suspected cancer category for further investigation via colonoscopy. Conversely, if the FIT test is negative, the results from the TFT and TTG tests will inform the next steps for further investigation.

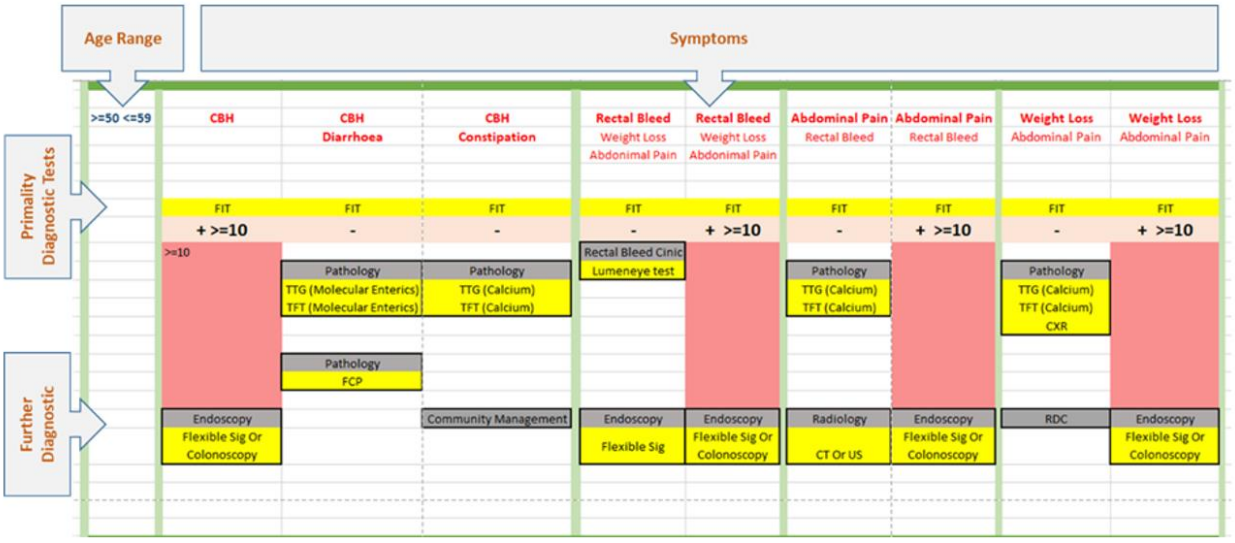


Fig3: Author Own Framework for Age Range Between 50-59.

The proposed pathway accommodates multiple symptoms, with clear steps defining appropriate investigations based on the patient's condition. This framework can be translated into an automated system to accelerate the process of selecting the correct and appropriate diagnostic procedure for each patient in a timely manner.

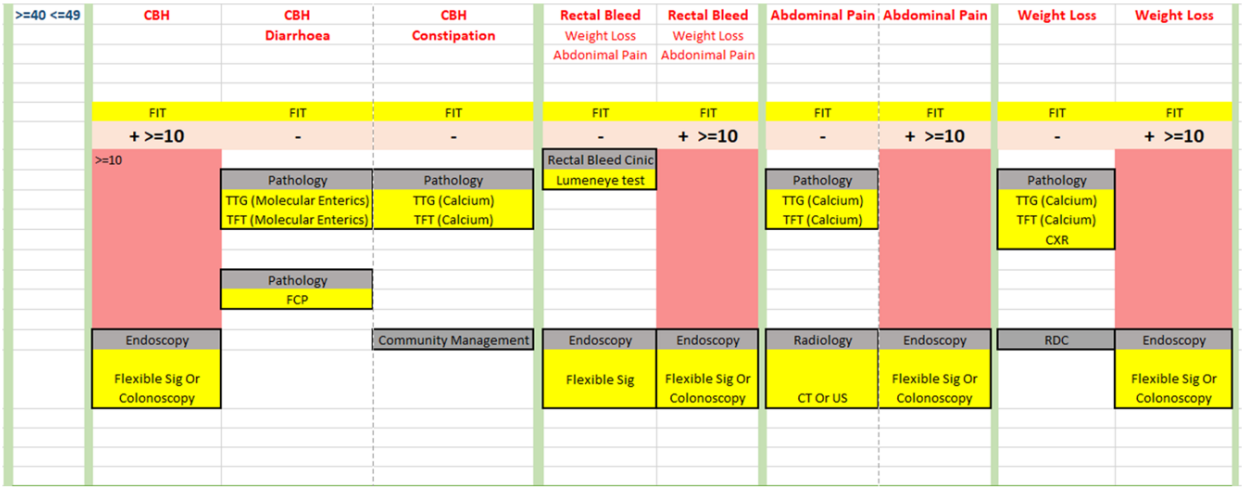


Fig4: Author Own Framework for Age Range Between 40-49.

Furthermore, this system can be integrated with existing clinical platforms, such as the Welsh Clinical Communication Gateway (WCCG), Welsh Clinical Portal (WCP), or Welsh Patient Administration System (WPAS), ensuring seamless information transfer between primary and secondary care. Integration with the "Patient Knows Best" portal can also keep patients informed throughout the process.

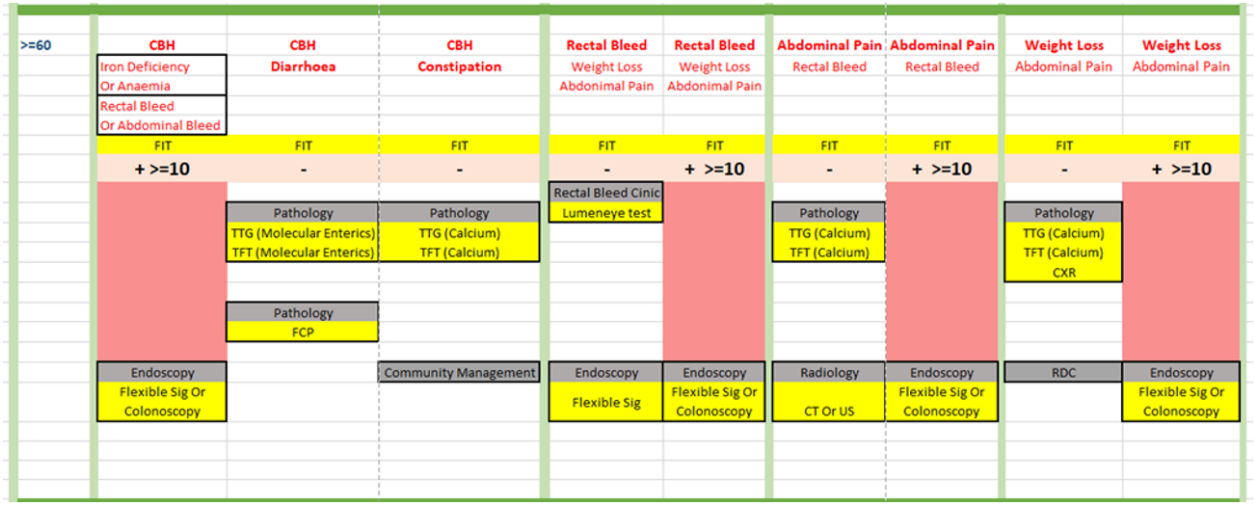


Fig5: Author Own Framework for Age Range Above 60.

A key advantage of this automated pathway is its flexibility. The system can be reconfigured to accommodate updates in clinical guidelines. For example, if the FIT test threshold changes from 10 to 90 for suspected cancer cases, the system can be centrally updated to reflect the new criteria.

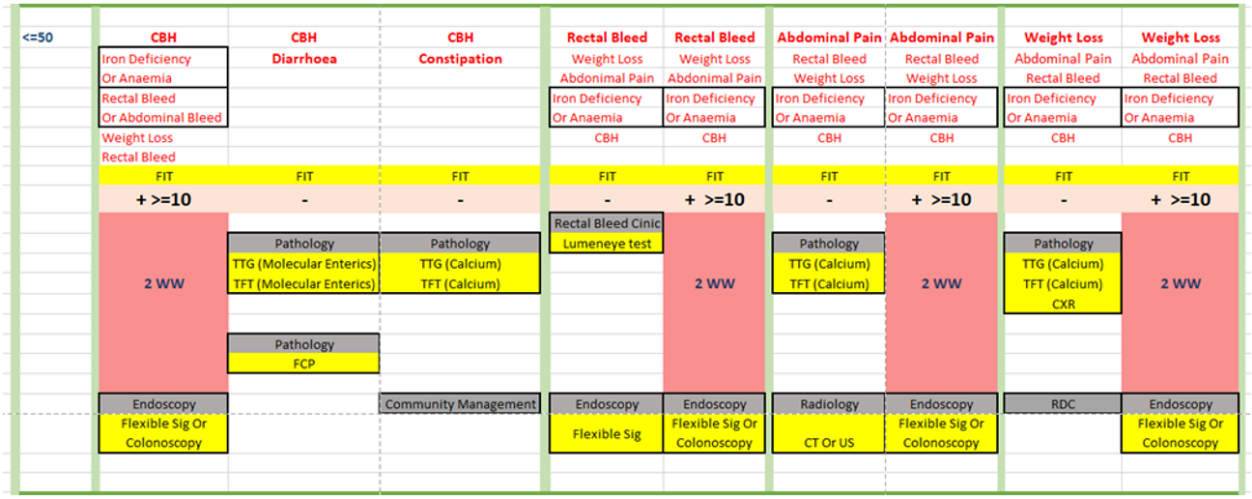


Fig6: Author Own Framework for Age Range 40 and Less.

This recommendation contributes significantly to improving the efficiency and accuracy of Lower GI referrals, aligning with the broader goals of automating healthcare processes to enhance patient outcomes and streamline clinical workflows.

Improve Service Delivery through Better Resource Allocation

Automation can streamline service delivery by improving the triaging and prioritisation of cases, allowing clinicians to focus on high-risk patients. Currently, large volumes of referrals, coupled with incomplete data, create bottlenecks in the system, making it difficult for clinicians to manage their caseloads efficiently.

- **Recommendation:** Implement automated triaging systems that can categorise referrals based on urgency and completeness. By fast-tracking high-risk patients while ensuring routine cases are processed efficiently, NHS Wales can reduce waiting times and ensure timely interventions for patients with lower GI conditions like colorectal cancer.
- **Implementation Strategy:** Develop algorithms that prioritise referrals based on clinical criteria such as FIT scores or other risk factors. Automated notifications should alert secondary care providers when critical cases are flagged, allowing for immediate action. This will improve the overall quality of care while reducing clinician workloads

Invest in IT Infrastructure to Support Interoperability

For automation to succeed, it is essential that primary and secondary care systems are fully integrated. One of the significant barriers identified in both the questionnaire responses and the literature is the lack of system interoperability, which limits the seamless flow of information between healthcare providers. Without effective communication between these systems, the full benefits of automation cannot be realised.

- **Recommendation:** NHS Wales must prioritise investment in IT infrastructure to ensure that electronic health systems across different care settings are interoperable. This will allow for the smooth transfer of referral data, ensuring that clinicians have access to all necessary information when making decisions about patient care.
- **Implementation Strategy:** Establish a unified digital platform that links primary and secondary care systems, ensuring data compatibility and real-time updates. NHS Wales could look at successful case studies from other regions, such as NHS England's implementation of cross-system EHR platforms, to guide this process. Financial resources and technical support should be allocated to ensure that all healthcare settings can adopt the new system without disruption to service delivery.

Provide Comprehensive Training and Support to Overcome Cultural Barriers

Cultural resistance among clinicians remains a significant challenge to implementing automation in healthcare. Some healthcare providers fear that automation could reduce their autonomy or compromise the quality of care, especially in complex cases. To overcome these concerns, it is essential to engage

clinicians early in the design and implementation process, ensuring that the systems developed meet their needs and enhance their decision-making capabilities rather than replace them.

- **Recommendation:** Develop a comprehensive training and support program for clinicians that focuses on the benefits of automation, particularly in reducing administrative burdens and improving clinical efficiency. Pilot projects that demonstrate the effectiveness of automation in real-world settings can help build trust among clinicians.
- **Implementation Strategy:** NHS Wales should organise workshops, seminars, and hands-on training sessions to introduce clinicians to automated systems. Early involvement of healthcare professionals in the design and testing phases will ensure that the systems are user-friendly and tailored to the specific needs of clinicians. This collaborative approach will reduce resistance and facilitate smoother adoption of the new technology.

Enhance the Patient Experience through Greater Transparency and Communication

One of the key concerns raised by patients in the current referral system is the lack of transparency and communication about their referral status. Automation offers a unique opportunity to improve patient experience by providing real-time updates on referral status, appointment schedules, and diagnostic results. This can help alleviate patient anxiety during long waiting periods and build greater trust in the healthcare system.

- **Recommendation:** NHS Wales should develop patient-facing portals or mobile applications that allow individuals to track their referral progress in real-time. These platforms should offer clear, easy-to-understand updates on the next steps in their care journey, helping to reduce uncertainty and frustration.
- **Implementation Strategy:** Introduce a digital interface for patients that links to the automated referral system, allowing them to receive timely updates and notifications about their care. Regular feedback mechanisms, such as patient satisfaction surveys, should be implemented to continuously refine the system and ensure it meets patient needs. Additionally, patients should have access to educational resources that explain the benefits of the automated system, further building trust and engagement.

Ensure Digital Inclusion and Address Patient Concerns About Automation

While many patients are likely to welcome automation, particularly if it improves the speed and transparency of their care, there are concerns about digital exclusion. Some patients, particularly older individuals or those from vulnerable groups, may struggle to navigate automated systems or may prefer direct interaction with healthcare providers. It is essential that NHS Wales addresses these concerns to ensure equitable access to healthcare.

- **Recommendation:** Implement measures to support patients who are less comfortable with digital technologies. This could include offering alternative means of communication for those who prefer phone or in-person interactions, as well as providing digital literacy training for patients who wish to engage with the automated system but lack the necessary skills.
- **Implementation Strategy:** Set up support hotlines, in-person assistance at healthcare facilities, and community outreach programs to help patients navigate the new system. Additionally, healthcare providers should be trained to identify patients who may need extra support and offer alternative solutions to ensure that all individuals receive the same level of care, regardless of their comfort with digital technologies.

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Appendix A: Questionnaire

Contact author

Appendix B: Ethics Approval Letter

Contact author

About the Authors

Imran Rao is a healthcare management professional with over 12 years of experience in driving performance improvement, governance, and project management within the NHS. Passionate about transforming healthcare systems, Imran focuses on enhancing operational efficiency, patient care, and service delivery through innovation and strategic planning. His work is centered on integrating data-driven insights to solve complex challenges and streamline processes, ensuring that both clinical outcomes and patient experiences are continuously improved.

Imran is committed to fostering collaboration across multidisciplinary teams, always advocating for solutions that not only meet but exceed organisational objectives. His genuine passion for improvement is reflected in his approach to modernising healthcare systems, keeping pace with digital advancements, and embracing new methodologies that can positively impact the future of care. Imran is always looking for ways to push boundaries and bring meaningful change, ensuring that healthcare services evolve to meet the demands of a dynamic environment.

What are the key challenges for Third Sector organisations in sustainably supporting Health and Care systems in Wales?

Kate Griffiths
UK Director of Health & Care
British Red Cross, UK

Abstract:

This research investigates the key challenges facing third-sector organisations in their efforts to sustainably support health and care systems in Wales. Against a backdrop of rising demand, constrained public finances, and policy commitments such as A Healthier Wales: Our Plan for Health and Social Care, the study explores how voluntary and community organisations navigate financial, workforce, and structural pressures while contributing to prevention, early intervention, and community-based care. Using a mixed-methods approach, data were gathered from survey responses and semi-structured interviews with sector leaders, complemented by a review of secondary literature and policy documents. The findings reveal persistent challenges across six thematic areas: funding, competition, commissioning, data and evidence, workforce, and engagement. Short-term and insecure funding arrangements undermine sustainability, while competitive commissioning environments weaken collaboration and trust. Difficulties in evidencing impact, alongside workforce fragility and declining volunteerism, further constrain organisational resilience. Moreover, insufficient engagement with statutory bodies limits the sector's influence in shaping policy and service design. The research highlights the need for long-term, stable funding mechanisms, equitable commissioning processes, improved data capabilities, stronger partnerships, and enhanced workforce support to secure the sustainability of third-sector contributions to health and care in Wales.

Keywords: Third Sector; Health and Care; Wales; Sustainability; Commissioning; Funding; Workforce; Community Organisations; Policy; Engagement

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Introduction

The aim of this research is to explore the challenges faced by third-sector organisations involved in the delivery of services and resources which support the health and care system within Wales. The motivation behind this research is to understand those challenges in greater detail than has been considered through research to date, to gain insight and perspectives into the causal factors of these challenges and how (or if) they are being navigated. Through examination of published materials, and by collecting and analysing feedback from a range of stakeholders working in or supporting the third sector, this report articulates the common challenges which present greatest risk to the third sector's sustainable contribution to Wales' health and care system.

This is particularly relevant in the current context of pressures faced by Wales' health and care systems, arising through increasing demand (now and projected) alongside significant financial pressures. Spending on health and social care accounts for almost 50% of Welsh Government funding, at a cost of £11.7bn (Welsh Government draft Budget 2024/25), but despite this, pressure continues to rise, and demand continues to exceed capacity. A survey by the Welsh NHS Confederation in August 2020, found that recruitment and retention challenges within the care workforce was in crisis, their report described the extreme pressures on the health and care system in Wales as a "National Emergency" (Welsh NHS Confederation briefing, September 2022).

This research is also relevant within a Welsh context, due to the government policy position, set out in A Healthier Wales: Our Plan for Health and Social Care, first published by the Welsh Government in June 2018. This policy describes a seamless, whole-system approach across both statutory and non-statutory organisations to deliver health and care within Wales.

Having acknowledged the pressures faced by the statutory sector in respect of health and care, the third sector faces similar challenges of increasing demand, increased costs of its workforce and its service delivery, reduced funding in its commissioned work and in fundraised income, and a reduction in volunteering since the pandemic. This research will be of value in understanding the challenges which present a risk to the sustainability of health and care system support offered by the third sector. It may provide a platform upon which further research may explore the development of potential solutions to these challenges.

Context – Wales' third sector

Wales has a diverse third sector made up of organisations and groups who support communities on a wide range of causes on a not-for-profit basis. Data published on Wales' Third Sector Data Hub indicates there are 45,041 voluntary organisations registered within Wales. In 2022, the sector accounted for 10.7% of employment in Wales, employing around 134,505 people. The contribution to health and care delivery from Wales' third sector is significant, with Wales Council for Voluntary Action (WCVA) reporting over 12,000 third sector organisations in the health and care space, employing a workforce of around 58,924 staff, and 60,431 volunteers. When you consider that between 31st March 2022 and 31st March 2023, the NHS workforce in Wales reached a headcount of 108,922, the addition of the combined third sector headcount of staff and volunteers (119,355) more than doubles this workforce capacity supporting the health system within Wales.

The contribution of Wales' third sector is resourced in a variety of ways. It is sometimes delivered through commissioning by statutory organisations outsourcing or enhancing statutory service provision. This is often achieved via a competitive tendering process under public procurement legislation, and subject to contracting monitoring against key performance metrics described through service level agreements. The work of third-sector organisations can also be funded through grants, trusts or other forms of fundraised or donated income. This work tends to be complimentary to statutory provision, for example, providing emotional and practical support on wards or in hospital departments, health coaching and education, developing resources or activities within communities to address issues such as loneliness or isolation, or through the funding of projects or pilots that test new approaches to social or condition-specific problems.

The sector serves a wide range of purposes, for example, organisations may be condition-specific (Alzheimers, cancer), place-based (community groups, county voluntary councils), focused on specific cohorts (carers, disabilities, the elderly) or cause-based (housing, health, mental health, poverty). Unlike the statutory sector, which is legislated to deliver health and social care outcomes to its population, the third

sector serves to add value, often through the provision of services or support targeted towards prevention or early intervention, community development and enabling people to live independent and fulfilling lives.

The diversity of the sector and its independence from statutory organisations and government make it agile and innovative in responding to the needs of the people it is established to support. Recognised in adding social value to communities across Wales, the third sector provides opportunities for volunteering, enhancing skills development, well-being and community cohesion. Beyond the calculated value of the activities, it directly delivers through contracts and other funding, the wider societal value of the third sector is much harder to quantify, though is broadly considered to be significant.

Methodology

This research explores the challenges facing third sector organisations supporting health and care in Wales by using a variety of methods to collect information for analysis. Primary data has been obtained via responses to a survey questionnaire, using Microsoft Forms to capture a broad understanding of the challenges directly from a range of providers of health and care services from within third sector organisations. 25 individuals from within the third sector were sent a link to the online survey, 12 responses were received and analysed to capture both commonalities and variances by theme. Primary data is further supplemented by semi-structured interviews held with three third sector leaders within Wales. Interviews took a conversational style using broad questions and where applicable, follow up prompts to explore responses in more detail. These were conducted in June and July 2024, one in person, where notes of key themes were recorded, and two using Microsoft Teams to generate a transcript from which to extract themes and key quotes. The interviews explored the themes arising through survey responses to gain perspectives through the lens of organisations which support and/or represent the sector, including government third sector policy makers.

A review of secondary data sources looks at key publications relating to the third sector in the context of health and care. This includes exploring the availability of literature specific to this topic, alongside review of published policy documents and reports at a government level, and wider reports and data from across the statutory sector. It also considers publications, including evaluations and reports produced by organisations within the third sector.

A discussion section brings together findings from each of these approaches, with a view to identifying commonality and areas around which there is consensus or variance in views.

Main Analysis

Secondary Data

Much of what is published in respect of the role of the third sector in supporting health and care specifically within Wales comes from secondary data. There is no previous academic research that is specific to this topic, however, there has been broader research which has drawn upon the challenges facing the third sector within the UK. One 2020 publication exploring the social determinants of health in relation to local authorities across the UK, demonstrates themes that are relevant to the Welsh context.

Local Authorities and the social determinants of health (A. Bonner, ed. Bristol University Press, 2020) explore how the approach to commissioning impacts on the third sector. It argues that the scale and diversity of the sector creates capacity and capability to deliver services, and coupled with close relationships with communities, it provides local authorities with a vehicle to drive forward their health and wellbeing objectives. It acknowledges that the barriers associated with public contracts that have grown in size, value and geography, can disadvantage third-section organisations, particularly smaller organisations that operate on a local basis.

These organisations are further disadvantaged by a move to outcome-based commissioning which utilises a payment-by-results approach, rather than fixed price contract values. Whilst this may be less of an inhibitor for larger third-sector organisations who may have national resources to support such funding arrangements, it argues that smaller, locally based charities are more likely to impact on social capital at a neighbourhood or community level through locally based assets and by supporting local supply chains.

A further theme covered in this literature is the importance of partnership across statutory and third sectors in addressing resource issues, health inequalities, increasing prevention and community-based

approaches. It emphasises the need for trust and understanding between sectors to provide a stable platform for successful partnerships that tackle these challenges.

Public and third sector leadership: experience speaks (Howieson, B., Hodges, J., & Ashcroft, J. 2014) is focussed on articulating perspectives on leadership, including from within the third sector. However, many of those perspectives identified challenges specific to the sector and the leadership approaches utilised, or considered important, to deal with them. Themes arising from those perspectives included:

- Defining the role of the sector – in view of a changing external environment, reduced funding, greater competition and an increased focus on demonstrating impact and value for money.
- Increasing collaboration – to deliver savings and create additional value, whilst balancing the risks associated with collaborating with competitor organisations.
- Creating a sustainable business model – which delivers an increase in services with less funding and resources, within a climate focussed on survival and not strategy.
- Delivering innovation and change – albeit with limited resources, by utilising technology and volunteers in ways that can enable support to more beneficiaries.

Whilst academic literature specific to this topic is limited, current and relevant secondary data provides insight to the contribution required of Wales' third sector in supporting health and care systems and the challenges associated with this.

Welsh Government's policy for health and care in Wales, A Healthier Wales (June 2018) contains an ambition "to bring health and social care services together" via a "seamless whole system approach", where "services from different providers should be seamlessly co-ordinated". It requires partners in this space to go "beyond services to make a difference to the social and economic factors which influence health, wellbeing and life chances". It recognises that to achieve this ambition requires the development of broader and deepened partnerships alongside new ways of working and argues that Regional Partnership Boards (RPBs) formed by local authorities, health boards and third sector providers, must collectively deliver strong oversight and co-ordination in developing high value models of integrated health and social care. Furthermore, it commits to supporting and investing in the health and social care workforce, including that of the third sector and in volunteers. These aims are undermined by the policy's intention to shift from a health and care system which has high dependence on hospital-based care and treatment and social care services, to one which has greater investment and emphasis on community-based health, wellbeing and prevention. It also argues the need to "go beyond what we do now, using new models which work through partners and communities, to address social causes of poor health and wellbeing", seeing the third sector as a fundamental asset in enabling the delivery of this ambition.

The Welsh Government's commitment to the third sector is laid out in its Third Sector Scheme. This Scheme is unique to Wales, being a requirement of the Welsh Government under Section 74 of the Government of Wales Act 2006. The Act mandates that Welsh Ministers must set out how they propose to promote the interests of relevant voluntary organisations. It expects all Cabinet members, Deputy Ministers and officials, to promote the interests of the third sector in their work, ensuring the sector has fair and reasonable access to public funds via a Code of Practice for Funding the Third Sector [currently under review], which contains eighteen key principles for funding the sector. The Scheme also recognises that the third sector helps by transforming how public services meet present and future demands, and how it acts as an enabler of co-production. The Code of Practice acknowledges the challenge of short-term funding for third sector organisations and that increases in funding for the Welsh Government departments should be applied fairly to third sector organisations. It commits to levels of funding that reflect the principles of full cost recovery, acknowledging that whilst a project or service will have direct delivery costs, it will also have organisational overheads in supporting the projects or services it runs. We will revisit the topics of short-term funding and full cost recovery in later sections of this report.

In May 2023, the Welsh Government published a consultation on Rebalancing Care and Support, which contained proposals on a national framework for commissioned care and support, a National Office for Care and Support, a Pay and Progression Framework for social care, and the strengthening of Regional Partnership Board arrangements. The largest number of responses to this consultation were submitted by the third sector, who highlighted the challenges in sustaining current services or growing to meet the expectations of statutory partners, due to lack of parity with public sector pay and conditions. Third-sector responses also reference the challenge of short-term commissioning, recommending minimum

commissioning periods of three years, coupled with support to challenge Local Authorities who expect third-sector organisations to adjust costings downwards when facing budget pressures. In addition, representation of the sector at Regional Partnership Board level was highlighted as insufficient, reflecting that the current structure requiring one or two individuals to represent the thousands of organisations in any health board area was unachievable. In response to consultation feedback, the Deputy Minister for Social Services published a written statement (March 2024) committing to principles and standards for commissioning, strengthening of partnership working and extending membership of Regional Partnership Boards to better support third sector members.

A number of challenges facing third sector organisations in Wales were articulated through results of a WCVA survey undertaken in October 2023. These reflect the impact of inflationary costs to third sector organisations who deliver public services and included:

- 33% of organisations say income for private sector contracts has never covered the total cost of the service they deliver.
- 43% have reduced staff employment.
- 80% cannot meet the level of demand for services.
- 60% chose not to tender for a new contract or may not retender when the contract ends.
- 20% have already closed the service.
- 63% are utilising their charitable reserves.

In their recent (May 2024) report, on the values and value of the third sector, the Bevan Commission outlined the challenges facing the third sector in supporting health and care under the following key themes:

- No baseline data – lack of data on existing collaborative relationships between statutory and third sector organisations.
- Culture and attitudes – positive relationships being reliant on individuals, assumption that cross-sector collaboration is often linked to financial transaction.
- Fostering competition – third sector organisations in competition with eachother, creating barriers for collaboration within the sector.
- Structural barriers – risk assessment and data sharing constraints posing a barrier to collaboration.

Survey Findings

Survey responses received as part of this research demonstrate challenges from the perspectives of individuals working in organisations who deliver services supporting health and care within Wales. Respondents came from both local and national organisations to ensure diversity which reflects that of the sector itself.

The following charts and tables demonstrate the data supporting these key themes whilst providing context to the respondents' role and organisation.

Survey respondents were asked to identify the primary purpose of their organisation. The majority of respondents came from organisations whose purpose was to deliver care and support services to the community.

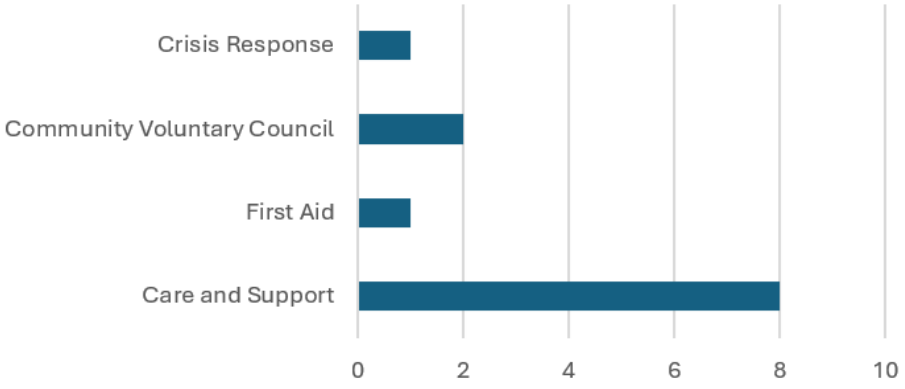


Chart 1. Respondents by Organisation Purpose.

Respondents came from a range of roles within their organisations, from service management positions overseeing the operational delivery of services within an area, to chief executive positions responsible for leadership of their organisation. Responses were also received from individuals working in a business development capacity. This diversity in respondent roles is helpful for this research as it enables a broader range of perspectives to be collected on the challenges this report seeks to understand.

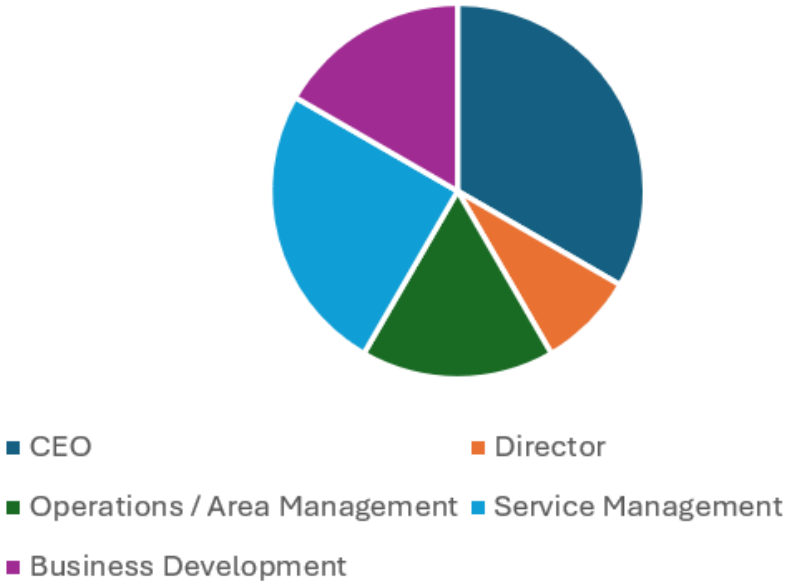


Chart 2. Respondents by role type.

Respondents were asked to identify the main services provided by their organisation. Where multiple services are provided, respondents were asked to identify the "top three" services delivering support to the largest number of service users. This demonstrated both a diversity in the breadth of services being offered, and in the format of their delivery. Some were co-located within statutory environments (in-hospital / onward services), some were delivered within service user homes (regulated care, unregulated care, falls response) and others offer community-based services (advice and support, signposting / social prescribing, activities and groups). This diversity in the types of services provided by respondents and their delivery methods demonstrates how the sector works within and outside of statutory health and care environments to provide support across the system.

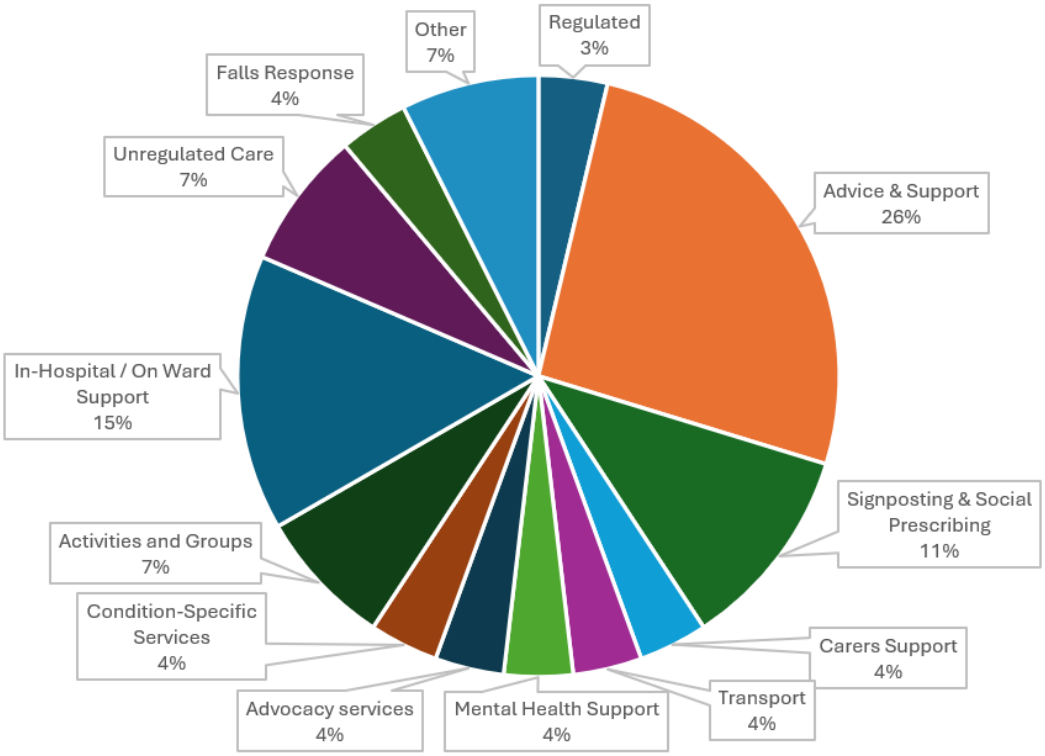


Chart 3. Top three services delivered by respondents.

The size of the organisation in terms of staff numbers and geographic coverage was not captured as part of the survey, but it was considered relevant to capture the scale of activity delivered by the organisations of respondents. Most of the respondents (7) worked within organisations who supported over 2,500 people during 2023. Only one respondent came from an organisation which supported less than 100 people. It is therefore important to acknowledge that survey findings largely reflect the views of organisations delivering larger scale activity, which perhaps reflects a challenge in the capacity of smaller organisations to engage in this research.

Table 1. Scale of delivery by organisation.

Number of people supported (2023)	Number of respondents selecting this option
> 2500	7
1000 – 2499	2
500 – 999	2
100 – 499	0
<100 people supported	1

In assessing how their services supported the health and care system, respondents were given a choice of options to select from. They were able to select all options relevant to the range of services their organisation provides. Over a quarter (26%) of selected options indicated services designed to increase resilience and/or personal independence. This is reflective of the preventative aspect of third-secret delivery, and this was further supported by equal consideration of respondents' services, helping to target the factors of hospital admission, preventing these and avoiding re-admission. At the opposing end of prevention, 14% of selections considered their services as enablers for patient flow by providing services which facilitate hospital discharge. In respect of social care impacts, 16% of respondents' selections were made for minimising demand on social services. These responses again reflect the third sector's breadth in supporting people before, after and through their interactions with statutory health and care.

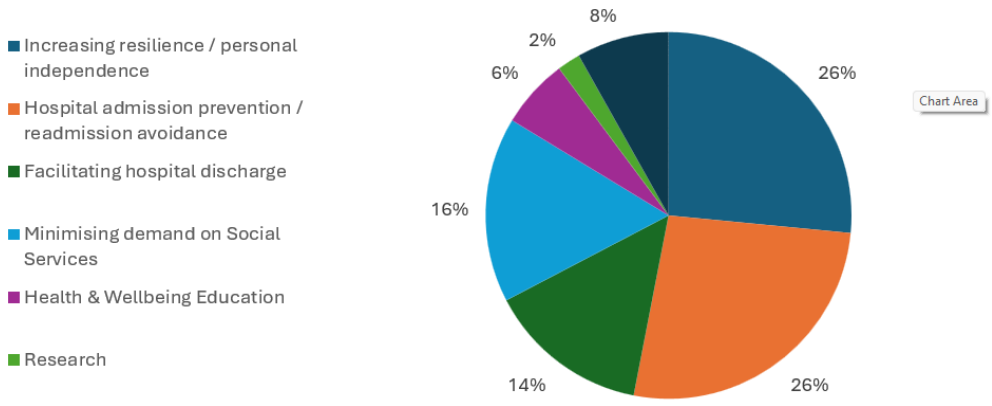


Chart 4. How do services support Wales' Health and Care System?

Respondents were also asked how a range of issues presented challenges or barriers to the delivery of their services. The most significant challenges were commonly identified as workforce, funding and short-term commissioning. Evidencing impact or improved outcomes as a result of their services was considered to be less of an issue by comparison. Further, 90% of respondents considered that these challenges collectively posed a high or medium risk to the future sustainability of their services.

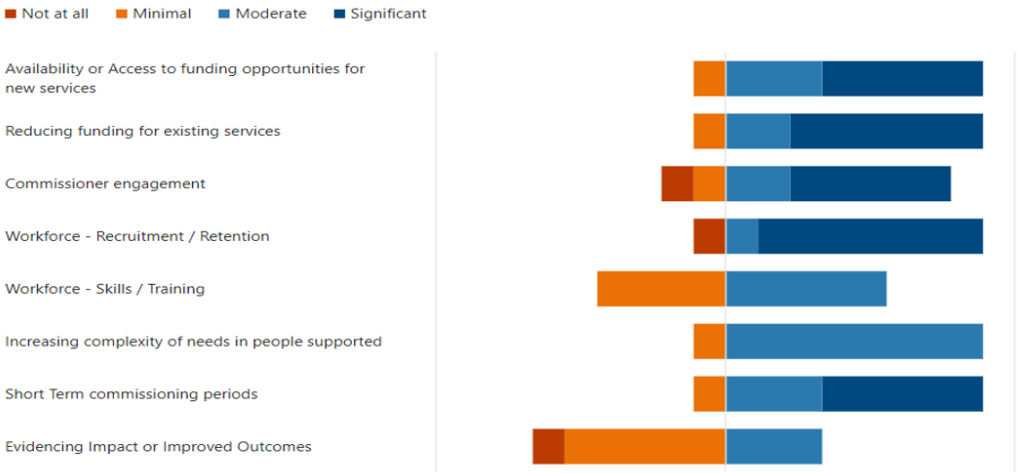


Chart 5. To what extent do the following areas present challenges or barriers to your work?

The survey also sought to explore confidence levels in the sustainability of third sector services being delivered by the respondents' organisations over the next three years. They were asked to rate their confidence on a scale of 1-10, with 10 being the highest level of confidence. Findings have been analysed and presented using a net promoter score. Responses present a concerning view, as no respondents indicated moderate to high levels of confidence about their services sustainability.



Figure 1. Service sustainability net promoter score.

When asked how they perceive their commissioners value of their services, respondents were mixed, with an equal number of respondents believing their services were valued as those who were neutral or felt

undervalued. This suggests variation in commissioner engagement and potentially points to mixed perception or understanding by commissioners of the value of services delivered by third-sector providers.

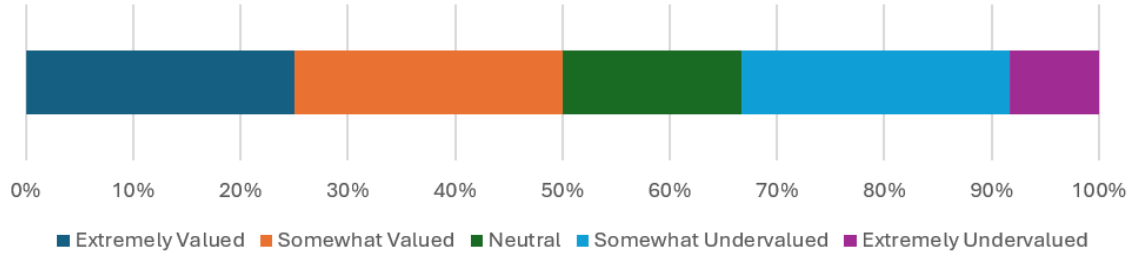


Chart 6. Valued by Commissioners.

The final question in the survey contained a free text field in which respondents were asked to suggest what changes would make the most difference to reducing the key challenges they are currently facing. The following extracts are taken directly from a selection of responses.

> *"Better engagement at a government level. Simplified procurement. Recognition of the work that charitable organisations undertake and the ability to source funding to underpin those services."*
>
> *"More medium to long-term funding (3-5-years) at an appropriate level. Commissioners almost always fail to build-in inflationary uplifts at anything like the prevailing rate of inflation. Added to which commissioners almost always fail to meet Welsh Government's challenge to fund at the Real Living Wage."*
>
> *"Greater opportunities to secure funding on a level playing field - Realistic funding (in terms of full cost recovery) - Less competition and more collaboration within the sector - Less competition from statutory services that are moving into service provision and volunteer recruitment…"*
>
> *"Short term Funding within the third sector is challenging, meeting outcomes and the consistent need to find new opportunities. Being able to access long term funding over 2-3 years instead of 12 months would offer some stability and time to focus on other areas of the business as opposed to constantly looking for funding."*
>
> *"In no particular order 1) Better access to and engagement with commissioners beyond the formal monitoring requirements, and for that engagement to be an immersive experience for them so they experience first hand the difference made by the support provided by the TS. 2) More trust in the sector backed up by INVESTMENT and not short-term project funding. 3) Greater collaboration with the sector to design solutions - better listening, more appreciative enquiry, greater flexibility to adapt and change. 4) Once a project has been proven as successful, continue to support it through recurrent funding routes - there's so much incredible project work being wasted because after the project funding stops, there's nowhere else to turn."*

Themes raised through these comments and the wider survey findings will be captured in the discussion section of this report.

Interview Findings

Three interviews were conducted as part of this research to gain additional qualitative information, specifically from the perspective of individuals holding senior roles within organisations which support the work of the third sector. To identify a range of perspectives and to explore commonality or variances between them, the organisations selected served the interests of the sector in different ways.

- Welsh Government's Communities and Third Sector Unit
- Wales Council for Voluntary Action (WCVA)
- A Community Voluntary Council

When asked how the sector supports the health and care system in Wales, interviewees collectively highlighted the diversity of the sector's approach in offering a wide range of services and supporting tools which are accessible in person and via telephone and digital formats. Interviewees referenced the third sector's role in delivering preventative services that impact on statutory service demand, with a consistent theme across all interviews that a blurring of boundaries exists between statutory and third sector responsibilities.

> *"…volunteers are there to add value to the statutory services that are already being provided. But, in some cases, that that boundary line is a little bit blurry, to say the least… that blurring of the boundary does exist and it exists across the whole of the social care type space."*
>
> *"the voluntary sector has that role in non-statutory services, but there is very much a blurred line. It's kind of expected [of the third sector] to get involved, from the statutory sector, in more places than maybe it should."*

Interview feedback will be drawn upon in more detail within the corresponding themes set out within the discussion section of this report.

Discussion

This section of the report brings together the findings of primary data gained through this research (surveys and interviews) with secondary data to develop our understanding of the challenges facing third-sector providers of health and care services. It will consider these challenges under the headings of key themes that have emerged from primary data analysis. These themes are categorised as funding, competition, commissioning, data and evidence, workforce and engagement.

Funding

Both the survey and interview findings made clear that funding for the third sector is a critical challenge, with multiple factors that impact on future sustainability of third sector service providers. Survey findings suggest that the duration of funding is directly connected to the sense of security providers perceive to have in their commissioned services, with respondents describing a commissioning environment of short-term contracting, where they are often bidding for 12 month funded services or seeking renewal funding on an annual basis. This is time-consuming for both commissioners and providers, creating instability not only in the workforce that is employed to deliver a service, but also to the recipients of the services being provided.

Survey respondents also told us that this position was a result of statutory funding limitations, whose own funding arrangements were determined on the basis of annual budget allocations by the Welsh Government. In the current economic climate, even in circumstances where there is an acknowledgement of the value of services delivered by the third sector, statutory organisations are caught in a cycle of short-termism, knowing that they too must stretch resources further to meet higher levels of anticipated demand annually and will face the challenge of identifying savings.

Interviewees also considered funding as the primary challenge, associated with short-termism in existing funding cycles:

> *"Well, let's deal with the big one first. Funding… it's one of those areas that no matter where you start, it is there being a barrier that the conversation will ultimately lead to - the funding."*
>
> *"I think the obvious challenge is resource… we're seeing financial challenges across the system as a whole… there are challenges from an immediate kind of resourcing point of view, but then also that links on to the lack of longer-term sustainability for those organisations."*
>
> *"Funding… Longer term funding is needed, with sufficient uplifts/increases to reflect cost of living rise and more effective commissioning that reflect value of tenders/contracts and size of the third sector… Salaries are low and short-term funded… some organisations are using their reserves."*

These interviews referred to current actions being taken to address the funding challenge, with specific reference to the Code of Practice for Funding the Third Sector, which is currently subject to consultation. The existing code was noted to contain eighteen principles to guide funders, which may be perceived as a deterrent to third sector funding. The revised code intends to reduce and simplify principles whilst enabling greater recognition of the value and benefits of third-secret delivery. There was, however, uncertainty over realising the full intentions of a revised code.

> *"The biggest challenge… will be the challenge from the [third] sector, quite rightly, to say that's brilliant… but how are you going to make sure that people do it? The answer to that question at the moment is I don't know, that is going to be the hardest bit of that jigsaw puzzle to do. But at least we've got something that is logical, makes sense and then we need to start working with the teams and showing the real difference that adopting these principles makes."*
>
> *"…if all of those things land and are embedded the way they're intended, I think there's real opportunity… but unfortunately it does come down to money a lot of the time, and the money doesn't always follow the intention… There's commitment at a national level, but then the reality is that working practises don't change to really fully embed that… I think we've got the right intentions and the right words, but at the moment we've got an implementation gap."*

The funding landscape presents challenges to the workforce employed by the third sector in many ways. Combined with the job insecurity related to short term funded contracts, this research demonstrated through interviews and survey responses that the sector is unable to match the pay structures and conditions associated with employment within the statutory sector, with a resulting impact on recruitment and retention of its workforce. Uplifts in contract values often do not match rates of inflation or enable third-sector organisations to deliver on Real Living Wage ambitious, therefore providers may be forced to scale back delivery service and make workforce reductions to meet a standstill or reduce budgets for the services they provide. Where they are able to maintain service delivery and staffing structures, this research found that some third sector organisations are doing so by utilising fundraised income or their own financial reserves. This is not a sustainable position for third-secret providers, whose reserves will only tolerate this kind of supplementation in the short term.

Secondary data makes clear the need to rebalance the health and care system towards early intervention, prevention and well-being, engaging the third sector to meet its aims of co-production and engagement with its communities. Government policy aspires to see a reversal in the dependence on statutory services, with a population who are better educated in looking after their own health within their homes and in community settings, using local resources to maintain their health and well-being rather than hospitals and statutory service locations. The sector is vital in delivering these aims, though if funded inadequately through existing contracts, it is unlikely to be in a position to grow and develop services that will have the scale of impact required to reduce statutory demand.

The Code of Practice for Funding the Third Sector will introduce a set of revised principles intended to address some of these challenges. It will require funders to make access to funding equitable, opening the door to smaller and more local organisations who currently do not have the scale or capability to deliver against larger tender opportunities. It also intends to promote early and continuous engagement with the sector, we will explore this more under the theme of engagement, but the impact on funding may result in a clearer understanding of the cost of delivering services that can release savings elsewhere in the statutory system.

The code also seeks to address the issue of value and recognising outcomes which are not purely about the "bottom line". It will aim to realise a broader appreciation by funders of the wider value that can be achieved through social return on investment. Appropriate funding mechanisms will be an important element of the code and introducing standards that relate to pay and full cost recovery will be welcomed by the third sector.

Flexibility will also be a feature of the revised code, requiring funders to consider how budgets may need to flex in response to external factors, such as inflation and the cost-of-living crisis. If the revised code addresses the challenges as it intends to, it could support the sustainability of third sector provision of health and care services. Though as interview feedback demonstrated, this is aspirational and an approach to

implementation of these principles is yet to be understood. Nevertheless, it is positive that the Welsh Government's position recognises the value and challenges of the third sector and is taking steps to implement policy with the aim of supporting and developing its potential.

Competition

This theme considers competition from two perspectives:

1. Competition between third sector organisations, and
2. Competition from outside of the third sector

Despite a commissioning environment trending towards partnership and collaboration between third sector organisations, survey and interview findings within this research suggest that the commissioning environment does not currently provide the right conditions for many third sector organisations to embrace partnerships or actively pursue these on a routine basis.

Survey respondents spoke of a limited commissioning environment, with a distinct lack of opportunity. Where tenders were published, respondents described these being for reduced amounts of funding that make partnering and collaborative approaches even more unrealistic. Exploring this in more detail with interviewees, feedback revealed that the scarcity of funding may have forced third sector organisations into a state of self-preservation. Further, they do not always have the capacity to consider how partnerships can complement their services and deliver greater impact, largely because their capacity is focussed on securing funds to continue to deliver the services they already provide. In some instances, this was creating the opposite of a culture which promotes partnership, driving third sector organisations into a "race to the bottom" approach when competing for funds that do arise. This presents a risk to third sector organisation relationships and rather than encouraging collaboration, may create an environment with less trust and a perception of increased risk in collaboration.

Interviews suggested that increasing partnerships would benefit the sector, both in delivering services together, but also to pool resources and support one another. Further, engagement and stronger relationships could be developed to level-out the balance of power between statutory and third sectors.

> *"For sustainability, the way that the sector works together in partnership is really key."*
>
> *"…working in partnership and trying where possible to not be competitive with each other… coming together and figuring out whether that's around pooled budgets… back office services…"*

Secondary data further reiterate competition as a challenge, describing how third sector organisations often perceive that they are in direct competition with one another, particularly when it comes to funding opportunities. Whilst third sector organisations may share common values and mutual challenges, this sense of competition risks relationship dynamics within the sector and is a clear barrier to collaboration.

Competition from outside of the third sector was also noted to be increasing. Survey respondents raised challenges relating to the development of volunteering opportunities within the statutory sector, believing that competition for volunteers was compounding the difficulties they already face as a result of reduced volunteer availability since the pandemic. Whilst volunteering is not exclusive to the third sector, it is far more reliant on voluntary service as part of its workforce than the statutory sector.

Competition was specifically referenced in the regulated care market, where third sector providers had been unable to compete with large private domiciliary care agencies, who were able to undercut the delivery costs of third sector providers due to their scale of existing operations. An example of a Local Authority having established its own trading company to provide care services to its population was felt to be absorbing opportunities that may have been previously delivered by the third sector. In the context of a sector already impacted by the financial challenge described earlier, collaboration is – perhaps, understandably – being viewed by the third sector as more of a threat than an opportunity.

Commissioning

Through this research, approaches to commissioning have been highlighted consistently as a challenge to third sector service providers. Publications considered as part of a review of secondary data described how public sector contracts are now larger in geography and value, which has the potential to deter smaller

voluntary organisations who may not be positioned to respond to contracts of such size and scale. Such organisations may lack the financial and human resources to compete with larger third sector or private sector providers that have more experience or capacity in navigating complex procurement processes.

The move towards outcome-based and payment-by-results commissioning was also referenced as a challenge and may be off-putting to third sector organisations due to the additional risk associated with non-delivery. This form of commissioning may impact on the achievement of full cost recovery and risks undervaluing the wider benefits of service delivery by third-sector organisations. In commissioning on a payment-by-results approach, without engagement or collaboration to specify the results, commissioners risk designing these in isolation, which may not acknowledge the perceived results of provider organisations or, perhaps more importantly, by the users of those services. This approach to commissioning may also impact on the development of trust and equity in the commissioner-provider relationship, which, as we saw from the secondary data considered by this report, are important in creating the conditions for health and care collaboration as intended by A Healthier Wales.

Short term commissioning was widely acknowledged throughout this research as a barrier to third sector service provision. Short-term contracts offer no guarantee of future income, making it difficult for third sector organisations to plan for the long term, invest in their workforce or maintain the value that its services deliver. Workforce and service delivery risks aside, public sector commissioning requires capacity and skills in bid-writing that may be limited within the third sector. To invest scarce resources in bidding for short-term contract opportunities is not viable for many third-sector organisations.

Interviews demonstrated the view that enhanced commercial awareness across third-sector organisations would result in a better understanding of the actual costs of their delivery service. This may also strengthen third-section organisations' ability to engage in commissioning processes, and result in them holding a firmer line on contract values and payment terms, to protect themselves from absorbing funding shortfalls.

> *"Some organisations bid for services without really going through the motions of actually costing things up. So, this thing about full cost recovery, you know, they think that they can deliver it for X amount. But the reality is if they went through the accounts, it would cost them Y. But because of the fact they're trying to attract the funding to keep the jobs they try and try and deliver it for X. And the reality is they never will."*

Feedback to the Welsh Government's Rebalancing Care and Support consultation demonstrated the sector's requirement for commissioning periods to meet a minimum of three years in order to address the issues of sustainability. Evidence from survey feedback and interview discussions as part of this research indicates that a simplified approach to commissioning, with longer contract periods and co-design as essential components, would enable third sector providers to better respond to commissioning opportunities.

The power dynamics within the commissioning process can also disadvantage third-sector providers. Statutory sector commissioners hold influence over the terms and conditions of contracts, weakening any negotiating position of the third sector and resulting in pressure to accept terms which may not be favourable. A lack of equity in the design of commissioning may result in third sector organisations gradually shifting away from their core mission to align with the priorities of commissioners.

Data and evidence

One area of variation arising through the primary data collected as part of this research related to data and evidence. Whilst survey respondents considered evidencing the outcome and impact of their services as less of a challenge than funding or commissioning, interviews specifically referenced this as a challenge which the sector needed to respond to in order to improve its own sustainability. Interviewees all agreed that data which could quantify the value of the sector in more detail was either not available or not consistent, and that this was a key area the sector should develop its approach to.

> *"…it's a really difficult question to answer, and the reason being is that there isn't the data, so no one can actually point at the data to quantify the contribution… It's the support that they give, both in terms of the paid support and the volunteering support. There's the economic importance [of the*

sector] they are a significant employer … the volunteering bit is multi-fold as well… in the support that the volunteer gives the recipients, but there's also the feel-good factor that it gives to the person who's volunteering and so how do you measure all of that?"

"We're aware is no real data on the value of the sector. If we could get under the skin of that a little bit more then we would be in a better place."

"I think we've got an opportunity around data and insights and being able to clearly demonstrate our impact."

Capacity within the sector to invest time and resources in quantifying its wider impact may be limited and interviewees acknowledged that demonstrating this was difficult. However, considering the economic challenges facing the health and care system as a whole, the importance of being able to demonstrate impact and value is more important than ever, particularly as commissioner expectations on providers demonstrating value for money in their services has increased.

If the third sector is able to utilise recognised models of evaluation and economic analysis to develop a consistent method of quantifying the value it delivers, it will be far better positioned to respond to opportunities and to strengthen its role as a provider of health and care services. This may also address the balance of power between the statutory sector as a commissioner and third sector as a provider.

Workforce

Whilst already referenced within the themes of funding and competition, the challenge the third sector faces in respect of its workforce is a worthy theme on its own.

There was a consensus view between survey participants and interviewees that recruitment and retention within the third sector was problematic. Whilst secondary data suggested commitment to parity in pay across sectors, interview feedback made specific reference to comparatively low salaries within the third sector, coupled with less favourable terms and conditions than statutory sector employment.

Both voluntary and paid roles within the third sector are sometimes viewed as a platform from which to progress into statutory sector employment. If pay and conditions are not competitive, this is inevitable and understandable when the cost of living is a societal challenge. It is hoped the revised Code of Practice for Funding the Third Sector will help to balance this conflict, but as has been discussed already, the aspirations of this code are likely to present a challenge which commissioners of third-sector services may struggle to deliver on.

A reduction in the number of volunteers since the pandemic was referenced within secondary data sources, as we discussed under the theme of competition. However, if the third sector sees a further diminishing of its volunteer workforce, this is likely to result in an increase in its costs of delivery service, which is likely to compound its funding challenges further.

Engagement

The engagement of the third sector in matters relating to health and care within Wales is important for several reasons, all of which contribute to the more effective, inclusive and responsive health and care system, which A Healthier Wales aspires to. Third sector organisations are acknowledged to be deeply rooted in the communities they serve, giving them a unique understanding of local or condition-specific needs. This, combined with the existence of well-established and trusting relationships, makes the sector uniquely placed to support and enable the co-production of health and care services for the future. Being independent from government and statutory sector structure and governance, they have a greater degree of flexibility, allowing them to innovate and adapt quickly to emerging health issues or shifts in demographic trends.

The sector also plays a critical role in advocacy, often representing the interests of vulnerable and marginalised groups who may lack a voice in the public sector. This advocacy is vital for improving equity in health and care, through challenging inequalities and promoting more inclusive policy and practice. The sector also uses its advocacy to enhance public sector accountability. As independent entities, third sector

organisations can hold the statutory sector and government to account to their commitments and performance.

Despite the recognised importance of the sector in its capacity to innovate, its enabling of co-production and its advocacy role, survey feedback argues that engagement by commissioners and government requires improvement. One survey participant highlighted that commissioners do not look at third sector delivery beyond formal monitoring arrangements and that this inhibits their understanding of the impact on quality of life of those its services support.

Interviewees agreed that engagement was an area for development. The complexity of structures within the statutory sector, including Public Service Boards and Regional Partnership Boards, was difficult for the third sector to navigate. Where third sector representation is included within these structures, there is an unreasonable expectation for one or two individuals per health board area to be able to represent the entirety of the sector within that geography.

> *"…we go out to the sector and we ask for intelligence, we ask for feedback and data, but people just haven't got the time to be thinking about that kind of stuff because they're dealing with the firefighting in the here and now, which obviously then has a negative effect when we're trying to do some of that policy influencing work."*
>
> *"… (it) can be quite difficult to navigate the systems, and certainly those of public organisations… the sector doesn't have the space or the capacity to engage in strategic thinking in longer term thinking, it's really reactive and that's through no fault of their own... There are so many different structures, you've got the RPB's, you've got the PSB's, you've got the local authority… it's navigation of that landscape and how difficult it can be for some organisations."*
>
> *"… the complexity of the landscape is also a challenge, so people knowing at which levels to get involved, whether at a local, regional or a national... If you just look at the PSB structure and how people are engaging in that or aren't able to engage in it. In some places it's really complex to understand when they've got such a finite resource in terms of capacity to engage."*
>
> *"I see massive fatigue in the influencing and engagement space. There's so many asks on the sector's time, whether that's going to meetings, engaging in networks, responding to consultations, responding to asks around data – those working in the Third Sector just haven't got the capacity or energy to do it all and unfortunately, that is going to have a knock-on effect on how we can engage with important policy decisions at national level."*

Secondary data suggests that this has been acknowledged and that third sector representation in key structures will be developed, though detail on what this will look like in future is not yet available. The survey's feedback also suggested some variance in views on statutory sector commissioners' value of third sector services. This variance would be worth exploring in more detail, but could be attributable to responses reflecting multiple commissioners, some with a greater degree of engagement than others.

Conclusion & Recommendations

This research underscores the profound challenges facing third sector providers in the health and care sector in Wales, as highlighted through primary data from surveys and interviews, complemented by secondary data review. The findings are clustered around several key themes: funding, competition, commissioning, data and evidence, workforce, and engagement. Each of these themes reveals hurdles that, if left unaddressed, will continue to undermine the sustainability and efficacy of third sector contributions to health and care provision.

Analysis reveals that funding is a paramount concern, characterised by short-term contracts and limited financial stability, which not only hampers long-term planning but also destabilises the workforce and service delivery. This insecurity is compounded by a competitive environment, where third-sector organisations often find themselves pitted against each other and larger private or statutory entities, further eroding collaboration and trust within the sector. The commissioning process, with its emphasis on larger contracts

and outcome-based models, places additional strain on smaller organisations that lack the resources to compete effectively or absorb the risks associated with payment-by-results commissioning arrangements.

Moreover, the challenge of data and evidence collection is significant, as third sector providers struggle to quantify and demonstrate their impact, a crucial factor in securing funding and support from commissioners. The workforce issues outlined, including low pay, job insecurity and a diminishing volunteer base, exacerbate these challenges, making it increasingly difficult for the sector to attract and retain talent. Finally, the engagement between the third sector, government and statutory bodies remains insufficient, limiting the sector's ability to influence policy and service design, despite its deep community roots and valuable insights.

Recommendations

Long-term Funding and Full-Cost Recovery

To ensure sustainability, it is essential for funders, including the Welsh Government, to move towards longer-term contracts, ideally a minimum of three years. This will allow third sector organisations to plan, invest in their workforce and maintain consistent service delivery with better impact and outcomes across the population. Additionally, funding mechanisms should ensure full-cost recovery, including adequate provisions for inflation and cost of living increases, to prevent service reductions and workforce instability.

Enhanced Collaboration and Partnerships

To mitigate against the detrimental effects of competition, there should be a strategic push towards fostering collaboration and partnerships within the third sector. This can be facilitated by creating funding streams specifically designed for collaborative bids, coupled with capacity-building initiatives that help smaller organisations navigate and engage in partnerships effectively.

Simplified and Equitable Commissioning Processes

Commissioning should be simplified to encourage participation from smaller third-sector organisations. This includes reducing the complexity of bidding processes and ensuring that contracts are not disproportionately large or outcome-focussed, which can deter smaller providers. Co-design of contracts should be prioritised, allowing third sector input from the outset to ensure that commissioned services are aligned with both community needs and provider capabilities.

Improved Data and Evidence Capabilities

Investment is needed to develop the third sector's capacity to collect and analyse data that quantifies its impact. Third sector representative organisations should provide resources and training to help organisations adopt recognised models of evaluation and economic analysis. This will empower the sector to demonstrate value more effectively, strengthening its position in funding and commissioning negotiations.

Workforce Support and Parity of Pay

Addressing the workforce challenges requires an urgent focus on pay parity with the statutory sector, alongside improving terms and conditions to make third sector roles more attractive and sustainable. The Welsh Government's Code of Practice for Funding the Third Sector should be leveraged to promote these standards, ensuring that third-sector employees are fairly compensated, and that volunteer recruitment and retention are supported.

Strengthened Engagement and Representation

Engagement mechanisms between the third sector and statutory bodies should be enhanced, with investment in increased and more consistent representation across Public Service Boards and Regional Partnership Boards. This will ensure that third-section organisations have a stronger voice in decision-making processes, leading to more inclusive and responsive health and care services. Regular and meaningful engagement should be institutionalised, moving beyond formal monitoring to include ongoing dialogue and feedback loops.

By addressing these recommendations, the Welsh Government and statutory sector stakeholders can create a more supportive and sustainable environment for third-sector providers, ensuring that they can continue to play a vital role in the health and care system in Wales.

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What are the Critical Stages in the Introduction of an Integrated Discharge Hub for Managing Safe Patient Flow?

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Abstract:

The Welsh Government, along with healthcare professionals and academics, has focused extensively on improving patient flow from acute services. The existence of delays and inefficient processes has led to prolonged care pathways, placing significant strain on Health Boards and adversely affecting patient outcomes. This study assesses the implementation of an Integrated Discharge Hub aimed at facilitating safe hospital discharges within a Welsh Health Board, framed within the concepts of systems thinking, socio-technical systems, and learning organisations. By embracing a collaborative and co-produced methodology that leverages the strengths of multidisciplinary teamwork, there is potential for a sustainable model to be developed that reduces hospital discharge delays and enhances outcomes, which could be adopted across NHS organisations.

Keywords: Hospital discharge, Patient Flow, Integrated Discharge Hub.

Tables and Figures

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1.	The key government and other policies impacting on patient flow
2	The five elements of a learning organisation
3	Comparison of current process and proposed IDH model
4	Failure Mode and Effect Analysis of current system
5	Failure Mode and Effect Analysis of IDH implementation

Figure Number	Title
1	Literature review key concepts
2	The conceptual framework
3	The research onion
4	Stakeholder map
5	Graphical depiction of IDH process overview
6	Swim lane map prior to IDH
7	Swim lane map with IDH
8	Pareto chart of FMEA- Current process
9	Pareto chart of FMEA- IDH implementation
10	IDH implementation four fields map
11	IDH flow chart
12	The main sociotechnical principles

Acronyms

Acronym	Definition
A&E	Accident and Emergency
COP	Clinically Optimised
D2RA	Discharge to Recover Then Assess
IDH	Integrated Discharge Hub
LoS	Length of Stay
MDT	Multidisciplinary Team
NHS	National Health Service
TQM	Total Quality Management
WG	Welsh Government

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Introduction

BACKGROUND AND CONTEXT

The transition of patients from secondary care to primary care has attracted significant and increasing attention from both academics and healthcare professionals. It is rare to find a day without news coverage on mainstream television or social media addressing the backlog of ambulances waiting outside A&E Departments or other delays in healthcare services. The pandemic has intensified the scrutiny of patient flow issues that have been present long before these media reports became prevalent. Challenges such as delays, backlogs, and ineffective discharge processes that prevent the timely availability of beds for incoming patients have been exacerbated by an aging population with multiple health conditions, alongside social services grappling with chronic workforce reductions and the pressures of insufficient care facilities for discharged patients. The aftermath of the pandemic has brought these challenges to the forefront, which is the central theme of this thesis.

The WG has emphasised the importance of treating patients with respect, delivering high-quality services, and achieving these objectives at the lowest possible cost in various policy documents, directives and targets. These policies underscore the necessity of minimising unnecessary admissions to secondary care in order to reduce the demand on the service and to ensure clinically optimised patients flow out of the wards to release capacity and time to serve other patients. Numerous initiatives have been implemented to enhance performance in this area (see Table 1).

Table 1. The Key Government and Other Policies Impacting on Patient Flow

Policy/Document (year)	Aims and/or Recommendations
Six Goals for Urgent and Emergency Care (2022)	This handbook sets out the priorities for urgent and emergency care to ensure that patients get the right care, in the right place, first time.
Hospital Discharge Guidance (2023)	This document sets out guidance on hospital discharge standards for health, social care, third and independent sector partners in Wales.
Discharge to Recover Then Assess (D2RA) Pathways (2023)	The principles and processes that support safe, timely and effective discharge are set out in this guidance.
All Wales Optimal Patient Flow Framework (2022)	The Framework focuses on ward-based care and preventing a patient's clinical deconditioning as well as the key principles of using SAFER, Red to Green and D2RA Pathways.
A Healthier Wales (2018)	This plan sets out a long-term future vision of a 'whole system approach to health and social care', which is focused on health and wellbeing, and on preventing illness.
Social Services and Well-being (Wales) Act (2014)	The Act imposes duties on local authorities, health boards and Welsh Ministers that require them to work to promote the well-being of those who need care and support.

PERSONAL MOTIVATION OF THE RESEARCHER

The researcher holds a senior management position in the Community Services within the Welsh NHS and has an expertise in the flow of patients in the primary and secondary care settings. In light of the challenges and demands faced by the system (to facilitate safe and efficient hospital discharges) the researcher sought to expand her knowledge of patient flows in the complicated setting and interface between secondary care and the diversity of primary care services that receive patients and care for them on discharge. She had the opportunity to access the initiation and development of an IDH to enhance patient flow within an acute hospital.

RESEARCH QUESTION, AIMS AND OBJECTIVES

The key research question, that guides this study, is "What are the critical stages in the introduction of an IDH for managing safe patient flow?". This study aims to evaluate the implementation of an IDH in a Welsh Health Board. The objectives of this study are:

- To assess the implementation methods employed to create an IDH
- To evaluate the implementation process in the context of systems thinking, socio technical theory and the learning organisation concept
- To report on implications of an IDH for future practice and research

CONCLUSIONS AND THE STRUCTURE OF THE THESIS

This chapter has set out the modern context of patient flow and its challenges. The next chapter will present the main published literatures in this subject area that informed the project requirements along with the research design and strategy. The following chapters will analyse the results of the study, conclusions drawn and key recommendations.

Identification of Project Requirements

INTRODUCTION AND PURPOSE

The literature that underpins this study, is drawn from change management (the implementation of a new discharge model) within the context of the Welsh NHS, with the intention of enabling better patient flow (service operations management) and changes in performance of a system (system measures including flow, quality, and safety) within a professional service setting.

CHANGE MANAGEMENT MODELS IN HEALTHCARE

Harrison et al. (2021) conducted a systematic review aimed at assessing the evidence surrounding established change management models utilised in healthcare, as well as the consequences of their application in facilitating implementation and enhancement methodologies. The findings from this review are essential for health systems to understand how change management models contribute to healthcare transformation and to explore the potential for integrating these models with improvement and implementation strategies. This review indicates that changes initiated by clinicians are prevalent, emphasising that change management models serve mainly to offer a supportive and adaptable framework for guiding change processes. Additionally, the review points out the potential to merge change management models with those typically used for improvement and implementation, thereby facilitating beneficial transformations in healthcare.

LEAN HEALTHCARE TO ENHANCE PATIENT FLOW

A recent systematic review considering Lean healthcare interventions that focused on enhancing patient flow identified the main approaches of process modelling that can be used to inform service operations management (Lima et al., 2024). The review identified start and end events, decision making factors along with other elements necessary to understand the reality of patient process flows. The authors proposed alternative models to support flow in emergency departments and suggested that standardisation of core activities can facilitate the development of models that can be adapted to the specific characteristics of the context. The authors also recommended that similar studies be conducted for other hospital areas, given the gain of starting from standardised processes in improvement projects.

INITIATIVES TO IMPROVE PATIENT FLOW

Cantrell et al. (2023) had previously conducted a mapping review that examined various interventions or initiatives aimed at addressing winter pressures, specifically focusing on discharge planning to enhance smart discharge (this approach seeks to reduce the number of patients awaiting discharge and ensure that patients are released to the most suitable settings) alongside integrated care strategies. The authors recognized that D2RA is extensively utilised and strongly backed by evidence. They concluded that since hospital discharge requires a comprehensive system approach, it is essential to consider the entire health and social care framework to prevent the transfer of issues from one setting to another when implementing an initiative. Abuzied et al. (2021) suggest that LoS can be reduced by introducing a quality improvement intervention, driven by a multidisciplinary committee involving health care staff, to facilitate optimal discharge mechanisms through available resources.

LITERATURE REVIEW KEY CONCEPTS

This research builds on the literature with foundations derived from operations management, Lean healthcare and value based healthcare, along with socio technical systems and Highly Reliable Organisations to implement and evaluate the benefits of a new initiative, an IDH, on patient flow from hospital. Figure 1 shows the key concepts identified to frame this study.

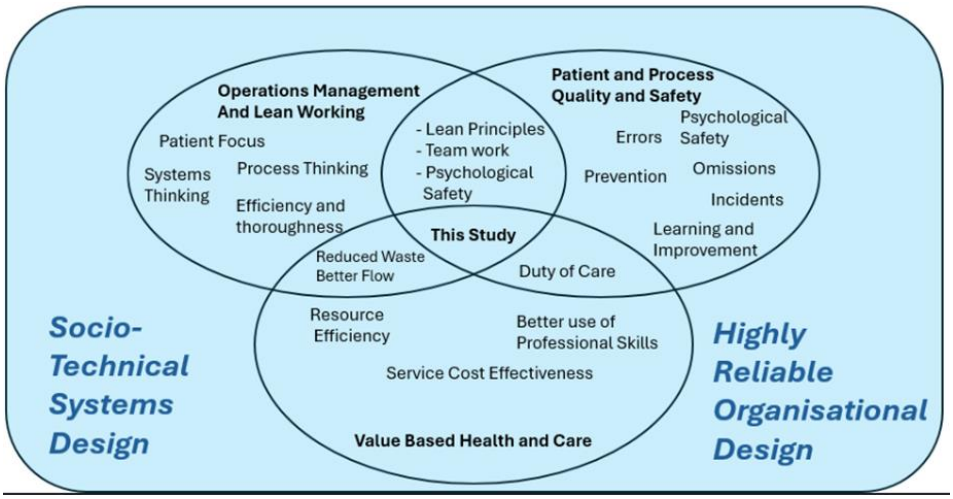


Figure 1. Literature Review Key Concepts.

From the literature review and the many professional body and WG policies and directives, it was possible to determine the following 'gap' in the current knowledge of flow systems and integrated discharge planning:

"What are the critical stages in the introduction of an IDH for managing safe patient flow?"

THE CONCEPTUAL FRAMEWORK

The researcher developed a conceptual framework from the literature review and produced figure 2 as a summary of the key concepts that describe patient flow in a professional service (NHS Wales) context and to frame the major elements of an IDH. The researcher will address these issues through the use of mapping techniques to show the strengths, process, context and outcome of changes by an IDH team who were formed to introduce this mechanism at a Local Health Board.

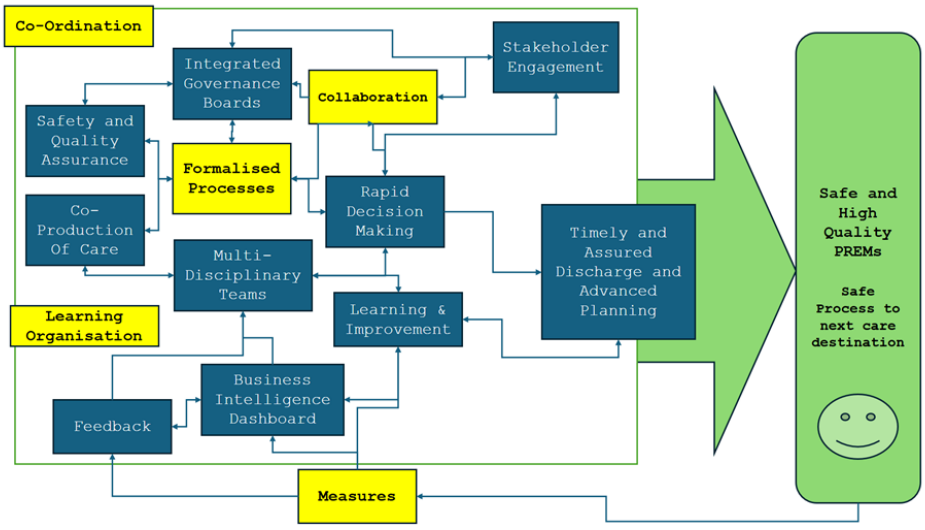


Figure 2. The Conceptual Framework.

RESEARCH DESIGN

Every study must be positioned in the background literatures. This literature is different to the focal subject literature and instead contains theoretical approaches. The main theoretical literatures that underpin this study are systems theory which proposes that the system generates benefits that are greater than the sum of the parts of the system and superior patient flows will result from more effective systems designs that fit the new dynamic fast-flow setting for patient discharges and that all actors in the system, if working to a common agenda and process, will increase safe flow of patients from secondary care. The second lens, chosen by the researcher is socio-technical systems theory which promotes the view that aligned

technologies and engaged staff will lead to more effective and efficient patient flow and finally a combination of the Learning Organisation TQM which posits that learning leads to improvement and that five principles of the learning organisation (Senge, 1990) will enhance performance.

Table 2. The Five Element of a Learning Organisation (Senge, 1990).

Feature	Definition
Personal mastery Systems thinking	One of the most widely recognised interpretations of systems thinking is its application in personal mastery. This approach enables us to understand our interconnectedness with the world and highlights the interdependencies that exist between our actions and the realities we experience.(Flood, 2010)
Common mental models	Events and patterns arise from systemic structures and mental models. Behaviours stem from a variety of system frameworks, which are formed based on these mental models. To comprehend behaviours effectively, it is essential to first identify and understand the systemic structures and the foundational mental models that give rise to them.(Monat & Gannon, 2015)
Building shared vision	A shared vision involves fostering a sense of commitment within organisations by crafting future-oriented images of principles and aspirations that serve as a roadmap to success. Establishing a clear vision and mission is crucial for an organisation to avoid performance deficiencies.(Shoid & Kassim, 2012)
Team learning	Team learning refers to the enhancement of a team's knowledge, skills, and overall performance achieved through collaboration, dialogue, reflection, and adaptation. This process encompasses the exchange of ideas, knowledge, and experiences among team members, utilising this collective information to elevate the team's effectiveness.(Nadav et al., 2023)
Systems thinking	Healthcare systems are highly intricate, arising from numerous interconnected and interdependent components along with their feedback mechanisms, which include various independent agents interacting with their environment. Systems thinking serves as a valuable framework for addressing the complexities within healthcare and has been recognised as beneficial for facilitating change in health service delivery. This problem-solving methodology encourages viewing issues as interconnected elements of a broader system, highlighting the importance of understanding relationships, interactions, and patterns within a complex framework to enhance comprehension and effectively manage challenges. (Linnéusson et al., 2022)

RESEARCH STRATEGY

The research process commenced with a literature review of the Swansea University iFind database using key search words including models of discharge planning, improving discharges, enablers for improved discharge planning and variants thereof. This process yielded a number of journal papers and grey literature reports that were each reviewed and key concepts were identified. These were included and summarized by the conceptual framework.

Figure 3 shows the Research Onion (Saunders et al., 2009) and allows this research to be positioned for the reader. The philosophical approach to the study is one of pragmatism and deriving impact from understanding what is pragmatically happening in the workplace for discharges. The approach needed to answer the contextual understanding of the discharge process is declared as inductive where findings and the contribution of this study will be drawn from the workplace and not predetermined hypotheses.

The chosen strategy of the study was to explore changes at a focal organisation and therefore a case study was selected as the most appropriate strategy for the researcher to engage and understand the changes in dynamics as a discharge process improvement intervention was undertaken (the introduction of the IDH). The selection was based on the researchers' access to the case study, the ethical approval of Swansea University (School of Management) and the practical constraints of the MSc thesis duration for field research.

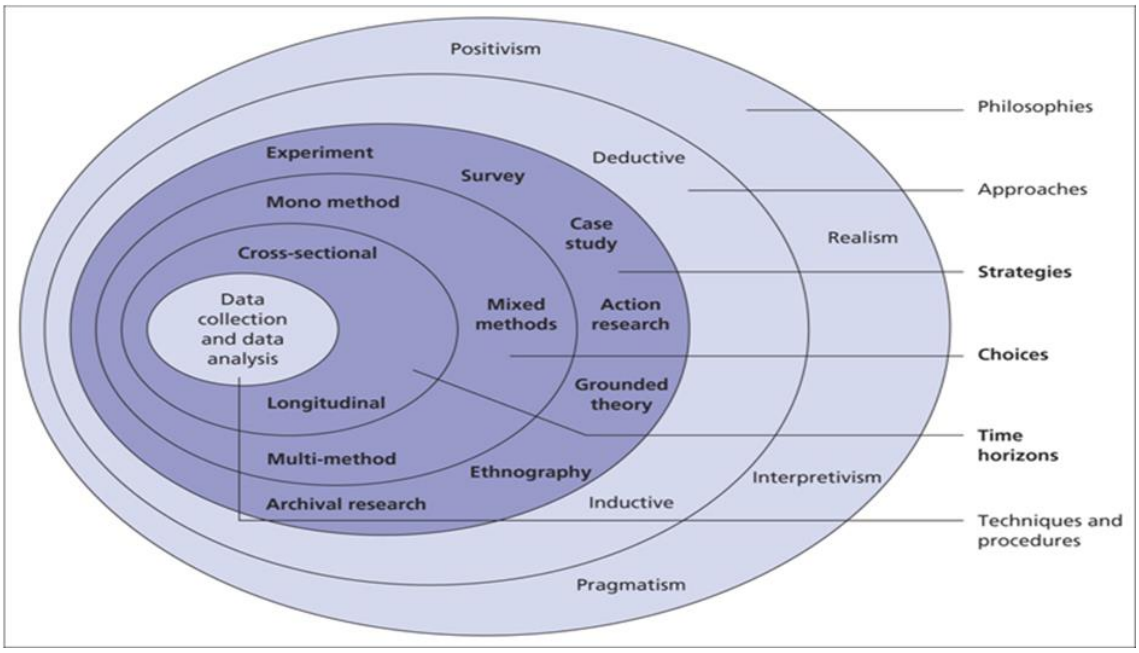


Figure 3. The Research Onion (Saunders et al., 2009).

Within the case study, the researcher collected perceptual evidence as well as data derived from the discharge processes (multi qualitative methods) in a series of stages which is best described as action research as the researcher is known to the discharge team and collocated with them. Periods of weekly reflection were held with the supervisory team of the researcher to assist her to reflect on the process of change and what was happening with staff feelings and performance data.

GENERALISATION OF THE STUDY

The researcher proposes that other discharge processes in Wales and the UK will exhibit similar patterns of enablers and inhibitors and thus generalisation to these contexts is possible based on technological equivalence.

LIMITATIONS OF THE STUDY

The study is set within the unique contexts of the Welsh NHS and a system that is taxpayer funded but also does not involve competitive contracting for services by Local Health Boards.

SUITABILITY OF THE APPROACH

The approach is highly suitable and recommended for action research within a longitudinal change process of a case study.

ETHICAL APPROVAL

Ethical permission for this study was granted by Swansea University in July 2024.

METHODOLGY USED TO IMPLEMENT THE INTEGRATED DISCHARGE HUB

The researcher engaged in an action research approach to the operationalisation of the case study IDH. She was actively involved in facilitating a team-based change process using workshops, stakeholder engagement and she collected data concerning the performance of the service as it was introduced and changed the flows of patients. The research involved multiple cycles of activity and reflections by the researcher. To assist this process, she kept a researcher daybook as well as a weekly report to her supervisor to reflect on her views and evidence of change (the latter exercises were used to test and challenge her learnings about patient flow and inhibitors to flow). A Stakeholder map was conducted and is shown in Figure 4.



Figure 4. Stakeholder Map.

The researcher utilised a number of operations mapping techniques that offered greater insights into how patient flow and bottlenecks could be managed for optimal discharge rates (subject to confirmation of clinical optimisation). These will be discussed later in the paper.

The study does not involve changing any form of governance regarding the patient and is observational of events and decisions taken by the team concerned. These methods involved systems mapping and depiction, swim lane maps, demand analysis, risk analysis using the technique known as Failure Modes Effect Analysis and Four Fields Mapping.

Main Analysis

THE PROCESS FOR IMPLEMENTING THE INTEGRATED DISCHARGE HUB

The first stage of mapping involved a general process map which showed graphically the major stages and process of an IDH. The graphical depiction shows the logic and safe flow of patients from discharge processes to the responsibility of primary care services. The Strategic model was drawn from feedback from both ward and community teams during the initial workshops.

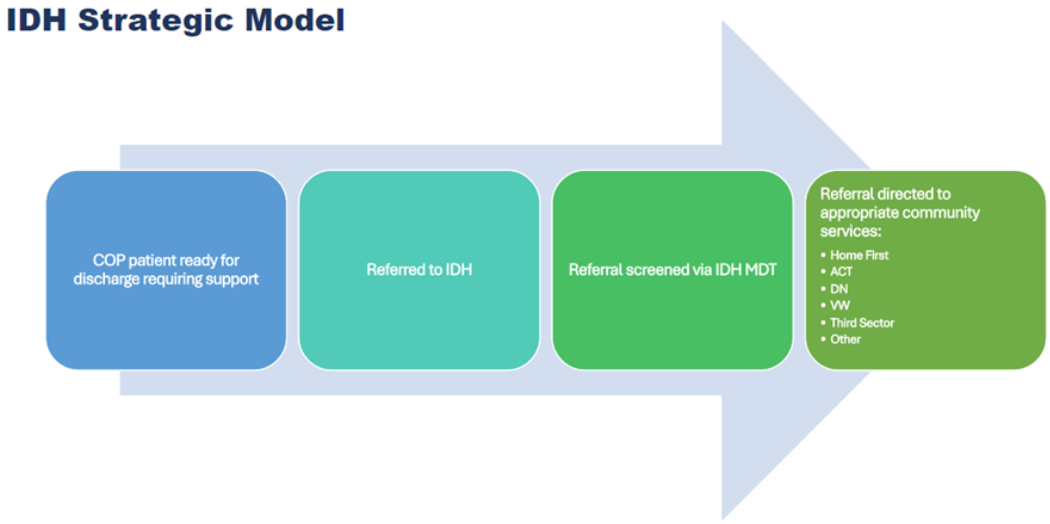


Figure 5. Graphical Depiction of IDH Process Overview.

Acronyms used: COP= Clinically Optimised Patient, MDT= Multidisciplinary Team, ACT= Acute Clinical Team, DN= District Nursing, VW= Virtual Ward

To provide a balanced view of the IDH service as it emerged a swim lane map was used to depict the current state (Figure 6). The team conducted brainstorming and innovation workshops to depict the flow of patients under conditions of an IDH mechanism. The cloud bursts show issues that were identified by the ward teams.

The next stage in the learning journey was to identify risks to the change from a current state discharge process and the IDH model. This was mapped using a swim lane (figure 7).

The team determined the potential gains against themes identified in the workshops following the implementation of an IDH which are shown in table 3.

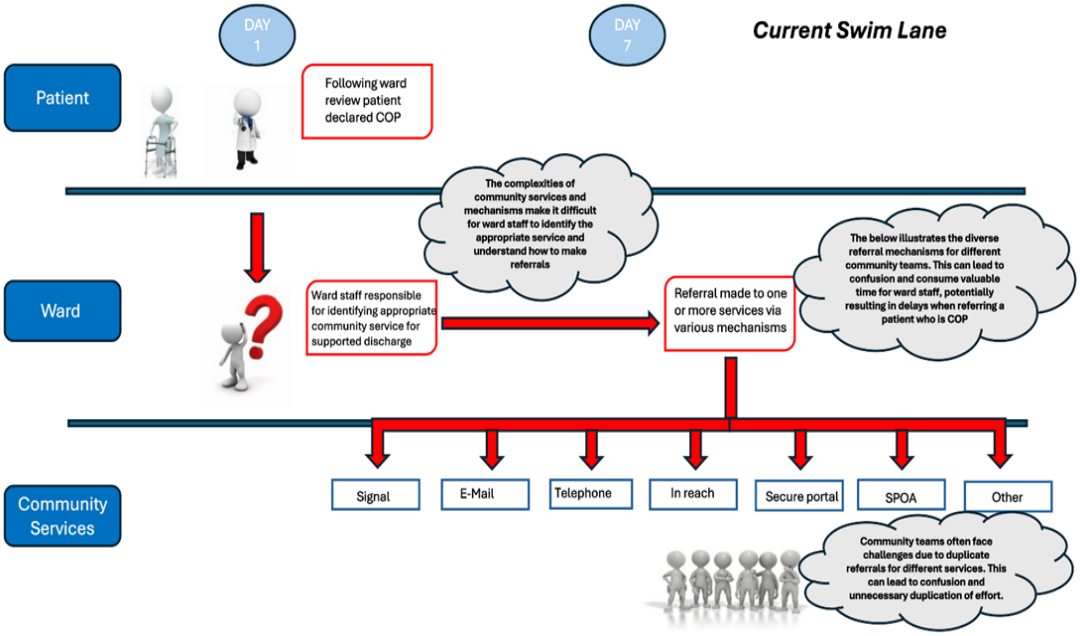


Figure 6. Swim Lane Map Prior to IDH.

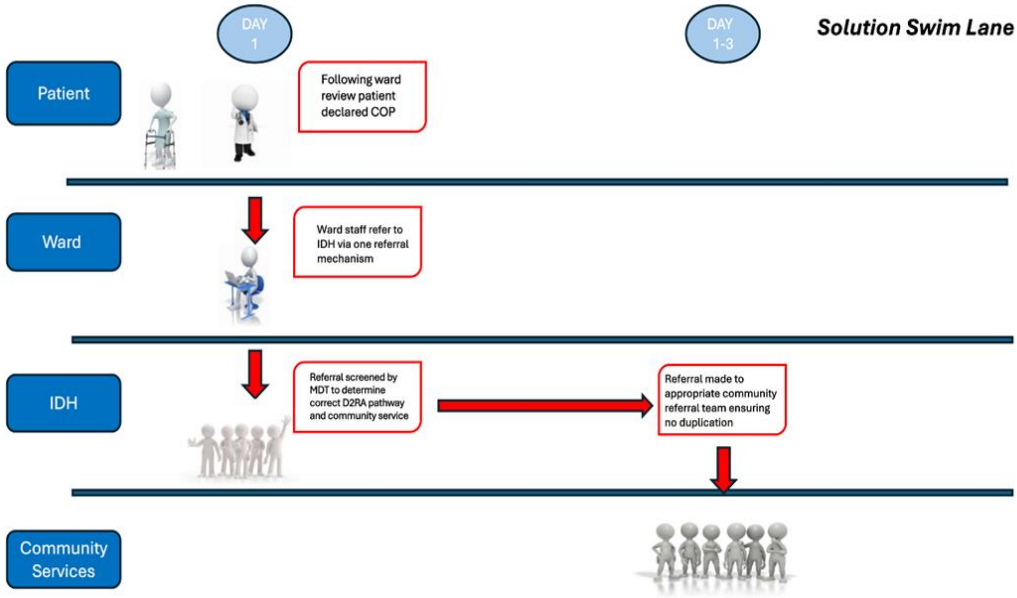


Figure 7. Swim Lane Map with IDH.

Table 3. Comparison of Current Process and Proposed IDH Model.

Themes Identified	Old Discharge System	IDH Model (Estimates)
Identification of appropriate community service for supported discharge	Dependent of ward staff knowledge of available community services	Burden taken from the ward staff and appropriate community service identified by MDT with extensive knowledge of services available to support hospital discharge
Referral Process to community teams for supported discharge	Various processes individual to each receiving team i.e. telephone, email, IT portal, Signal system etc.	One process to refer to any community service for supported discharge.
Shortest time to safe discharge	Delays in discharge due to duplicate, inappropriate or incomplete referrals to community services required to support discharge.	Reduced delays, no duplicate referrals, contact response to ensure information is complete and appropriate and enhanced 'push function' supported by strong links with community teams to help expedite discharge.
Patient Outcomes	There is a risk of deconditioning if referral onwards to services essential for discharge is delayed due to inefficient processes as well as the potential for patients to be discharged into the wrong care due to lack of information in referrals.	There is a potential to reduce the risk of deconditioning and improve patient outcomes by ensuring patients are discharged timely into the appropriate receiving service.

To ensure a controlled process of change, the researcher reviewed the risks and threats to the current and potential IDH process and is shown in table 4. This ensured early identification and mitigation for potential threats to the project.

Table 4. Failure Mode and Effect Analysis of Current System.

THEME	DETAIL	SEVERITY	FREQ	SCORE	SHORT TERM MEASURE	LONG TERM MEASURE	PREVENTION
Reliance on ward staff knowledge of community services for referral onward	When a patient is deemed ready for discharge from the hospital with some support needed, it becomes the responsibility of the ward staff to pinpoint and direct them to the suitable community service. The multitude of services with differing eligibility criteria and referral processes poses a challenge for ward staff in determining the right referral pathways	9	9	81-HIGH	One referral mechanism to a centralised hub for all individuals ready for discharge from hospital requiring some level of community support	Education and strengthening of links between community and secondary care teams	All referrals from secondary care to community services to be directed via the IDH

Delays between an individual being declared COP and being referred to an appropriate community service for discharge support	It can take up to 5 days for a referral to be made to community teams once a patient is identified as COP This leads to increased LoS, cost and risk of hospital infections and deconditioning for patients	9	9	81-HIGH	Integrated discharge team to attend board rounds to support ward staff in identifying individuals for referral to the IDH One referral mechanism to IDH prevent delays in ward staff identifying the correct service and referral method to support a hospital discharge	Support, advice, education and guidance for ward staff	Targeted education for ward staff Monitoring of target to refer onwards within 24 hours of individual being declared COP IDH to prevent delays as ease of referral to community teams via the hub negates need for ward staff to seek appropriate service and referral mechanism for discharge
Incorrect D2RA pathways inputted to Signal system	As part of D2RA all patients must be placed on the appropriate D2RA pathway for discharge The pathway is entered on the Signal system. Reports indicate that the correct D2RA pathway is often not selected by ward staff	3	9	27 MEDIUM	All referrals for discharge for pathways 1-3 will be made to the IDH The IDH team will input the correct pathways on to the Signal system at point of referral onwards	Support, advice, guidance and education for ward staff	IDH team to input correct pathway on Signal system
Duplicate referrals to more than one community service	Inefficient ward processes often lead to duplicate referrals being actioned to multiple community services, causing confusion for both staff and patients during discharge This duplication of effort wastes resources and creates frustration	3	9	27-MEDIUM	All referrals for individuals requiring community support for discharge will be directed to the IDH who will be responsible for ensuring the referrals do not duplicate	Support, advice, guidance and education for ward staff	IDH to manage all referrals to community services

Table 5. Failure Mode and Effect Analysis of IDH Implementation.

THEME	DETAIL	SEVERITY	FREQ	SCORE	SHORT TERM MEASURE	LONG TERM MEASURE	PREVENTION
Inability to recruit skilled resource	IDH is resource neutral requiring the repurpose of capacity	9	6	54 Medium/ high	Resource repurposed from available teams already involved in the triage for hospital discharge	Permanent allocation of resource to support the IDH	Permanent resource
Digital solution unable to deliver required results	IDH function dependent on an appropriate referral format and feedback loop to ward staff	9	9	81- High	Microsoft electronic form to be used for referrals and some elements of signal functionality utilised for feedback to wards. IDH staff will also attend Board rounds to provide feedback.	Signal referral form and full Signal system functionality	Signal system utilisation to align with current and familiar processes at MGH site
Ward staff engagement with IDH	The IDH will not function without ward staff following the new IDH process	9	3	18- Low/ medium	Communication and engagement with ward staff prior to launch of IDH pilot to include FAQ to ensure understanding and clear guidance	Continued guidance and education between IDH and ward teams	Adequate communication and engagement prior to IDH launch

The following pareto charts depict the significance of the failures identified by the FMEAs for both the current process and the implementation of the IDH.

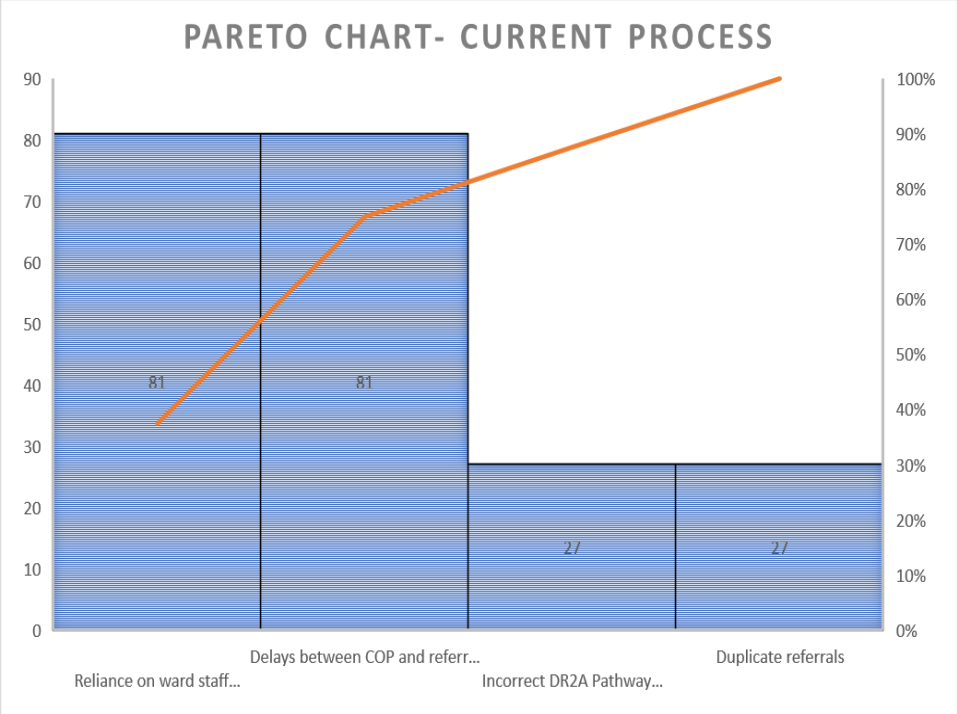


Figure 8. Pareto Chart of FMEA: Current Process.

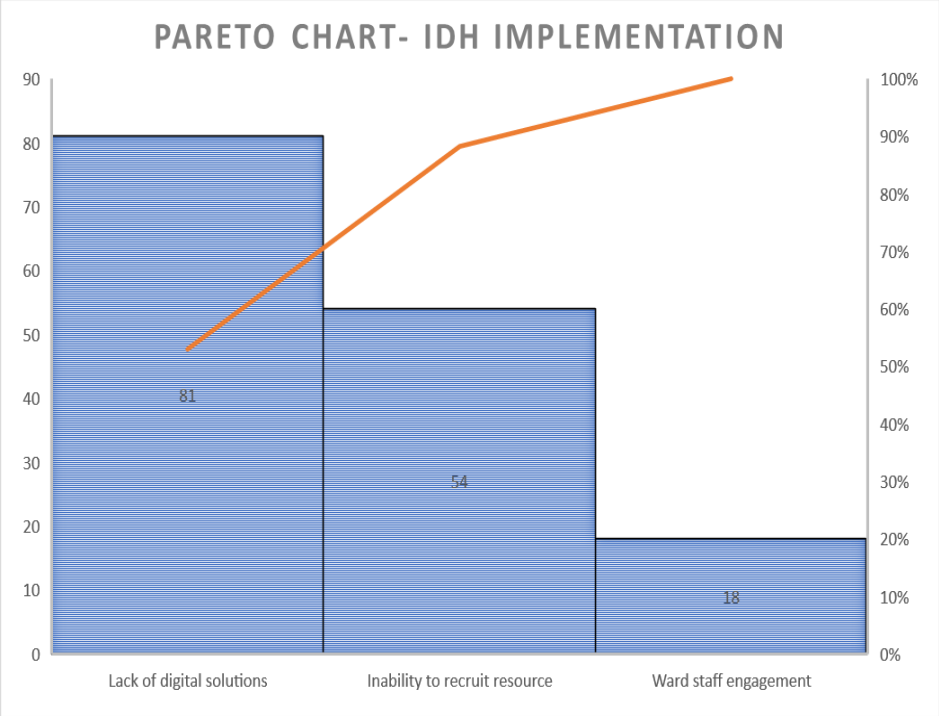


Figure 9. Pareto Chart of FMEA: IDH Implementation.

To ensure the IDH implementation was planned within the designated timescale of six weeks, the tasks required were mapped using a four fields map (Figure 10). The map shows the process undertaken to facilitate the implementation of the new service.

Incorporating feedback from both the ward and community teams, a process map of the IDH function was designed to show the new IDH operating model (Figure 11). This model was designed in collaboration with both the Acute and Community service groups to ensure it was designed in a way to meet the needs of all stakeholders as well as ensuring an approach that would support hospital discharge.

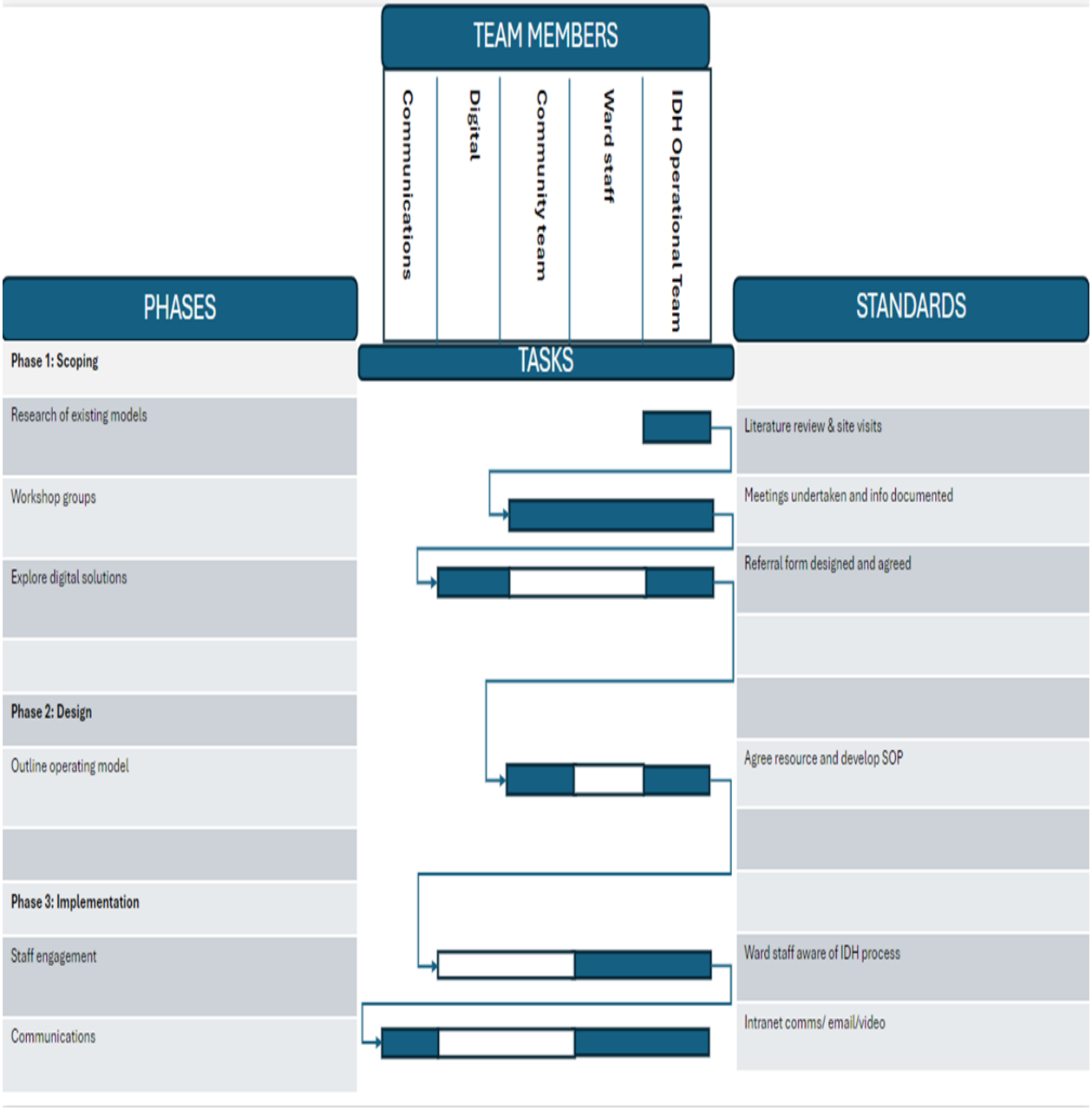


Figure 10. IDH Implementation Four Fields Map.

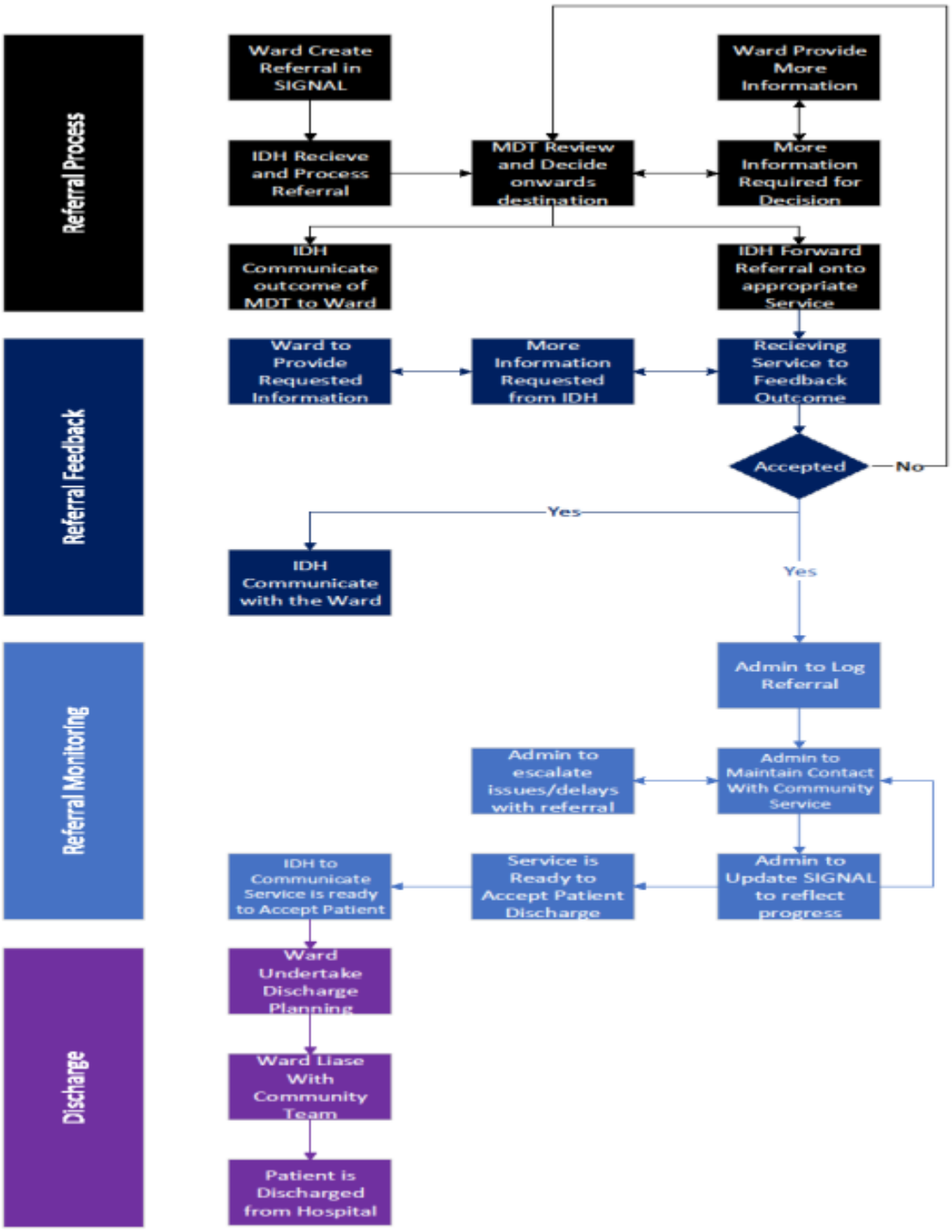


Figure 11. The IDH Process Flow Chart.

REFLECTIONS

The researcher reflected on her observations and field research and contends that the major changes in the process to implement an IDH included:

- Enhanced collaboration between the acute and community services with strengthening of relationships
- Improved communication and understanding

- Multiple referral processes amalgamated to one simplified process
- Opportunities to share learning and knowledge between acute and community teams
- 'Live' triage to expedite patient flow

The key research question, that guides this study, is "What are the critical stages in the introduction of an IDH for managing safe patient flow?" and the researcher will now answer this question.

THE CONCEPTUAL FRAMEWORK

The initial conceptual framework proved to be effective. The IDH was developed through collaboration between acute and community teams, tailored to meet the requirements of both services. It is important to note that this project was resource neutral, drawing resource from numerous existing teams. Regular interactions among all stakeholders were established to address needs and risks during the implementation phase, ensuring that all parties remained engaged and aligned; without this collaboration, the project would not succeed.

The IDH operates on a robust MDT foundation, where team members collaborate to share their expertise and insights, ensuring that patients are directed appropriately and timely to facilitate safe hospital discharges. Effective communication between the IDH and ward teams was crucial, with agreed-upon channels that have functioned effectively. This feedback mechanism has helped to minimize delays and eliminate confusion regarding patient discharges, likely preventing unsafe discharges. However, as of this writing, efforts are still ongoing to develop a performance dashboard that will provide data to assess the IDH's effectiveness in reducing LoS in the hospital.

Throughout and after the implementation process, the researcher has maintained regular meetings with both operational and strategic teams to exchange feedback on the IDH, fostering a culture of continuous learning and adaptation. The initial rollout of the IDH represents only the first phase of the project, and the insights gained have been instrumental in informing subsequent phases.

The most important elements of the conceptual framework were:

- Stakeholder engagement
- Collaboration
- MDT working
- Co-ordination

APPLYING THE THEORECTICAL LENSE

The theoretical lenses will now be applied to the results of the study.

SYSTEMS PERSPECTIVE

In recent years, there has been a significant emphasis in systems thinking on creating methods that actively engage participants in the modelling process of problem situations (Hunter & Perkins, 2012; Marjanovic et al., 2020; Wolstenholme, 1993). Engaging all essential stakeholders is considered crucial for establishing the credibility of the model and ensuring its successful implementation.

Employing qualitative models to map processes and examine their functioning within specific organisational guidelines offers a robust approach to connecting individual and group motivation factors with organisational development (Kunze et al., 2016; Verhoeff et al., 2018). In this case, the implementation of the IDH commenced with workshops that engaged all pertinent stakeholders to identify perceived challenges within the existing system and to discuss potential solutions for the new service. This approach ensured that stakeholders were actively involved from the project's inception, allowing them to contribute to the model, which ultimately fostered motivation and collaboration throughout the system. A prevalent issue faced when implementing new innovations in large systems is the presence of multiple organisations managing various segments of the process (Wolstenholme, 1993). Without the integration of control strategies among these organisations, the overall process is likely to experience disruptions. This research highlights the functioning of entire systems, emphasizing the integration of all components such as structures, processes, and patterns that influence thought and behaviour in the workplace, ultimately facilitating transformational change. The development of the workforce, processes, and change management necessary for the IDH

was achieved through collaboration among all organisations engaged in hospital discharge, thereby reinforcing the integrated framework of the IDH.

The study involved a diverse group of stakeholders from various organisations, including the Health Board, Local Authority, and Third Sector. This group featured representatives in workshops and governance bodies, reflecting collaborative approaches to achieve a common goal and utilising stakeholders' perspectives as the foundational principle for the delivery of the IDH. The study's collaborative and inclusive methodology highlights a partnership that leverages the strengths of all organisations involved to attain common goals and meaningful results. The workshops conducted likely fostered an environment of open expression, facilitating a comprehensive examination of the elements that would influence the functioning of the IDH.

The IDH was developed in line with the UEC Six Goals Programme (Government, 2022) and incorporated the DR2A pathways. The intricate nature of the NHS necessitates a systemic approach to ensure the successful implementation of current government initiatives (Kalim et al., 2006). Many government initiatives aimed at enhancing patient flow are intricate and emphasise the importance of collaborative efforts and a comprehensive whole system approach.

In order to effectively align the IDH with the identified challenges within the system and ensure that actions yield the intended results, various methods were utilised to analyse and understand the functioning of the current system. This process led to the identification of the organisational requirements for the IDH and provided valuable insights into the complexities that complicate effective decision-making when it comes to supported hospital discharge. The process focused on identifying the specific problems that required resolution, thereby elucidating the existing issues as a necessary step for outlining potential improvement options within a systems thinking framework. The methodology utilised in the implementation phase of the IDH facilitated a comprehensive exploration of these issues, engaging all stakeholders in the investigative process, which inherently served as a learning opportunity regarding the challenges present in the current system.

The NHS consists of sub-systems that do not always work in harmony, have differing goals, or different views of how goals are to be achieved. Systems thinking when applied to the NHS has identified conflict as being undesirable and dysfunctional (Kalim et al., 2006). The IDH approach was shaped by a combination of complementary and conflicting interests. Both researchers and policymakers acknowledge that even innovations supported by robust and validated evidence frequently struggle to gain acceptance and implementation. (Greenhalgh et al., 2004; Marjanovic et al., 2018). While the process adopted a multidisciplinary approach that encompassed all pathways and systems from development to implementation, one stakeholder did not maintain their involvement in the project post-implementation, as differing opinions on the value of the IDH emerged. The short timescale available (six weeks) to implement the IDH likely impacted on the ability to fully engage and build a shared vision, which may have been the underlying cause of this.

It is widely accepted that achieving high quality care requires the alignment of multiple stakeholders, organisations and behaviours. It is harder, however, to pin down what this means in practice: that is what facets of an innovating healthcare system need to be in place, how different influencing factors can simultaneously be nurtured and coordinated to achieve desired outcomes, and how we understand the multiple processes needed to effect change.

SOCIOTECHNICAL SYSTEMS PERSPECTIVE

Sociotechnical systems view each organisation as comprising a social subsystem of individuals and a technical subsystem of process components (Marsilio et al., 2017). In this case, the technical system comprises of structures, processes, skills and knowledge to deliver safe patient care, whereas the social system brings in to play attitudes, beliefs and relationships between staffing groups and correlating organisations. In order to successfully implement the IDH, it was recognised that each organisation and staff group must align and ensure compatibility to ensure joint optimisation of both the technical and social subsystems that make up the whole system. This study primarily involves NHS staff, Local Authority employees, Third Sector representatives, patients, as well as policymakers and commissioners. The main sociotechnical principles are shown in figure 12.

The multilevel perspective on sociotechnical systems, as outlined by Geels (2004), aligns closely with the understanding of innovative systems as complex adaptive systems. It views the innovation process and its

outcomes as products of the interrelated social and technical components within a complex system, which are essential for meeting societal needs in both usage and production contexts (Marjanovic et al., 2020).

This approach highlights the importance of stakeholders' roles and viewpoints in shaping the course of innovation. The sociotechnical systems approach views the creation, distribution, and utilisation of technologies as interconnected sub-functions within a system. This perspective facilitates a more explicit exploration of the iterative and non-linear aspects of innovation, encompassing the development, testing, adoption, dissemination, and ongoing modification and adaptation of an innovation as it evolves over time (Fuenfschilling & Truffer, 2014; Marjanovic et al., 2020).

A systems view	Identify and address goals for organisation (e.g. aims and objectives). human (e.g. motivation) and technology dimensions.
Social shaping	Understand that system design, implementation and use are extended, socially-shaped and political processes.
Core process integration	View organisations as a number of core service-delivery and other processes that typically cut laterally across different functions.
Local adaptability	Meet planned and unpredicted change through as much local shaping as possible, with variances controlled at their local source using the combination of system elements most appropriate to a given context.
Boundary management	Organisational and work boundaries are crucial and frequently highly political, so should be managed carefully to promote the sharing of knowledge and experience.
System incompleteness	Ensure design and adaptation is ongoing, as requirements are likely to be continuously evolving.
Holistic evaluations	Regularly review progress and adjust course as necessary, bearing in mind the 'system incompleteness' principle.
Multistakeholder needs	Take account of the needs of the enterprise, the system's users and those affected by its use.
User ownership	Build strong ownership of systems and their design by those who use and manage them in their working environments.
User participation	Support meaningful, not token, inputs to system design and implementation from all users and other key stakeholders.
Social support	Establish systems in an environment that supports and encourages desired behaviours.
Resource support	Provide education and financial resources to underpin effective design, implementation, review and ongoing evolution.

Figure 12. The Main Sociotechnical Principles (Peltu et al., 2008).

Braithwaite et al. (2009) argue for the necessity of a clinician-led 'bottom up' strategy to complement the primary top-down' methods that often yield only limited and unsustainable improvements within the NHS. Each healthcare issue is supported by networks, hubs, and sub-clusters that possess specialised knowledge and a keen interest in that particular field. In light of this, the IDH was developed in partnership with these groups, and its staff was sourced from this collective to guarantee effective and resilient multidisciplinary team collaboration. This strategy facilitated cooperation with individuals who were generally eager to invest their time and effort into addressing the issues identified within the system, even in the absence of available funding. By leveraging the inherent characteristics of the sociotechnical system within healthcare and directing the established practices that are instinctive to health and social care teams, this approach fostered development and utilisation aimed at promoting ongoing improvement with an element of self-regulation.

The successful service design and operational framework of the IDH necessitated a sociotechnical perspective, which ensured that both social and technical dimensions of the intricate system were given equal importance. These two components are mutually dependent and interact closely; therefore, to achieve a favourable outcome, all elements of the system were engaged, leading to a collaboratively

developed design that continues to adapt over time. Nevertheless, while the sociotechnical perspective provided the researcher with a comprehensive understanding during the design and implementation phases of the IDH, it alone was insufficient for defining and operationalising the new service. Additional methodologies were employed to focus early on the challenges within the existing system and to formulate potential solutions, complementing the sociotechnical approach in the implementation process.

LEARNING ORGANISATION PERSPECTIVE

The idea of a learning organisation was developed to enhance the success of organisations dealing with difficult and intricate challenges by utilising an internal framework for learning (Senge, 1990; Senge, 2014). Across the five disciplines identified by Senge (1990) (Table 2) team learning is believed to be central to a learning organisation. In recent years, an increasing array of specialists and stakeholders have advocated adaptive strategies aimed at enhancing health systems. To effectively strengthen these systems, it is essential to address their inherent complexity, considering not just the individual components but also the intricate relationships among them. This necessitates the adoption of innovative thought processes, as each advancement in health systems presents a valuable opportunity for learning (Akhnif et al., 2017).

In the context of the NHS, the essential traits of a learning organisation include the integration of learning with work to ensure its relevance, an openness to change viewed as a valuable opportunity for growth, the empowerment of the entire workforce to assume responsibility at all levels and values and beliefs are broadly embraced, communicated, and promoted within a culture that fosters openness and is free from blame. (DoH, 2001; Peeters et al., 2015; Santa, 2015).

The collaborative and multidisciplinary nature of the IDH and its implementation, assisted in the sharing of information between various organisations. By involving stakeholders and staff in the innovation process, it conceptualised a cycle between knowledge, learning and innovation. Learning played a critical role in the process in terms of both absorption of external knowledge to inform delivery and learning by doing as the IDH evolved.

The importance of reflective learning and indeed reflective practice has long been established in the literature (Bradbury et al., 2010; Clouder & Sellars, 2004; Cole, 2000). However, in recent years there is growing evidence that action learning is being used in healthcare for service development, partnership working and service improvement (Brook, 2010; Edmonstone, 2017; McCray et al., 2018). Action learning involves gaining knowledge through experiential learning and engaging in critical reflection on those experiences. This process is facilitated by group discussions, experimentation, exploration, and collaborative learning with peers (Zuber‐Skerritt, 2002). Within the framework of this study, action learning was conducted through the collaboration of multiple groups engaged in the design, implementation, and operation phases, focusing on real workplace challenges within a complex environment. Solutions were formulated and adapted in accordance with organisational needs, drawing on insights acquired during the process. The benefits of this were that those participating in the study accepted a level of ownership for problems and issues identified and the corresponding solutions. In contrast to scenarios where senior managers impose solutions from the top down, action learners demonstrate a greater tendency to pursue their own solutions to effect the necessary changes.

This research facilitated ongoing learning by utilising action learning, reflection, and collaborative knowledge sharing. This approach ensured that the design and operations of the IDH evolved over time, incorporating input and feedback from all stakeholders, thereby embodying and illustrating the principles of a learning organisation.

Conclusions

It is generally recognised that delivering high-quality care necessitates the collaboration of various stakeholders, organisations, and behaviours. However, defining what this entails in practical terms is more challenging. This includes identifying the essential components of an innovative healthcare system, understanding how to cultivate and harmonize various influencing factors to achieve the desired results, and comprehending the multiple processes required to implement change effectively. In summary, this longitudinal case study of an IDH has identified many new methods and activities that have resulted in a success change to discharge processes with little to no investment but rather a change in logic and the operations management of the NHS system.

This research has shed light on the complex mechanisms that either facilitate or hinder patient flow during discharge processes. It is evident that enhancing patient flow in acute care settings necessitates a collaborative, multidisciplinary, and integrated strategy involving multiple agencies. The establishment of an IDH within this Health Board was overall successful, largely due to the engagement of all relevant stakeholders and the cultivation of a learning culture as the service adapted to address the needs of patients, the Health Board, Local Authority, Third Sector, and independent sectors to optimize patient flow.

Adopting a systems thinking, socio-technical, and learning organisation framework enabled the co-creation of the IDH through a grassroots approach, which promoted ownership, knowledge sharing, and a whole system perspective aimed at enhancing patient flow and potentially improving outcomes for individuals being discharged from the hospital.

Key Recommendations

IMPLICATIONS FOR PROFESSIONALS PRACTICING IN DISCHARGE PROCESSES FOR MAJOR HOSPITALS

This research has demonstrated that mapping methodology is essential for establishing a unified approach and comprehension of patient flow from hospitals. In its absence, gaining insights into the delays and risks associated with hospital discharges becomes nearly impossible, hindering efforts to address these issues and ultimately improve patient outcomes by reducing care pathway delays.

When pursuing service enhancements and the creation of new services, conducting team-based risk analyses can help eliminate potential project failures from new innovations. In this instance, a failure mode and effects analysis were performed on both existing systems and the proposed solutions. This proactive approach ensured that any flaws identified post-implementation were minimal and easily rectified, as higher risks had already been addressed.

Furthermore, it is acknowledged that the success of the IDH relies heavily on its multidisciplinary operations. The collocation of a diverse team is essential to foster collaborative efforts and avoid a fragmented, siloed approach.

IMPLICATIONS FOR HEALTH BOARDS

An IDH is a highly effective and safe process to aid in the management of patient flow. By reducing the burden on ward staff in the decision-making process for supported discharge from hospital, teams are better able to concentrate on the discharge planning itself. Given the vast number of services available to support patients once discharged home, numerous government initiatives and pathways it can be confusing for acute teams to navigate. By collaboration between both acute and community teams, this process is simplified and facilitates shared learning, better communication and relationships.

To support the development of an IDH, collaboration between all stakeholders is crucial. A systems thinking sociotechnical approach alongside a culture of learning is required to facilitate integration and collaboration between all relevant organisations.

IMPLICATIONS FOR THE WELSH GOVERNMENT

There is currently significant attention from the Welsh Government on the delays in care pathways within Health Boards, accompanied by the introduction of policies and initiatives designed to mitigate these delays. The IDH model presents an opportunity for implementation across all Health Boards in Wales. In fact, several NHS organisations have already adopted their own versions of the IDH model, although these variations differ in certain aspects.

Cardiff & Vale University Health Board has implemented an IDH model that facilitates comprehensive discharge processes and enhances the discharge planning across the D2RA pathways. It is important to highlight that the IDH is currently in its initial phase, with subsequent phases aimed at further supporting and accelerating hospital discharges to minimise delays and enhance patient outcomes. The planning for the next phase of the IDH is already underway, with a rollout anticipated in the upcoming months. By establishing a sustainable and efficient model, there is an opportunity for other Health Boards to adopt this approach.

This initiative operated without additional resources, utilising the workforce from current services. While this reallocation of staff has been effective, it has created strain on the existing services due to a decrease in their workforce. To establish a sustainable model, additional resources will be necessary, which could have financial repercussions for the Welsh Government. Nevertheless, it is expected that a comprehensive model of the IDH will generate cost savings that surpass the expenses associated with operating the service, thereby offering a financial incentive.

IMPLICATIONS FOR FURTHER RESEARCH

3. The limitation of this study was that it was conducted exclusively in Wales and therefore the first research programme should look at other Welsh sites and also other UK locations to see if the findings hold true elsewhere for the UK NHS.
4. The second study should compare this study and Japanese health and care providers as they have a much longer and deeper relationship and practice of total quality management. This study would see how far advanced the Japanese are and if they approach change in a different and potentially more integrative manner.
5. To research the issue of primary care sector and social service staff in particular so that the personal stresses and issues of trying to support patients from their perspective.

THE FUTURE OF THE INTEGRATED DISCHARGE HUB

As previously mentioned in this paper, this study represents the initial phase of an IDH. Efforts are currently in progress to implement the subsequent phase, which will include comprehensive discharge processes at both the entry and exit points. This phase will focus on accountability, oversight, and coordination of all discharges that necessitate community support, as well as promoting enhanced integrated collaboration and minimising delays in care pathways across all D2RA pathways.

In summary, this research has included many hundreds of hours of observations and investment. It has been a long and hard journey, but it has been worthwhile for many patients and their loved ones. It is hoped the new conceptual framework will be useful to other professionals and researchers. It is also hoped that the lessons from this study can be learned and pre-empted in the changes made by others.

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Does compulsory registration of social care workers positively impact the quality and safety within social care?

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Abstract:

The compulsory registration of social care workers in Wales, implemented through the Regulation and Inspection of Social Care (Wales) Act 2016, sought to professionalise the workforce, improve accountability, and enhance quality and safety in service delivery. This study critically examines whether registration has achieved these aims within adult residential services. Using a mixed-methods research design, data were collected through questionnaires and semi-structured responses, combining both quantitative and qualitative insights. Findings suggest that while the registration process has raised awareness of professional standards and ensured a baseline of mandatory training, its direct impact on quality and safety remains limited. Persistent issues include outdated qualifications, limited auditing of continuing professional development, and gaps in staff understanding of the professional code of practice. These shortcomings undermine the potential of registration to deliver tangible improvements in care quality. The study concludes that compulsory registration, while symbolically significant in elevating the status of the profession, has yet to produce measurable outcomes in enhancing the safety and quality of social care. Recommendations include strengthening auditing mechanisms, reviewing qualification frameworks, and refining data collection methods to assess long-term impact.

Keywords: Social Care; Workforce Registration; Regulation; Wales; Professional Standards; Quality of Care; Safety; Mixed Methods Research; Training; Continuing Professional Development

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Introduction

Background and context

October 2022 was a milestone for all social care workers.

Long seen as the poor relation to NHS, social care was undervalued with minimum oversight from statutory bodies. There were no minimum qualifications or experience required and if you had a clean DBS – or at least nothing relating to assault or fraud in the last few years, you were offered a job. This created a situation where the most vulnerable of our society were being cared for by those who were (mainly) well-intentioned but underpaid, underqualified and overworked.

The Regulation and Inspection of Social Care (Wales) Act 2016 (RISCA) published several reforms, with a key factor being that all social care workers were required to be registered as social care staff within their relevant field. Initially, there were 3 phases to commencement, with children's services the primary focus then domiciliary care, who were all required to register between 2017 – 2019. Then, COVID struck, and the world paused. Following lockdowns and hybrid working, in 2022 Social Care Wales (SCW) who are responsible for managing the register, gave all adult residential services 6 months' notice to register all support workers. The deadline was 1st October 2022.

Social care was now a recognised profession. No longer the ugly duckling, but a beautiful swan who had to follow a code of conduct, complete qualifications to work in their role and pay £30 a year for the privilege! There were continuous professional development training hours that required to be achieved and uploaded, embedding not only the code of conduct but the principles of the Social Care and Well-being (Wales) Act 2014 into daily practice. And if you did not have the relevant qualifications (City and Guilds, NVQ, QCF), you would be signed up and, in the meantime, provided training through the All-Wales Induction Framework (AWIF) which covers all legal aspects such as the SSWB Act, Safeguarding, Health and Safety etc.

Prementioned acts are clear in their intention. They reformed a failing social care system, moving the focus towards person centred care, allowing personal choice, independence and working in partnership. There are clear principles in the regulation of social care providers and staff through training, enrolment on the register and inspection.

We are now in the summer of 2024 and as a service manager in adult residential service, I find myself asking 'Has it made any difference?'. Has enrolling on a register made any difference in quality delivery? Or upon the safety of the individuals, we support? This report will seek to answer those questions.

Contextualisation

Social Care has undergone several iterations in the past decade. This has been due to catastrophic failures such as Winterbourne and Stafford Hospital in England and Gower Lodge in Swansea. There have been parliamentary reviews on the failure of all vocational training within social care and no review of care legislation or care provision since Care Standards Act, 2000. A clear overhaul was required.

This came in 2014 with the introduction of Social Services and Well-being (Wales) Act 2014 (SSWB). This act changed the foundation of the sector. The aim was to change the way social care was delivered, putting people first, promoting independence and giving them a voice and control. Promoting partnership working in social care and enhancement of preventative care within the sector.

The Regulation and Inspection of Social Care (Wales) Act 2016 (RISCA) introduced a new regulatory regime for care and support services in Wales and reformed the system of regulation of those who work in the sector and provide care to vulnerable individuals and children. The key principles are tackling provider failure, developing a coherent approach with people at the centre and responding quickly and effectively to new models of service and any concerns over the quality care and support.

Social Care Wales (SCW) assumed the functions of the Care Council for Wales as the regulator of the social care workforce from April 2017, as well as overarching role as regards to care and support services.

The Care and Social Services Inspectorate Wales (CSSIW) was the inspection body for Social Care in Wales. In January 2018, CSSIW changed name Care inspectorate Wales (CIW). RISCA replaced powers previously under Health and social care (community Health and standards) Act 2003 and Care Standards Act 2000 and inserted provisions of the SSWB. SSWB act gives powers to review how local authorities discharge their social services functions.

Registration and Training requirements

As directed by RISCA, SCW is required to maintain a register of all social care workers who have registered to be able to work within social care in Wales.

The list of individuals required to register of are:

1. Qualified social workers
2. Student social workers
3. Residential childcare managers and workers
4. Adult care home managers (mandatory since 2016)
5. Domiciliary care managers (mandatory since 2016)
6. Domiciliary care workers register opens from April 2018 (mandatory from April 2020)
7. Residential adult care home workers register opens from April 2020 (mandatory from April 2022 – extended to October due to post COVID workloads).

To be registered, each staff member must set up an account and apply to the register. Everyone on the register must show they:

- Are appropriately qualified.
- Are physically and mentally fit to practice.
- Have character and competence.
- Follow the code of professional practice for social care and practice guidance for their role.
- Intend to practice social care in Wales.
- Will practice in the field that relates to their application for registration.
- As proof of being 'Appropriately Qualified', proof of a SCW recognised qualification must be uploaded.

'Getting the job done: the governments reform plan for vocational qualifications', published 5/3/2014, highlighted several concerns, ultimately stating that the 'QCF is complex and difficult for individuals and employers to engage with. This reduces the capacity of qualifications to act as a clear and reliable signal of competence and can lead to the development of qualifications in terms of employment or progression'.

In the recommendations, a Vocational Qualification Review Plan 2014 introduced a Health and Social Care Induction Framework Wales to commence in April 2018. This was followed by the new Health and Social Care Qualifications were developed by Qualification Wales, September 2019.

Maintaining registration includes annual fee payment (£30 as a social care worker and £80 for Home and Deputy Managers), a minimum of 45 CPD hours to complete, and adherence to the code of professional practice.

The table below sets out the 'Appropriate Qualified' training requirements.

Table 1. Training requirements.

Qualification	Level
Current accepted qualifications	
Social Care Wales	All Wales Induction Framework (AWIF) for Health and Social Care. Those new to care or do not have a recognised qualification identified below, required to complete all Five modules (2 and 4 are for Children workforce). 1.Principles and Values for Health and Social Care 3.Health and Well-being 5.Professional Practice and a social care worker 6.Safeguarding individuals 7.Health and Safety within Health and Social Care To complete these modules, will need to complete booklets, process logs, use ongoing training to cross-reference knowledge and through discussions in supervisions, staff meetings and care team interactions. The individual must complete City and Guilds qualification within 3 years.

	Anyone who has come from outside of the UK to work in Wales will require to complete AWIF regardless of if have any qualifications below.
City and Guilds – Regulated Qualification Framework (RQF)	Level 2 Health and Social Care: Core PLUS Level 2/3 Health and Social Care: Practice (Adults) within 3 years (Available since 2019) RQF Includes core – mandatory core learning modules. This covers current legislation, policies and training required for the role at that level. English and Math key skills must be achieved to pass. Once core completed, receive certificate and able to register then move onto the training component which compromises of exams, chosen modules relevant to work and observations. This will form the Practice component, and the qualification gained upon sign off from Assessor and Employee and Employer.
City and Guilds	Level 3 Health and Social Care: Practice (Adults)
City and Guilds	Level 4 Professional Health and Social Care: (Adults)
City and Guilds	Level 3 Practice Children and Young People PLUS AWIF.
Qualification to register but no longer taught.	
NVQ	Level 2 Health and Social Care Level 2 Care Level 2 Care: Direct Personal Care Level 2 Care: Independent living support Level 2 Care: Developmental Care
NVQ	Level 3 Health and Social Care (Adults) Level 3 Care: Continuing Care Level 3 Promoting Independence Level 3 Care: Mental Health Care Level 3 Care: Supported Living Level 3 Care
QCF/Diploma	Level 2 Clinical Health care support Level 2 Health and Social Care (Adults) in Wales and Northen Ireland
QCF/Diploma	Level 3 Rehabilitation Support Level 3 Physiotherapist Support Level 3 Occupational Therapy Level 3 Clinical Health Care Level 3 Health and Social Care (Adults) in Wales and Northen Ireland.

Source:https://socialcare.wales/qualifications-funding/qualification-framework/job-roles/care-home-services-for-adults/adult-care-home-worker

Literature Review

In attempting to review current literature, it was quickly apparent there was none. There are no articles or research projects undertaken following the implementation SSWB or RISCA, never mind any further deeper review. Admittedly, this was a key factor in completing the project and focussing on quality and/or safety post registration. However, it has been frustrating as the little data collection that is available via the SCW, is not sufficient.

Freely available are registration data reports from 2017 – 2022 which show the number of registrants for each qualifying year. There are workforce profiles for both commissioned care provider service and local authority regulated services for 2018 and 2019. There are Workforce reports for 2021 and 2022 which provides an overarching review of social care workforce on the register. This includes data on gender, ages, ethnicity, Welsh language skills, contract types, working patterns, vacancies, staff turnovers and sickness. Further data on safeguarding reports and the outcomes (not met standards, safeguarding panel, police involvements), reports to CIW regarding any concerns regarding management/leadership or regarding individuals (reapplication for DoLS, disclosures of abuse, pressure sores) are also provided. As a service manager, I am responsible for completing the workforce reports and required to submit such data from April – March by April every year. Upon reviewing the data reported published, there is data being submitted but is not reflected in the published annual reports.

Whilst confidentiality is key – any issues that were raised to safeguarding due to risk from care staff to another individual (whether resident, staff or public) – would be required to be referred to SCW. This will be investigated and (unless subject to police charge in which their investigation takes priority and once completed, will be returned to the SCW regardless of outcome) will be subject to a Hearing.

The hearing section is where you can review who, if anyone, has been investigated and are awaiting a hearing. It provides full details of the individual's name, registration number, job title and full explanation of the investigation against them. Regarding those who have had their hearing meeting, there is a list of individuals and can search the register for the outcome – whether removed, suspended, warning etc. Therefore, confidentiality is clearly not a reason to issue such statistics in annual reports.

It would be possible to search through each name review each person on the register, detail the cause of hearing and subsequent consequence. However, this collection of data would be time consuming to search just the past month, never mind the past years to identify any trends, comparisons or whether there has been a decrease and is due to the instigation of registration.

Working with secondary research (SR) – in this case from SCW – is beneficial as the data has already been collected, free to access as part of the registrant's annual subscription and have no concerns regarding ethical or confidentiality concerns as the original contributor would have cleared. Whilst SR can be used to test theories or generate new knowledge (Heaton 1998, 2008) and the accessibility via online databases are a clear benefit (Smith 2011), the lack of knowledge on how the data was collected, the quality of the data/incomplete/inappropriately audited can be a drawback. (Croxford, 2006). Likewise, the data has been collected to prove compliance by service providers to a government agency to show they are compliant with the legislation. In an era of revolving door first ministers, the data could be formed to a particular political agenda (Smith 2008).

To enable the project to have foundation in academic standings, I reviewed other professions who have undertaken registration and how this developed. The profession chosen is the registration of nursing. It's the intention to compare between both fields and reflect on the themes identified.

A timeline of nurse registration

In the early 19th century, nursing was unregulated. There were no minimum standards of training or education and was exploitative due to poor working conditions and pay. Due to such concerns, as well as the need for improvement in patient care, the Nurses' Registration Act 1919 (NRA) was introduced. The NRA had one main objective which was to create a register where nurses should have uniform educational standards and to prevent those who do not meet these standards from working as a nurse. This would in turn improve patient care.

The NRA itself did not state how this would be achieved, instead created the General Nursing Councils for England and Wales, Scotland and Ireland. Each council were responsible for forming a register, education requirements and disciplinary policies.

The register was created in 1921 with England and Wales requiring the following for established nurses to be able to register by 1921:

- 21 years or older
- To be of good character and be able to provide references as such
- Received at least one year's training, followed by two years subsequent practice

If not currently working as a nurse, or did not meet the above criteria, a three-year curriculum was created to be able to qualify as a nurse and register.

This curriculum covered topics such as anatomy, physiology, theoretical and practical nursing. Each student would have exams and would require a set pass rate to be able to practice. This delivered uniformity required as set out by the NRA and establishing clear definition of the nursing profession.

Alongside the creation of the register in 1921, the Disciplinary and Penal Cases Committee was established. This ensured that any nurse who was deemed not to be meeting the standards established would be subject to a public inquiry. The committee had the powers to discipline or remove individuals from the register if required. Most common were individuals identified as working as a nurse without registration. These public inquires, not only served as a deterrent for others but that the public would have confidence that the profession was accountable and received external oversight.

The GNC was replaced in 1979 with the introduction of the Nurses, Midwives and Health Visitors Act and led to the establishment of United Kingdom Central Council for Nursing, Midwifery and Health Visiting

(UKCC) in 1982. The UKCC took all three separate registrations of professions and combined them into one statutory board.

The transition from the UKCC to the NMC was due in part due to government-led reforms in health care regulation such as The Health Act 1999, but that the UKCC were ineffective and required modernisation.

Following high profile cases of misconduct and patient concerns, there was a growing criticism of the UKCC due to non-transparent working, how complaints were managed, disciplinary actions and the auditing of professional development. The key focus of the NMC was to be more responsive to needs of healthcare focussing on patient safety, professional development and accountability.

The development of Project 2000 was given the seal of approval (UKCC 1987) and introduced two elements: 18 months of theory followed by 18 months of clinical practice. Criticisms of this new approach were based in the fact that a university-based education (this was the forerunner of the current undergraduate nursing degree) was not required as nurses were required to understand specific tasks that can be taught.

In 2001, the Nursing and Midwifery council (NMC) was created. They now oversee the oversight that the Disciplinary and Penal Cases committee once did via Fitness to Practice process and maintain the register. The NMC establish the key professional standards and have identified a Code of Conduct to which all nurses agree to work within. (NMC.org) This has again evolved with revalidation introduced in 2016.

All registered nurses must follow the following standards to be able to revalidate their registration and to continue to work as a nurse in the UK.

Revalidation consists of practice hours, CPD hours and written pieces. This forms the portfolio covering the past 3 years. The payment for NMC is paid annually and must be current to revalidate. The NMC select a percentage of the nurses revalidating who must submit their completed portfolio for auditing and must:

1. Have at least 450 hours of practice in the past 3 years.
2. Do 35 hours of continuing professional development (CPD) relevant to your practice. This could be things like courses, conferences, or workshops.
3. Obtain five pieces of practice-related feedback.
4. Provide five written reflections.
5. Undertake a reflective discussion with another NMC registrant.

(bna.co.uk)

From the breakdown above, both sectors were long established careers, before being recognised as a profession. A combination of poor care delivery and impact on patient safety, led to changes of legislation and provided legitimacy of professional bodies with accountability and oversight. The key difference is the number of iterations that the nursing register has gone through. The register was established 105 years ago, however, nursing moved on but there were no changes in how registration was audited or managed. The role of the nurse, as with the social care worker, develops through role expansion and responsibilities. If we reflect on what occurred with nurse registration, the initial registration for social care workers should equally develop further.

‘Such changes aptly reflect the evolutionary nature of the register. They demonstrate the importance of continually evaluating the registration, education and regulation procedures to ensure that nurses, and the patients under their care are protected in the most effective way possible’. (Shepherd, 2019)

Further expansion of the impact of the training requirements, Continuous Professional Development (CPD) and competence within nursing and social care will be explored when results from the project are discussed.

Research Methodology

Quantitative data is based on structured data- collection, in which a report can be produced with themes, findings and significance (Johnson and Christensen, 2008; Given, 2008). Other kinds of quantitative research can be through experiments, descriptive surveys – such as questionnaires, and comparative research method (Lodico et al., 2010).

Data collection via questionnaires, using both a formal and semi structure answering system, was the simplest and easiest way of collected required data. Whilst this deductive method would certainly provide

the numerical evidence, a quantitative approach would simply not yield the required results. Likewise, whilst a Qualitative approach would provide the inductive insights into the descriptive and personal experience that is equally as valid, there is risk in reaching a biased outcome.

To address this concern, a Mixed Methods Research (MMR) was utilised. MMR definition is one of research using both elements of Qualitive and Quantitative approaches to provide a broader understanding.

Cohen (1994) highlighted that the world we encompass is not an either/or world. By using either Qualitative or Quantitative is preventing us using all the information and data at our disposal to reach a conclusion. Creswell and Plana Clark (2011) go further to claim that through MMR, a greater understanding can be achieved that each one alone could not.

Questionnaires

As large data collection was required, questionnaires were the most effective collection tool. Cohen (1994) refers to questionnaires as 'cheap, reliable, valid, quick and easy to complete!' (pg. 471) This is exactly what was required as staff have limited time to undertake such activities as their priorities are (as should always be) on the individual at the home. The questionnaire format was both structured and semi structured. The structured (closed) questions provided the staff member to give a definitive response i.e. How long have you worked in Social Care? What is your role? Along with multiple choice questions with definitive statements i.e. 'What qualification did you use to register with SCW? NVQ, QCF, Core, AWIF, Other. The semi structured (open) questions allowed the staff member to provide personal opinions and comments i.e. 'Can you give me an example of how registration has improved your own practice?'

Upon exploring the project question when compiling the questionnaires, there was inquiry on whether there was a causal effect between quality and safety within social care, could one be obtained without the other or if both were required to achieve the goal. Accordingly, the method of Correlation Research (CR) had unwittingly begun. This research method explores the statistical relationship between two or more variables and establishing the strength and direction of that link.

Correlational research is a type of quantitative research method (Anderson and Arsenault, 1998). It includes explaining incidents by collecting quantitative data methods (Aliaga and Gunderson, 2000).

Hussan (2024) believes CR is successful for predicting and explaining behaviours. This is especially useful within social care as this can then identify risk factors or interventions. Whilst the focus is on the individuals in our care and care plans and relapse prevention and risk management plans are completed to allow positive risk taking and least restrictive methods, to implement this on the staff team will be a new venture. However, I suspect no less informative.

There are 3 types of outcomes with CR:

- Positive: When both succeed or fail together.
- Negative: when one succeeds, and one fails
- Zero: No relationship and therefore do not impact each other.

Using CR, alongside MMR, will test whether the theory 'One year on, has mandatory registration of social care workers had an impact of the quality and safety within social care?' Is supported by the data and has a positive, negative or zero impact.

Main Analysis

Quality: the standard of something as measured against other things of a similar kind; the degree of excellence of something

Safety: The state of being protected from or guarded against hurt or injury; freedom from danger.

How do we maintain quality and safety in social care? What does that mean? The definitions above are reminders that whilst we may think we know what something means, being able to produce in a social care setting can be more difficult. Whilst there are training and opportunities for 'buddy systems' for practical learning, the introduction of different models of care or moving all documents to a new electronic system can and does impact care delivery. To be clear, this is not an intentional act, but when there are periods of change, the focus is taken away from the individual and onto the new system or care plans. This is especially true when working with staff from other countries where English is not there first language or with

staff who have worked in social care their entire career, having left school with no qualifications, but now must undertake Maths and English exams. Whilst SSWB and RISCA fundamentally changed social care at its core, the purpose of this project to review how the registration process was implemented and how the change manifested with those working on the shop floor.

The results from the questionnaires were broken down into 4 themes: Registration, Training, Reporting Concerns and Improvement in practice. The focus of this project will be around the theme of training.

Out of the 50 questionnaires submitted, the total response was 29. That yields a percentage of 58%. The intention was to have a variety of social care staff engage – from support worker, shift leader, senior support worker, deputy and service managers. The reason was for a cross section of staff would have different levels of knowledge, understanding and years of service. Of the 29, there were 19 support worker/shift leads who present the largest portion of our work force. Therefore, no surprise this was the largest contributor.

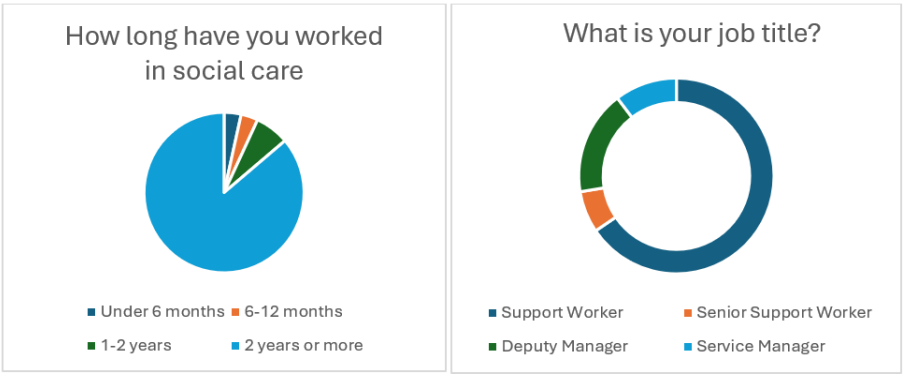


Figure 1.

However, when it came to years of service, something I did not expect occurred. Of the 29, 25 stated they had 2 or more years working in social care. This immediately impacted the study as, as we have established, the registration had only come into effect since October 2022. As with many fields, the turnover in social care is high. This is due to competitive wages, holidays and sick pay. Those who came to help in COVID have now returned to their original employment. Students finish their courses and move away. I had anticipated that more than 2 staff completing this questionnaire would have had less than 12-month service. The responses of how long they had worked in social care before requiring registering also reflected this as 21/29 has been employed for 2 years or over.



Figure 2.

Those employed during the 6-month timescale in 2022, were enrolled to the registered via qualifications already gained or through 'employer's competency'. This meant that staff who did not have the qualifying qualification or would not be able to complete the AWIF in time, could be assessed as competent by the service manager and bypass the qualification section. Whilst not meant as a loophole, it was the preferred method of service managers as if your staff were either not on the register or had completed the application at that time, they were unable to work.

It should not have been a surprise then that there was a mixed response to why SCW introduced registration or if they knew enough about registering before having to do so. The pressures of having to register, be able to understand, retain the information and embed into practice was no small feat. It is an inferred guess that the 'Don't know's were 'No's! Even though anonymous, there is pressure to not admit what you don't know when you should.

Whilst 19 stated they understood registration was introduced, there were 10 who stated that they either didn't know or said no. This was one of the first semi structured questions are were asked to provide an explanation. Only 4/29 did so, and one had clearly googled the answer!



Figure 3.

- To ensure safe practice in social care, ensuring everyone is appropriately qualified for the job.
- Although I understand the need for SCW to be registered, I do not agree that the cost should be so high for hm. It should be a flat rate for all.
- SCW was introduced to address challenges in Wales – public services – such as demographic changes, economic realities and increased expectations from care users. It aims to improve the quality of care and support for children, adults and families and carers, and to promote people's independence.
- To reinforce professional status. To uphold standards in code of professional practice for social care.
- Professionalism across the workforce aimed to eventually increase wage in line with responsibility and to ensure quality across the board, also to enhance safeguarding potential.

The physical registration caused a spilt into either was easy or staff found it hard. There were issues identified regarding not being able to find their qualification, payment method or the system not working and having to contact SCW.

Training

Of the 29, only 9 were registered via the employee competence route, yet only 3 were registered with the currently approved qualification of the Core or AWIF. That means that only 10% of the staff met this requirement.

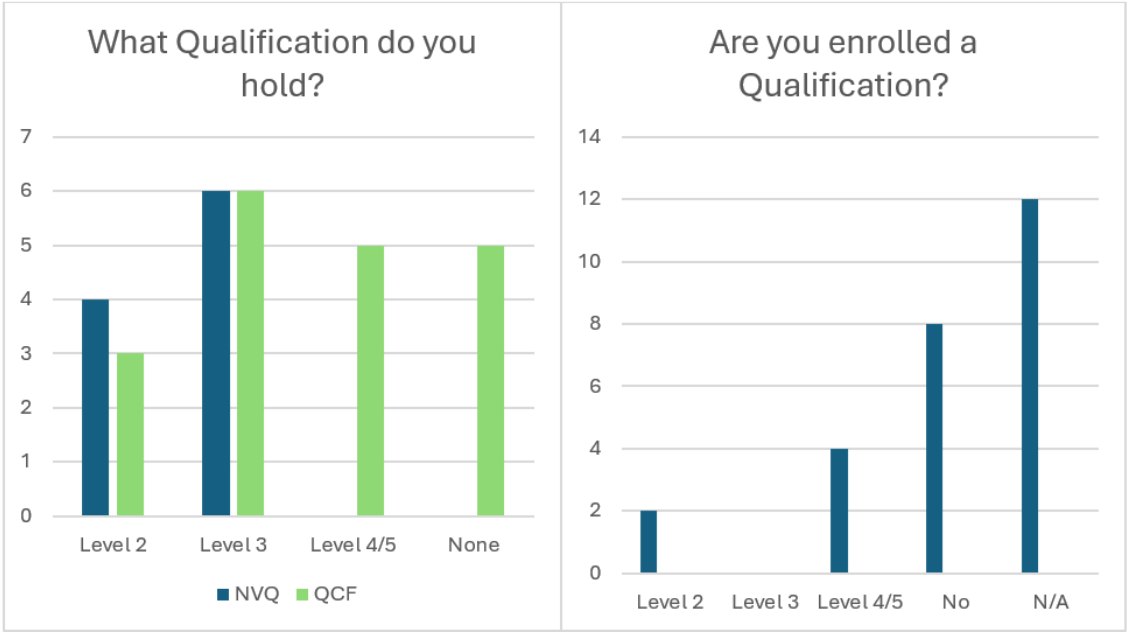


Figure 4.

"If qualifications are to be effective, it is essential they are both rigorous and responsive.

A rigorous qualification has high quality and ensures that an individual is stretched, needing to show the full range of competencies required for a task.

A responsive qualification responds to individual need and employer demand and helps to get people into work and to progress their careers". (Getting the Job done).

Cooper (2003) states that through linking practice to an appropriate qualification on the register, it is argued that standards will be safeguarded. However, this does not factor in the date of qualification obtained or the competence of the individual who has gained the qualification. The AWIF and Core/Practice qualifications have been in effect from 2018/2019 respectively. Whilst the SSWB act has been in effect from 2014, the QCF did not reflect the changes in the legislation until 2018. NVQ's were still being offered when QCF came into being in 2011 but phased out shortly after. The 2-year review of vocational studies found that QCF's were not fit for purpose but were continued until the new qualifications were ready. Being able to register with an outdated qualification such as QCF – or even further back to NVQ – that do not cover the new provisions of SSWB or RISCA, is failing both staff and individuals they are supporting.

If a staff member moves from England to Wales, has a QCF in Health and Social Care, they must complete the AWIF to ensure compliance with the legislation. I fail to see why that approach was not enforced across the board.

Regarding the AWIF, when new starters arrive in service, they are provided a 'buddy'. That buddy supports the individual to navigate the paperwork, supporting individuals, accessing eLearning and is a source of general information and point person. The buddies are generally senior support staff who have experience and knowledge to share and would be responsible for supporting completion of the AWIF with their buddy.

The AWIF is to be completed within 12 weeks and application to the SCW for registration can be completed. Below are the answers of whether the AWIF is achievable in that timeframe and whether staff feel competent to support completion.

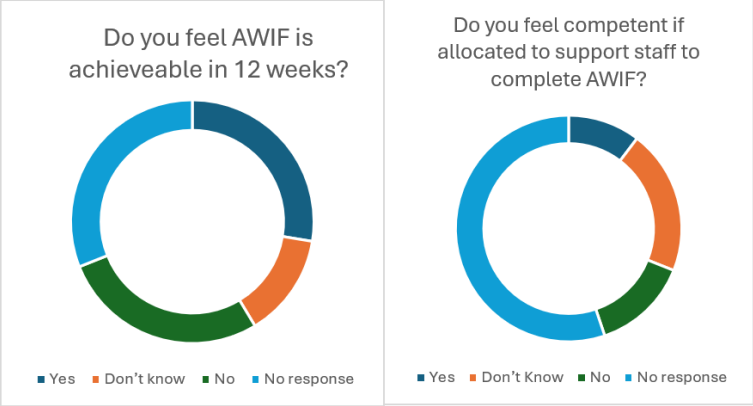


Figure 5.

The feeling that 12 weeks was not enough time were outlined in written responses stating that it was:

- Too much work.
- Possibly if the company did not also have additional training requirements within the same timescale – it is entirely NOT possible for the AWIF booklets to be completed within 12 weeks when a candidate is also expected to complete company induction, 35 eLFY courses and in house training to get them familiar with the service and the people we support.

Regarding competency, one response stated:

- Absolutely not – we were not provided with any training to mark the booklets or any additional time to do so – no answer booklets are provided to managers for reference so ensuring consistency between services and candidates is impossible.

There is a developing theme regarding training and qualifications for registration. The staff who are in place to support the completion of the AWIFs do not feel competent to do so, or that they do not have the knowledge to support as this was not covered in their appropriate qualification when registered.

Continuous Professional Development (CPD) and Competence

What do we mean by competence and how does that differ from CPD?

The Health and Care Professionals Council (HCPC) states that CPD is how you learn and develop throughout your career, ensuring your skills and knowledge are up to date so that you can practise safely. https://www.hcpc-uk.org/cpd/what-is-cpd/

The HPCP 5 standards

To meet the requirements of CPD. The standards are set out below and are achieved by carrying out a variety of learning activities on a regular basis that might improve your practice and benefit service users.

1. Maintain a continuous, up to date and accurate record of CPD activities.
2. Demonstrate that their CPD activities are a mixture if learning activities relevant to current or future practice.
3. Seek to ensure that their CPD has contributed to the quality of their practice and service delivery.
4. Seek to ensure that their CPD benefits the service user.
5. Upon request, present a written profile (which must be their own work and supported by evidence) explaining how they have met the standards for CPD.

Source: https://www.hcpc-uk.org/cpd/your-cpd/our-standards-for-cpd/

Competency is defined as behaviours that reveal mastery at work and can be applied to determine work standards (Xi et al. 2015), is reflected in the terms of formation of power and responsibility, and the extension of decision-making (Hsieh and Chihuikao, 2003).

Regarding health care, there is a further element of clinical assessment to establish competence which is to prepare and induct people to work as safe, ethical, and accountable individuals. (Bourbonnais et al., 2008).

Therefore, CPD is the knowledge gained from training: eLearning modules, face to face training or QCF/NCQ. Competency is how you take the knowledge gained and use in daily practice. You cannot have one without the other, however, you can have poor training informing bad practice and you can have excellent training not being used in practice. This has been reflected in the recent 'revalidation' that nurses must undertake to maintain their registration. Whilst the initial overhaul of nursing accreditation and acknowledgement of appropriate training came in 2001, it was further required to be reviewed in 2015. Healthcare is not stagnant, and the fields of medicine, treatment plans or models of care progress. The changes implemented in the nursing register will need to be echoed within social care to ensure that this new impetus continues to advance. This will only be achieved through firmer auditing, prescriptive training standards and physical observations – whether in person or written.

By professionalising the social care field, there are expectations and requirements that are required and are set out in the Code of Professional Practice in Social Care. There are 7 standards that every social care staff member – regardless of position – who are registered with SCW must follow. Similarly, the NMC has set out a code of standards for nursing. Both codes essentially cover the patient being at the core of their own care, acting in a professional manner and requirement for CPD and accountability for own learning.

The Code of Professional Practice for Social Care

The code is a list a list of statements that describe the standards of professional conduct and practice required of those employed in the social care profession in Wales. The code plays a key part in raising awareness of the standards of conduct and practice that are expected of the profession. They are:

1. Respect views and wishes, promote rights and interest of individuals are carers.
2. Strive to establish and maintain trust and confidence.
3. Promote wellbeing, choice, and control, while supporting them to keep safe.
4. Respect rights of individuals while seeking to ensure their behaviour does not harm themselves or others.
5. Act with integrity and uphold public trust and confidence in social care profession.
6. Be accountable for quality of work and take responsibility for maintaining and developing knowledge and skills.
7. In addition to 1-6, if you are responsible for managing or leading staff, you must embed the code in their work.

Source: Code-Print-Friendly-English.pdf (socialcare.wales)

Table 2. The Code.

Professional standards of practice and behaviour for nurses, midwives and nursing associates. All standards apply within your professional scope of practice.	
Prioritise People	1. Treat people as individuals and uphold their dignity 2. Listen to people and respond to their preferences and concerns 3. Make sure that people's physical, social and psychological needs are assessed and responded to 4. Act in the best interests of people at all times 5. Respect people's right to privacy and confidentiality
Practise effectively	6. Always practise in line with the best available evidence 7. Communicate clearly 8. Work cooperatively 9. Share your skills, knowledge and experience for the benefit of people receiving care and your colleagues

	10. Keep clear and accurate records relevant to your practice 11. Be accountable for your decisions to delegate tasks and duties to other people 12. Have in place an indemnity arrangement which provides appropriate cover for any practice you take on as a nurse, midwife or nursing associate in the United Kingdom
Preserve safety	13. Recognise and work within the limits of your competence 14. Be open and candid with all service users about all aspects of care and treatment, including when any mistakes or harm have taken place 15. Always offer help if an emergency arises in your practice setting or anywhere else 16. Act without delay if you believe that there is a risk to patient safety or public protection 17. Raise concerns immediately if you believe a person is vulnerable or at risk and needs extra support and protection 18. Advise on, prescribe, supply, dispense or administer medicines within the limits of your training and competence, the law, our guidance and other relevant policies, guidance and regulations 19. Be aware of, and reduce as far as possible, any potential for harm associated with your practice
Promote professionalism and trust	**20. Uphold the reputation of your profession at all times** 21. Uphold your position as a registered nurse, midwife or nursing associate 22. Fulfil all registration requirements 23. Cooperate with all investigations and audits 24. Respond to any complaints made against you professionally 25. Provide leadership to make sure people's wellbeing is protected and to improve their experiences of the health and care system
Source: https://www.nmc.org.uk/standards/code/read-the-code-online/	

The following information shows the data collected on the questions regarding the code to assess awareness, knowledge and ownership. To reflect on the project intention to assess quality and safety, there must be an understanding of what the code of professional practice is, how it applies to you and how it is implemented in your daily practice.

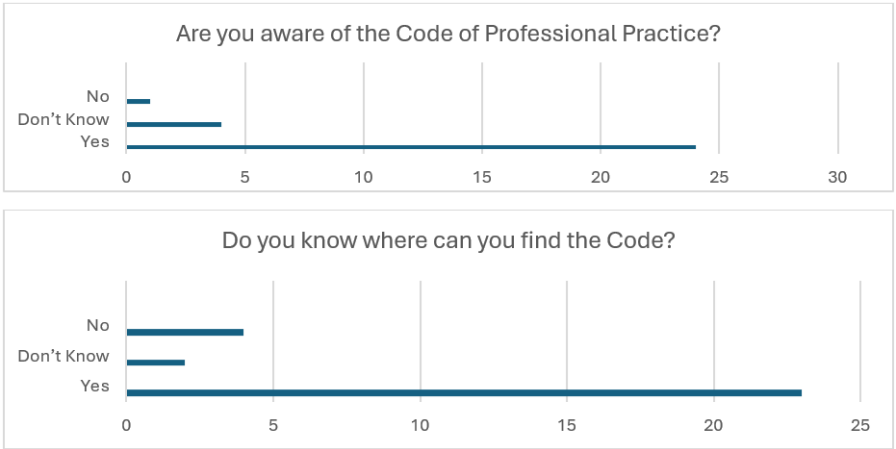


Figure 6.

The general answers regarding knowing about the code and where to find it were on the SCW website, with one stating it is in the office and another highlighting that is provided as part of the two-day induction

process. However, that would not capture all the staff completing – especially if they had been in the company for several years and had not completed the current qualification. However, as their own professional body, the staff must be held accountable as a cursory look at the SCW website – of which all staff must hold accounts with as part of registration, shows an information hub where the basic mandatory information is held.

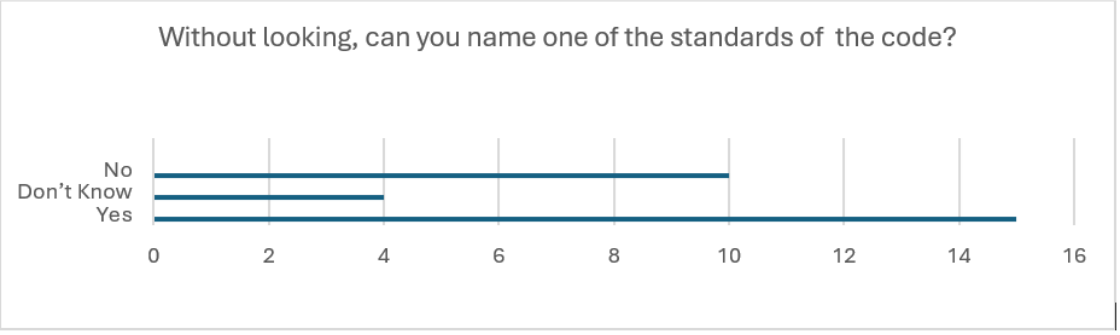


Figure 7.

Table 3. Written responses.
Mainly because I often quote it during disciplinary meetings.
Maintaining confidentiality
Competent, communication, professional, respect.
Openness
Person centred care
You must never abuse or neglect harm or exploit those who use health and social care services, their carers or your colleagues.
Promote well-being, voice and control.
Accountability.
Respect, person centred care.
Respect, dignity, privacy, preferences, culture, language, rights, beliefs, views and wishes.

Whilst those who provided answers are correct, there are only 10 who provided comments, yet 15 answered yes. Does that mean they were not telling the truth? Or do they not want to admit that they were unsure? Likewise, the 14 who answered no/don't know should be able to provide some answer as the standards in the code are reflected in the mandatory eLearning modules all staff complete such as person-centred care, Equality and diversity or professional boundaries.

Standard 6 of the Code of professional practice in social care states: Be accountable for quality of work and take responsibility for maintaining and developing knowledge and skills. As identified within the project, there are a minimum of 45 hours of CPD to be completed. CPD has twin aims of improving practice and professional development.

There is no determination on what is or is not relevant CPD training, only that when you are uploading the training to your SCW account, you are required to explain how this is relevant to your current workplace/field of registration. This is a mere sentence and no requirement to upload certificates or for line managers authorisation or agreement that these have been achieved.

Looking to Nursing field for comparison, it was discovered that in 1995, the UKCC introduced the Post Registration and Education Practice (PREP) scheme. PREP provided a coherent and comprehensive framework, incorporating the standards and principles of education and practice beyond the point of registration. Smith (1991).

Table 4. The key proposals.	
1.	A period of support should be provided for newly qualified practitioners at the time of each new registration.
2.	A personal professional file should be maintained by every practitioner as a record of higher experience and achievements.
3.	A minimum of 5 days of study leave every 3 years should be available to each practitioner.

4.	A complete return-to-practice programme must be completed by those wishing to return to professional practice after a break of 5 years or more
5.	A UKCC-approved qualification must be recorded with the UKCC by those who wish to practise as an 'advanced practitioner' in the fields of clinical expertise, education, management or research.
6.	Registration with the UKCC will embrace a new concept of 'eligibility to practise' which will demonstrate that practitioners have maintained and developed their professional knowledge and competence, and which will identify their area of practice.

Whilst PREP made Nurses, Midwives and Health Visitors the first profession that had to prove they had maintained professional competence to continue to be registered to practice, it quickly became stagnant. Other professions created more advanced assessment and auditing tools whilst PREP remained unchanged. PREP system was a tick box exercise to prove CPD with the NMC physically auditing the portfolios of 10% of the registrants. However, this did not occur due to the numbers on the register.

As with what has been identified in the data collected through qualifications and registrations, it appears that SCW are repeating the initially celebrated but quickly criticized 'tick box' exercise PREP became. The main difference here is that there is no auditing of CPD and therefore lacks any assessing or quality control.

Further to these concerns, there is no correlation between CPD and competence that is measured. Sitting through a 3-hour online course on positive culture does not mean this is now embedded into your practice. Whilst training informs knowledge which is the foundation of any health care practice as has been cited as a component of competence, (Cope et al. 2000) this knowledge does not transfer directly to competent behaviours or appropriate use (Tabarit et al (2006), rather the amount of stored knowledge in one's memory, is the key factor in differentiating an expert from a novice. (Nojima et al. 2003). As identified, there are many 'experts' social care workers in relation to within the participants of the project, but their expertise is from obsolete qualification or having completed all mandatory eLearning modules.

Tabarit et al (2006) states experience is viewed as needing to be active if it is to lead to learning. This implies that experience is not the mere passage of time (Benner 1984) and cannot result in the development of competence on its own if the individual does not reflect on and learn from it (Rolfe 1997).

Watson (2002) argues that competence was developed from an anti-educational stance and in opposition to intelligence testing. Therefore, instead of assessing general abilities and cognitive functions (Intelligence), it became an assessment of specific skills for a specific job (competencies). The question became, was this system set up to educate and develop or to merely train. Watson goes further to state that competence – whilst well intentioned – is from a misguided political and public impression that nurses who are university trained are too clever to care. Whilst this approach is not currently apparent in social care, the increase in educational standards and qualifications now being equivalent to A levels/Undergraduate degrees does isolate a large majority of staff who have entered social care as they did not have educational abilities but were practical and skill based. These staff are those who formed the majority of the participants of the study and gained entry to the register due to previous qualification, which did not require the academic rigour currently required. However, with the current trend observed in both social care and nursing, academia is the preference over the fundamentals of care. It will be interesting to see if there does become a divide between those who are knowledge based versus experience based as increasing staff enter the register with newly developed social care qualifications.

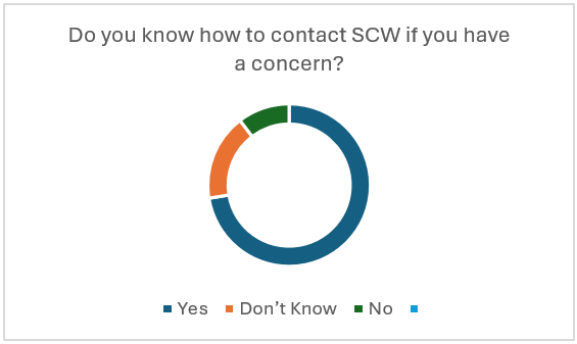
Barriball et al. (1992) stated there are no strategies to assess for non-technical aspects of care or the application of theory in practice by the practitioner, whilst there are some attempts for a holistic approach to assessing professional knowledge and competence. McVeigh (2009) Highlights an ongoing debate over definitions of competence and on how best to link competence developments and standards. Little evidence that methods and instruments used to assess competence are robust, whilst a range of organisational factors may mitigate against demonstrating competence.

Health and Social Care is holistic in its nature. We no longer use a medical model of care by treating a broken leg or a diagnosis of schizophrenia, but how those impacts all the person. Likewise, whilst the training is essential for upskilling staff, minimum training requirements etc so are the hands-on clinical competencies to ensure good practice, risk management and safeguarding. Both are essential and currently neither are being monitored, measured or audited.

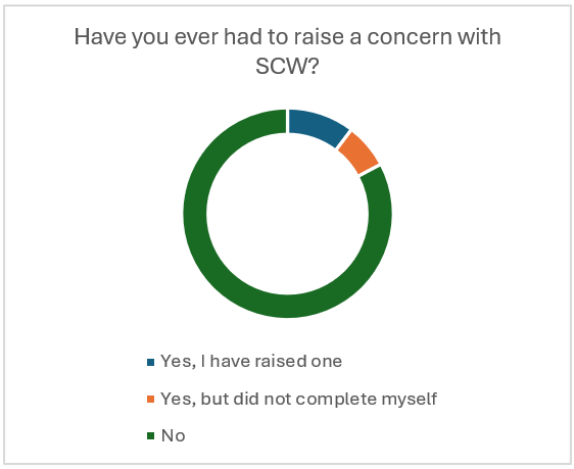
Whilst the qualification route, competence and CPD has raised concerns, the outcome of questions regarding to raising a concern proved satisfying.

There appears to be enough training – whether eLearning modules, taught adobe sessions and face to face training as part of the mandatory and house specific training needs that maintain knowledge of good practice and recognising the signs and knowing who to report this too. It is important to recognise that anyone who has worked in any health care setting for any length of time or gained any qualification should know the basics of safeguarding and reporting guidelines. This has developed throughout the years due to changes in reform and unfortunately new ways that people can abuse others from Protection of Vulnerable Adults (POVA) to the current safeguarding measures that now include modern slavery and coercive control guidance.

Due to the questioning posed in the questionnaire, it is not clear whether those who answered about reporting did so due to knowledge gained from previous training verses specific knowledge on the SCW reporting system.



Written Answers:
Telephone/email
Online would get all info from there
You can contact the SCW by using their online form or calling 0300303444 weekdays between 10am – 2pm.
Advice on website
SCW page



One response stated: I have sent queries regarding staff accounts etc – I have also been called as a witness/required to give statements following dismissal of a staff member.

Figure 8.

Two further questions only relevant to those who had stated that they had contacted SCW, all 5 stated they found this 'easy' and that all received support from their line manager when doing so.

When asked what issues or concerns you think you can raise to SCW, the response was informative:

- Concerns with colleagues work e.g. unsafe practice. If someone is at/putting someone at risk of harm
- Anything that is a concern
- Anything that effects the clients in the home. Staff conduct.
- Conduct.
- Any concerns regarding the service/staff or people we support
- Whistleblowing, malpractice.
- Reports of abuse, safeguarding issues.
- As a manager: abuse, dishonesty, failing to follow procedures and policies, poor or unprofessional conduct.

- Abuse, fraud, exploitation, violence.
- Concerns about the standard of care provided e.g. neglect, abuse.
- Anything that is a concern.
- Any.
- Safeguarding, fitness to practice.

The final two questions were regarding registration improving own personal practice and improved the quality in care?

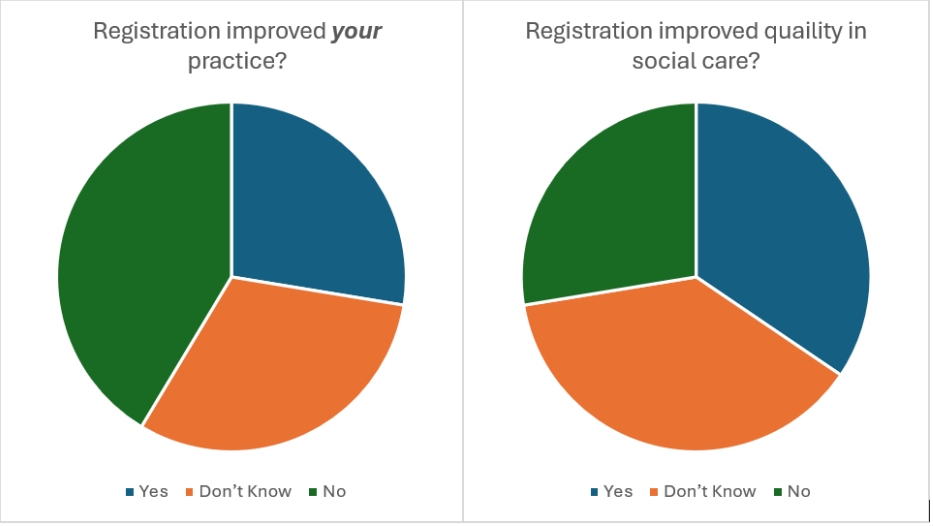


Figure 9.

Staff were asked to provide examples of how it has improved their own practice and the quality in social care. Below are the responses:

Own Practice
• Ensures suitable candidates work within social care. Keeps everyone safe. • More aware/trained colleagues working alongside each other • I'm same carer but £30 short. • Have an understanding of expectations within role. • tracked staff so we are all on a good level and providing a good level of care. • Fair and equal representation within company. • Helps track ppl that shouldn't work in care, prevents abuse. • Feel part of a professional role, recognises support workers as profession and hopefully prevents ppl who should not be trusted to work in care from gaining positions of power in charge of vulnerable adults. It has the potential to drive quality in care due to the expectation of qualifications and training. • It provides or negates a pathway for ppl to continue in social care if they have been removed from their post for misconduct. • Not sure. I still continue to my job to the best of my ability but I have to pay £30 to do it. • By enforcing standardised training and qualifications. Ensuring accountability through code of practice and promoting ongoing professional development. • My standards and moral compass remains unchanged!
Quality in Social Care
• Less behaviours, drop in anxieties etc • none

- all have a duty of care and tracked so wherever any staff go the next company will see disciplinaries etc.
- registering with SCW allows ppl to have a better understanding of the job, the role and the work. It allows ppl to understand what they are entering.
- One would hope so as we are now aware that we have a body to answer too and could be banned from care work if appropriate.
- As above.
- Social Care Wales provides resources and frameworks for training programs eg social care learning hub. This initiative has enhanced the skill and knowledge.
- Code of conduct, professional body, encourages cpd.
- Care workers undergoing specific training programs and workshops to stay updated on best practices
- It raises minimum standards required for support workers from an academic standpoint but unfortunately this also means that many very good support workers who are not academically minded have been lost or overwhelmed. Its good for safeguarding as it prevents ppl leaving in the middle of investigations and continuing to work in care.

There are some positive and negative points raised. There does appear to be a trend that there is resistance to having to pay for the registration and why there are different costs for Support workers and Deputies/Managers. This is as expected as most staff who completed this questionnaire, would have been in social care long before this registration, and whilst their job has not changed or certainly the way they perform their job hasn't changed, but now have to pay to do it.

Another point is that the 'tracking' of staff appears to be a selling point. There was very little provision before the register to monitor poor staff. Even if they had been identified as lacking skills to be an effective social care worker, there was little recourse as employers. References are now merely confirmation of employment and must seek permission from the employee to be given, even if disciplinary action had commenced, staff could leave and as it was not finalised would not state on any references. However, through registration, having to provide a full work history, individuals with high turnover of social care jobs, or confirming that they had been terminated from a position, will be forwarded to the Fitness to Practice department. Here, everything is reviewed and discussions with previous and current employers as well as the staff member occur, and a decision will be made to whether they can register.

Finally, whilst there are concerns already identified with qualification to register, the CPD has been identified as a positive. This is reflective of what has previously been identified regarding the mandatory training modules providing a bridge to maintain knowledge and skills.

Conclusion

Has the project question been answered?

SCW states that registration is to protect the public. Only those who are competent and qualified can deliver care and support in roles where registration is required. Staff will be part of professional workforce and can show the skills and knowledge which are vital to providing good care and support. Overview and Awareness | Social Care Wales

It has been established that whilst staff may have the competence and skills to deliver quality care, they are not doing so under the current qualification scheme and some qualifications are at least 13 years old if they were completed in the last year available (NVQ in 2011). There is also no identified competence assessment to ensure good practice or collection of CPD that is reviewed and audited to maintain registration.

Whilst the mandatory training is creating a bridge to cover some elements in training gaps, I am unclear if that is sufficient to qualify as being part of a qualified professional workforce. Likewise, the lack of knowledge and understanding of the code of professional practice is a concern, especially when standard 6 states 'Be accountable for quality of work and take responsibility for maintaining and developing knowledge and skills.' If there are staff that do not know there is a code or where to find it, that is not performing as part of professional workforce.

In the Parliamentary review of Health and Social Care in Wales. A revolution withing: Transforming Health and Social Care in Wales. 2018, the key aim is to maximise the value of care and being more efficient. There are 10 recommendations with number 5 being:

- A great place to work
- Staff should be well trained, supported and engaged to deliver and continually improve quality service.
- Assessment of staff wellbeing and engagement should be explicitly element of registered inspection process of providers.
- Joint workforce planning between employers, health board and SCW, with emphasis on expanding generalist skills and new ways of working that enable staff to work at the top of their skill set and across professional boundaries.

The themes of training and quality of service coupled with professional boundaries are throughout the SCW remit, however, in this small sample, I cannot agree that this has been proven.

Upon collating the information from the questionnaires, there appears to be some ambivalence towards having to register and that this is something else to deal with rather than understanding that social care has shifted dramatically in its delivery of quality care and how these elements should be embedded into practice.

It gives me pause to think whether this is due to the initial roll out being halted by COVID and then the rush to register all within a brief time frame. Was the attitude of the senior staff – managers, regional managers etc to 'get this done' as we could not afford to lose any more staff or have a staff member unable to work due to not registering, detracted from the significance of the entire process.

When discussing the research methodology, it was identified that MMR would be used as would CR. The quality of the data collection was good but could have been better. There were many questions that were answered 'don't know' or when asked to provide a written response, this was omitted. Therefore, this left gaps in the data that could have helped form more solid conclusion. I view this as a reflection that the questionnaire was not formatted correctly and phrasing of questions should have been rewritten, and not due to the staff members completing. However, when exploring whether to continue with MMR, I still feel that this was the best way to collect data and whilst statistics can tell a story, it doesn't always tell the whole story.

With CR, this was a negative outcome. There is correlation between training and good, effective practice – however, this was not identified through this data set. What was identified is that safety of individuals in social care has not changed and that staff can easily identify any concerns and to act on them appropriately. Therefore, the Quality variant decreased, and the Safety variant increased and that provides the answer to the project question.

The ability of health care systems to respond to changes, to maintain and improve quality, efficiency and equity of services, is dependent on appropriately trained and supported healthcare professionals who are available where and when they are needed (World Health Organisation (WHO), 2002)

Upon reflection, I do not feel that registration has had any impact on the quality or safety of individuals in social care. That is not to say that anyone is at risk or poor care delivery is rampant. Quite the contrary, registration has not had an impact as mandatory annual training updates, previous care experiences and qualifications such as the NVQ or QCF have provided sufficient awareness of safeguarding, deprivation of liberties, neglect, whistleblowing, engaging in a person centre way, positive cultures etc that the quality and safety has been maintained. However, there was very little in the way of actionable data outside of that collected via questionnaires, which made the answer to the project very narrow in scope. It would be interesting to repeat this in a years' time, where a further data set would have been collected and amendments to how and who data was collected from would show if the register for social care is improving the profession.

Key recommendations

Review of registration auditing

Whilst registration in social care is new and will undergo evolve as time moves on, the concern is that healthcare is always reactive rather than proactive. Changes will be made following a specific event or

failing. This means that individuals will be harmed in some way before a review. To prevent this, SCW needs to undertake a stringent auditing process that is built on trust. There should be evidence to show that individuals have relevant qualifications, knowledge and skills. As with CIW, there should be inspections or requirements to produce evidence to highlight knowledge and skills that is not a signed piece of paper the manager has completed. There is too much focus on the 'trust' of individuals, and not enough on the SCW of accessing services and ensure implementation.

Review of training within appropriate qualifications

There must be a review of all appropriate qualifications. If they have not been achieved since 2018, when the new curriculum was introduced, further training is required. This could cause unrest amongst staff who have been in the sector for years, or even decades, however, as their qualifications are no longer relevant or measurable, there is no reason to accept them. To ensure that all staff are working under the same frameworks, with the same expectations and standards is essential. By having a workforce that is not cohesive in this approach will – and has shown – to impact quality of care delivery.

The resolution would not be difficult. SCW would need to revise the training proforma and state that any staff who have not completed the current training package must complete AWIF booklets One and Three (or two and four for those working with children). These booklets cover all relevant changes in legislation for both staff and individuals, provides clear protocol and policies that ensure the safety of all.

Target specific staff to increase the validity of data

To ensure a better collation of data, the questionnaire to be reviewed and targeted at specific staff groups. The first group will be/currently enrolled on the new qualification or have undertaken the AWIF. This will provide a more informed data set and will give a true reflection of the registration process. The second group will look solely at senior staff team and those who have been in post 12 months and under/over. This will provide an opportunity to assess not only knowledge but the feasibility of the process and their attitudes towards registration.

Group One

1. Staff who are new to social care/social care in Wales AND
2. Staff who have been employed for 6 months and under OR
3. Staff who have been employed for 6-12 months.

Group Two

1. Staff who are employed in Senior Support Worker, Deputy and Manager roles AND
2. Employees who have been in post 12 months or under OR
3. Employees who have been in post for 12 – 24 months.

When completed the questionnaires and data audited, follow up interviews to be completed to explore answers, attitudes and opinions. The process to them be compiled and review if any different conclusions can be made.

Data collection via hearings and registration searches

I had contacted SCW to ask for any reports or signposting for where to collect this data but had no reply. SCW to publish all data collected from the annual review submissions from across all registered services. This includes any safeguarding reporting to which staff were the offender, fitness to practice referrals made and the subsequent outcomes. This can be collated under each field i.e. Adult residential care, Domiciliary care and broad subject matters such as failure to follow care plans causing injury, restrictive practice, committed criminal offense outside of work. Then the allocated outcome such as suspended for fixed term, warning for fixed term, removal from register. Alternatively, there is required to be an easier way to search for referrals/outcomes than currently having to search every individual. There are time restrictions in place to collect data this way, but unable to go to previous years.

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The Role of Telehealth in driving Digital Transformation in Wales

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Abstract:

Background: This research report investigates the crucial role of Telehealth in driving digital transformation within Wales, focusing on how telehealth platforms enhance accessibility, quality, and operational efficiency of healthcare services. The study is underpinned by Rogers' Diffusion of Innovation theory (2003), providing insights into the adoption and impact of new technologies in healthcare settings.

Methodology: A mixed-methods approach was employed, incorporating a comprehensive literature review alongside primary data collection through surveys. Participants, including healthcare providers, developers, and researchers, provided insights into the usage and challenges of key telehealth platforms, such as eConsult, Doccla, and Patients Know Best.

Results: The analysis revealed significant barriers, including deficits in digital literacy and limited system interoperability, while highlighting the positive impact on healthcare access, particularly in rural areas, and the management of chronic conditions. The findings suggest that while telehealth has enhanced patient engagement and healthcare delivery, ongoing technical and policy challenges persist.

Conclusion: To fully harness the potential of telehealth, Wales must prioritise investment in digital literacy initiatives and robust policy frameworks that support system-wide integration. Key recommendations include the development of standardised telehealth policies and improvements in infrastructure to ensure equitable access and long-term sustainability of healthcare transformation.

Keywords: Telehealth, Digital Transformation, Healthcare Delivery, Wales, Innovation, National Health Service

List of Acronyms, Figures and Tables

Acronyms

Acronym	Definition	Acronym	Definition
AI	Artificial Intelligence	NHS	National Health Service
CAVUHB	Cardiff & Vale University Health Board	ONS	Office for National Statistics
COPD	Chronic Obstructive Pulmonary Disease	RPM	Remote Patient Monitoring
CWTCH	Connecting with Telehealth to Children in Hospital	TEC Cymru	Technology Enabled Care Cymru
DHCW	Digital Health & Care Wales	TERMS	Technology Enabled Remote Monitoring in Schools
GDPR	General Data Protection Regulation	UK	United Kingdon
EHR	Electronic Health Record	VIPAR	Virtual Pulmonary Rehabilitation
MRC	Mobile Respiratory Clinic	WHO	World Health Organisation

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1 Introduction

The purpose of this report is to explore the role of telehealth in driving digital transformation in the healthcare sector in Wales. telehealth, a subset of Telemedicine, refers to the use of digital and communication technologies to deliver healthcare services remotely. This includes consultations, diagnostics, monitoring, and patient education, enabling access to healthcare for those who may face barriers due to location, mobility, or other factors (National Health Service [NHS] Digital, 2020; Royal College of Physicians, 2020). In addition, these technologies allow the recording and sending of information relating to service users' conditions to ensure that a healthcare professional can remotely treat them (Technology Enabled Care [TEC] Cymru, 2024). Similarly, Telemedicine, a subset of telehealth, involves the remote diagnosis and treatment of patients using telecommunications technology, while telecare includes remote monitoring and support services for patients (Krukowski et al., 2017).

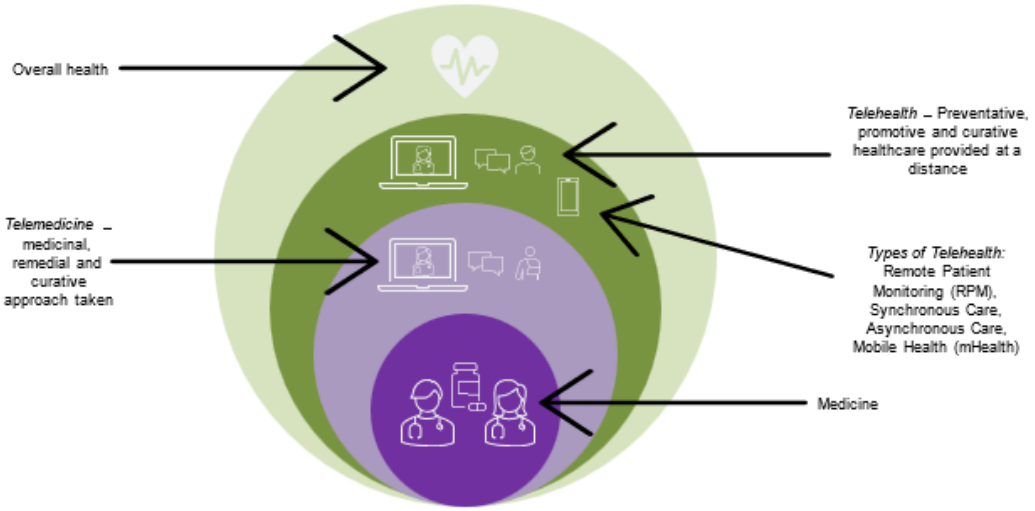


Figure 1. Telehealth & Telemedicine diagrammatic representation (Source: Authors Own)

The research is situated in the context of increasing the adoption of digital technologies in healthcare, accelerated by the COVID-19 pandemic. The pandemic highlighted the necessity for robust remote healthcare solutions, prompting a significant shift towards telehealth services (Greenhalgh et al., 2020).

1.1 Research Questions, Aims and Objectives

RQ1: How has telehealth facilitated digital transformation in NHS Wales?

RQ2: What are the impacts of telehealth services on patient access, care quality, and operational efficiency?

RQ3: How do innovation and transformation initiatives influence the adoption and effectiveness of telehealth in Wales?

RQ4: How can the findings inform future telehealth strategies and policies in NHS Wales?

The primary aim of this research is to assess how telehealth platforms have facilitated the digital transformation of healthcare services in Wales. It seeks to identify the specific ways in which telehealth has influenced patient access, care quality and operational efficiency within Wales. The project will also aim to explore the challenges and opportunities presented by telehealth adoption and offer recommendations for enhancing the sustainability and effectiveness of these platforms.

To achieve these aims, the project will focus on the following objectives:

- Conduct a comprehensive review of existing literature on telehealth and its role in digital transformation within healthcare systems, with a particular focus on the Welsh context (Kruse et al., 2017).
- Utilise both quantitative and qualitative data to evaluate the effectiveness of telehealth platforms in improving patient outcomes and operational efficiencies (Greenhalgh et al., 2018).

- Identify best practices for the implementation and management of telehealth services within NHS Wales, and analyse the challenges encountered during the adoption process (Shaw et al., 2018).
- Provide evidence-based recommendations for the enhancement and sustainability of telehealth services in Wales, with a view to informing future healthcare strategies and policies (Morse, 2021).

The report includes a detailed literature review on telehealth and digital transformation, an analysis of the case studies, data collection and analysis methods, findings, and recommendations for future practice. It will also address ethical considerations, ensuring privacy and confidentiality of participants throughout the study.

2 Identification of Project Requirements

This report explores how telehealth has acted as a catalyst for digital transformation within the Welsh healthcare system. telehealth, defined as the provision of healthcare services through digital and communication technologies, has gained significant traction in recent years, particularly in response to the COVID-19 pandemic (World Health Organisation [WHO], 2016).

The report will critically examine how the integration of telehealth within Wales has improved healthcare delivery, enhanced patient outcomes, and streamlined operational efficiencies. The increasing reliance on digital platforms has necessitated a transformation in how healthcare services are conceptualised and delivered, making this an opportune moment to assess the impact of these changes on the Welsh healthcare system.

The rationale for this study lies in understanding both the role of telehealth and how telehealth can support the digital transformation of healthcare in Wales, particularly within the NHS framework. This includes evaluating the effectiveness of these platforms, the challenges faced, and the strategies needed to enhance their implementation and sustainability. Moreover, the literature in relation to the impact telehealth can have on health and social care is minimal (Cushing et al., 2024). By examining these aspects, the research aims to contribute to the broader discourse on telehealth and digital healthcare, providing insights that could inform policy and practice (Jones, Row, & Gemmill, 2021).

telehealth has emerged as a critical component in the digital transformation of healthcare services in Wales, as evidenced by the Welsh Government's commitment to integrating digital technologies into its health strategy. The "A Healthier Wales" strategy underscores the intention to innovate and improve healthcare accessibility, particularly in rural and underserved areas (Welsh Government, 2018). This vision aligns with the objectives of Digital Health and Care Wales (DHCW), which leads on the development and implementation of digital platforms for virtual consultations and remote monitoring (DHCW, n.d.). Notably, the integration of telehealth solutions, such as video consultations through platforms including Attend Anywhere and Consultant Connect, exemplifies this commitment by facilitating remote interactions between patients and healthcare providers (DHCW, n.d.). Additionally, the acceleration of telehealth adoption during the COVID-19 pandemic has fortified the telehealth infrastructure, leading to more widespread and sustained use of remote care technologies (Welsh Government, 2018). The NHS 111 Wales service further incorporates telehealth to offer advice and consultations online, thereby enhancing service efficiency and reducing the need for in-person visits (NHS Wales, n.d.). These developments collectively demonstrate how telehealth not only supports immediate healthcare needs but also drives broader digital transformation within the Welsh healthcare system (Parliamentary Review of Health and Social Care in Wales, 2018).

Furthermore, the rationale for this study is grounded in the growing global interest in telehealth and its accelerated adoption, particularly due to the COVID-19 pandemic. According to Leochico et al. (2021), there was a significant rise in the online interest in terms related to telehealth, Telemedicine, and Telerehabilitation, as reflected in search term trends from 2020. Specifically, the study highlights that the pandemic caused a surge in telehealth searches across the world, driven by the urgent need for remote healthcare solutions (Leochico et al., 2021).

Top countries with higher online interest in "Telehealth"	
1	Australia
2	Canada
3	New Zealand
4	United States
5	United Kingdom
6	Ireland
7	Singapore
8	Vietnam
9	Philippines
10	Germany

Top countries with higher online interest in "Telemedicine"	
1	China
2	India
3	France
4	Netherlands
5	South Korea
6	Spain
7	Pakistan
8	South Africa
9	Indonesia
10	Malaysia

Colour Width represents relative percentage of online searches for "telehealth" (Blue) and "telemedicine" (red) per country.

Figure 2. Comparison of searches for "telehealth" and "telemedicine" per country from 2004 to October 4th, 2020 (Source: Authors Own; Leochico et al., 2021)

This growing public interest underlines the relevance of researching how telehealth platforms are driving digital transformation in healthcare systems, particularly within the context of Wales. telehealth services not only play a vital role in maintaining healthcare delivery during crises but also provide a foundation for long-term innovations in healthcare infrastructure. This research seeks to build on these insights, analysing the role of telehealth in reshaping healthcare delivery systems, with a particular focus on identifying barriers, opportunities, and best practices for successful implementation within NHS Wales.

Moreover, Leochico et al. (2021) found that the most notable increases in online interest occurred during periods of peak COVID-19 lockdowns, suggesting a critical correlation between public health emergencies and the acceleration of telehealth adoption. Such statistics demonstrate the need to investigate how telehealth platforms in Wales can be optimised and sustained post-pandemic to support ongoing healthcare transformations.

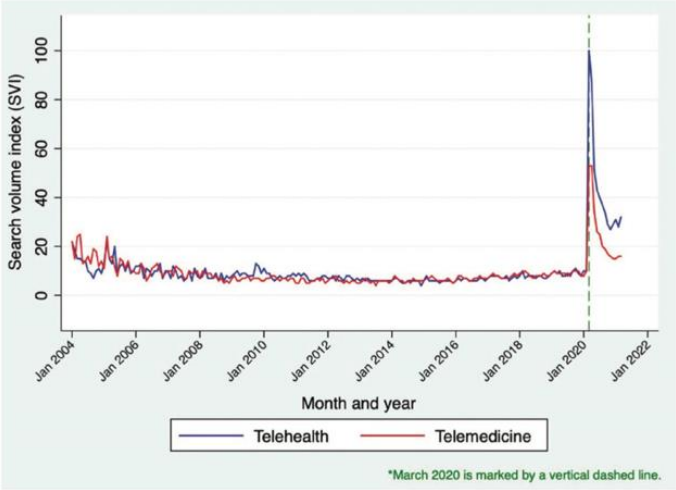


Figure 3. Trends of searches for "telehealth" and "telemedicine" from 2004 (earliest available coverage of Google trends) to October 4th, 2020 (date of search) (Source: Leochico et al., 2021).

The report is of significant relevance to NHS Wales and other stakeholders in the Welsh healthcare sector. As digital transformation becomes increasingly critical to the delivery of healthcare services, understanding the role of telehealth in this process is essential for developing effective strategies and policies. The insights gained from this research will help NHS Wales optimise its telehealth services, improving patient care and operational efficiency across the board. Moreover, the findings will contribute to the broader discourse on healthcare digital transformation, providing valuable lessons for other regions and healthcare systems seeking to leverage telehealth for similar purposes (Nesbitt et al., 2013; Mair et al., 2012).

By focusing on the Welsh context, this report ensures that its findings will be directly applicable to the local healthcare environment, while also offering broader implications for the adoption and implementation of telehealth services worldwide.

2.1 Methodology

Table 1. Overview of Research Methodology (Source: Authors Own)

Section	Description
Research Design	This study uses a mixed-methods approach, combining both quantitative (survey) and qualitative (case studies, survey) research to examine the adoption and challenges of Telehealth in Wales. The design enables a multi-faceted view, integrating both numerical data and in-depth insights (Creswell & Creswell, 2018).
Ethics Approval	Full ethics approval for this project was obtained from Swansea University. All participants were informed about the purpose of the research and their rights, including confidentiality and anonymity. Data handling adhered to GDPR regulations, with data stored for 12 months and securely destroyed afterward (Information Commissioner's Office, 2020).
Participants	Participants included healthcare professionals, developers of Telehealth platforms, and a sample of users from different demographic backgrounds. The selection of participants was purposive, targeting relevant stakeholders in Wales to provide insight into the experience of using platforms like eConsult, CWTCH, and VIPAR (Robinson, 2014).
Literature Review	The literature review explored academic and industry sources on Telehealth, digital healthcare transformation, and policy frameworks in Wales and the UK. This included a review of government initiatives (Welsh Government, 2018), studies on the effectiveness of Telehealth platforms (Greenhalgh, 2018), and the COVID-19 pandemic's influence on digital healthcare adoption (Krukowski, 2017).
Case Studies	Detailed case studies of Telehealth platforms such as eConsult and TERMS were conducted. The case studies examined the platforms' implementation, integration, and impact on healthcare services. The case study method allowed for an in-depth investigation of how these platforms function in real-world settings and the challenges faced during deployment (Yin, 2014).
Data Collection Methods	Survey: Distributed via Microsoft Forms to Telehealth platform users and developers, focusing on usability, satisfaction, and outcomes. Case Studies: Evaluated real-world implementations of platforms, providing insight into operational challenges and benefits.
Instruments Used	Survey: Likert scale and multiple-choice questions used to assess user experience with Telehealth platforms. Survey guide: Designed to explore participant views on the barriers, challenges, and future of Telehealth. Instruments were tested via pilot study to ensure clarity (Dillman et al., 2014).
Data Analysis	Quantitative Data: Survey responses were analysed using descriptive statistics (e.g., mean, standard deviation) to capture trends in user satisfaction and platform effectiveness (Field, 2018). Qualitative Data: Thematic analysis of interviews and case studies was conducted to identify recurring themes and challenges associated with the integration of Telehealth (Braun & Clarke, 2006).
Limitations	The study's limitations include the scope of the sample, primarily restricted to UK-based healthcare providers, developers and users. The self-reported nature of survey responses could introduce bias, and the cross-sectional design limits longitudinal insights (Bryman, 2016).

3 Main Analysis

3.1 Technology Enabled Care (TEC) Cymru

TEC Cymru plays a crucial role in shaping the digital health landscape of NHS Wales, spearheading the adoption and integration of telehealth technologies to enhance patient care, streamline healthcare delivery, and improve accessibility across the country (TEC Cymru, 2022). Its efforts are strategically aligned with national healthcare goals, fostering a standardised yet flexible digital infrastructure that supports both national policies and localised healthcare demands (NHS Wales, 2021).

At the national level, TEC Cymru has been instrumental in deploying telehealth solutions across multiple health boards, ensuring these services are seamlessly integrated into existing clinical workflows. Largescale initiatives, including remote patient monitoring and virtual consultations, have been underpinned by rigorous data analysis, facilitating ongoing improvement and ensuring that services meet the high standards set by NHS Wales (Greenhalgh et al., 2018). The COVID-19 pandemic underscored the organisation's capacity for agile, effective responses, with telehealth adoption accelerating rapidly under its guidance (Morse, 2021).

Beyond national strategies, TEC Cymru engages in bespoke collaborations with local health boards to adapt telehealth initiatives to specific community needs. For instance, the CWTCH project, developed with Aneurin Bevan University Health Board, demonstrates how telehealth can be tailored to ensure that vulnerable groups, such as children, receive continuous, high-quality care even in the absence of in person consultations (Shaw et al., 2018; TEC Cymru, 2022).

3.2 Viewpoints in Researching telehealth and Digital Transformation

The exploration of telehealth and its role in digital transformation within healthcare systems presents a multifaceted challenge, requiring an examination from multiple perspectives. These viewpoints include technological, policy, organisational, and patient-centered perspectives, each contributing uniquely to the understanding of how telehealth can drive digital transformation. The selection of appropriate viewpoints is crucial in shaping the research approach, influencing both the methodology and the interpretation of findings.

3.3 Patients - Digital Literacy and Internet Access

One of the primary considerations in implementing telehealth is the digital literacy of patients and their access to the internet. In Wales, as in other regions, the success of telehealth initiatives like CWTCH and VIPAR (Virtual Pulmonary Rehabilitation) depends significantly on patients' ability to navigate digital platforms (DHCW, 2023). Digital literacy is crucial for patients to engage effectively with telehealth services, yet disparities in digital skills and internet access can create barriers, particularly in rural areas (Beech et al., 2021). Policies aimed at improving digital literacy and expanding internet access are essential for ensuring equitable access to telehealth services across all demographic groups in Wales.

As the integration of telehealth services into the healthcare system grows, particularly in the post pandemic era, the issue of digital literacy and internet access among patients has become critical. In Wales, where rural and underserved communities face unique challenges, ensuring equitable access to telehealth is essential for maximising its benefits. Digital literacy, which refers to the ability of individuals to effectively use digital technologies for communication, information gathering, and decision-making, is fundamental for the adoption of telehealth platforms (Van Deursen & Van Dijk, 2014).

3.3.1 Digital Literacy in Wales

In Wales, digital literacy presents unique challenges. A 2020 survey from Ofcom showed that Wales demonstrates lower levels of internet usage compared to other regions within the United Kingdom (UK), with 11% of adults reporting that they never use the internet, compared to the UK average of 8% (Ofcom, 2020). This disparity can further exacerbate healthcare inequalities, as those unable to access or use online platforms may be excluded from telehealth services, leaving them reliant on traditional healthcare systems that may be more stretched.

Internet access is another major determinant of the success of telehealth in Wales. While the UK Government has made strides in increasing broadband connectivity, significant digital divides remain. In 2021, the Welsh Government reported that 95% of Welsh premises had access to superfast broadband, but rural areas still suffer from limited or slow internet connections (Welsh Government, 2021). This "digital divide" impacts the effectiveness of telehealth services, as patients in remote areas may struggle to access high-quality, real-time consultations, particularly for data-heavy services such as video conferencing (European Commission, 2020). This can significantly impact the delivery of telehealth services, particularly in rural Welsh communities, where high-speed internet is crucial for seamless telehealth consultations.

According to recent data, 82% of adults in Wales had basic digital skills in 2021, slightly lower than the UK average of 86% (Welsh Government, 2021). However, significant disparities exist between age groups and socio-economic status, with older adults and those in low-income households more likely to lack these skills. For example, only 47% of adults over the age of 75 in Wales reported using the internet in 2021 (ONS, 2022). This demographic gap is critical for telehealth adoption, as older adults are often the primary users of healthcare services.

To address these disparities, the Welsh Government has launched several digital inclusion initiatives. The Digital Communities Wales: Digital Confidence, Health, and Well-being programme aims to improve digital literacy, particularly among older adults and those with disabilities, by offering digital skills training (Welsh Government, 2021). However, despite these efforts, digital exclusion remains a challenge that could limit the effectiveness of telehealth.

3.3.2 Implications for telehealth in Wales

For telehealth to succeed, initiatives aimed at improving digital literacy and expanding internet access must be prioritised, particularly for older patients and those in rural or socio-economically disadvantaged areas. Training programs, such as those supported by DHCW, can help bridge the digital literacy gap by equipping

patients with the necessary skills to engage with telehealth platforms (NHS Wales, 2021). Additionally, the Welsh Government's Superfast Cymru initiative, aimed at increasing broadband penetration in rural areas, is vital to ensure all patients have the infrastructure to access these services (Welsh Government, 2022).

3.3.3 Digital Literacy in the UK

Table 2. Digital engagement and internet usage split by nation and region, 2023 (Source: Authors Own; Lloyds Bank, 2023)

	% offline (table ranked on this) N = 2,700	% Very Low Digital Capability N = 998,745	% Very High Digital Capability N = 998,745
UK AVERAGE	4%	25%	27%
WALES	8%	28%	25%
SCOTLAND	6%	26%	26%
Northeast	5%	28%	26%
Southeast	5%	26%	25%
Yorkshire and the Humber	5%	26%	26%
East Midlands	4%	26%	25%
London	4%	18%	31%
Northwest	4%	26%	28%
Southeast	2%	23%	28%
West Midlands	2%	26%	25%
East England	1%	24%	27%

In the UK, digital literacy varies significantly by age, socioeconomic status, and geography. According to the Lloyds Bank UK Consumer Digital Index 2023, around 7.4 million adults have "very low" digital engagement, struggling with basic online tasks such as form filling and accessing health information (Lloyds Bank, 2023). This issue disproportionately affects older adults, who often require more healthcare support but lack the digital skills to effectively use telehealth services.

Nationally, 4% of UK households still lack internet access, with low-income and elderly populations most affected (ONS, 2020). This lack of connectivity exacerbates health inequalities, as these vulnerable groups are less able to benefit from digital healthcare. Furthermore, rural regions, especially in Wales, face additional barriers due to lower broadband penetration.

The UK Government’s Gigabit Broadband Plan aims to provide gigabit-capable broadband to 85% of the

UK by 2025, which could enhance telehealth’s reach (UK Government, 2022). However, rural areas in Wales will require targeted investment to ensure equitable access.

Bridging the digital divide is essential for universal telehealth adoption. Future initiatives must work alongside national digital inclusion programmes to ensure that all patients, regardless of digital skills or internet access, can benefit from digital healthcare solutions.



Figure 4. 'How confident would you say that you are using the internet?', split by age, 2023 (Source: Lloyds Bank, 2023)

3.4 Comparative Analysis of telehealth Implementation: NHS Wales, NHS Scotland, and NHS England

The implementation of telehealth services within the UK varies across Wales, Scotland, and England due to differing healthcare policies, strategic priorities, and technological infrastructures. This section provides a comparative analysis of telehealth strategies in these regions, with a particular focus on the innovative use of telehealth remote booths in Scotland, which serve as a critical solution for rural healthcare access.

3.4.1 NHS Wales: Strategic Integration of telehealth Solutions

Telehealth is central to Wales' digital health strategy, with initiatives like TEC Cymru driving its integration into the healthcare system to improve accessibility, efficiency, and patient outcomes (Welsh Government, 2020). Programs such as Delta Wellbeing and VIPAR highlight how Wales addresses specific healthcare needs through telehealth (TEC Cymru, 2024).

The Welsh Government supports these efforts with policies that ensure patient-centred and equitable services, emphasising collaboration among healthcare providers, policymakers, and patients (Welsh Government, 2020).

3.4.2 NHS Scotland: Pioneering telehealth with Remote Booths

Scotland leads the UK in telehealth innovation, notably through remote booths designed to serve rural and remote populations. These booths, equipped with diagnostic tools, enable remote consultations, making healthcare more accessible in geographically isolated areas (NHS Scotland, 2023). This initiative supports Scotland’s broader aim to improve rural healthcare and reduce pressure on secondary care services by enabling patients to manage conditions locally (Scottish Government, 2021).

3.4.3 NHS England: Scaling telehealth Across a Diverse Population

England's approach focuses on large-scale telehealth deployment, aligned with its Long-Term Plan for NHS sustainability. The COVID-19 pandemic accelerated the use of platforms like eConsult for online consultations (NHS England, 2023). England’s strategy also extends to remote monitoring for chronic disease management and uses telehealth to gather data that informs broader healthcare policies (NHS England, 2023).

3.4.4 Comparative Insights

Policy and Strategy: Wales and Scotland focus on integrating telehealth into rural healthcare, while England emphasises scaling these services across a diverse population, embedding telehealth within the NHS infrastructure (Welsh Government, 2020; NHS England, 2023).

Innovative Use of Technology: Scotland’s remote booths target rural healthcare challenges, while Wales prioritises community-based care innovations like VIPAR. England’s focus is on widespread adoption, particularly in primary care and chronic disease management (Scottish Government, 2021; NHS Scotland, 2023).

Impact on Healthcare Delivery: telehealth enhances healthcare delivery across all three regions. Wales and Scotland focus on overcoming geographic challenges, while England addresses the scalability of telehealth in a large, diverse population (Welsh Government, 2020; NHS Scotland, 2023; NHS England, 2023).

In conclusion, the comparative strategies of NHS Wales, Scotland, and England demonstrate a shared commitment to digital healthcare. Scotland’s remote booths, Wales’ integrated community care, and England’s scalable approach highlight the importance of tailoring telehealth solutions to regional healthcare needs.

3.5 Technological Viewpoint

The technological advancements in telehealth have been instrumental in driving digital transformation within the Welsh healthcare system. The integration of telehealth technologies into healthcare delivery models has significantly altered the way healthcare is accessed and provided. These advancements encompass a range of digital tools and platforms that enable remote patient monitoring, virtual consultations, and the seamless exchange of health information across different healthcare settings.

3.5.1 Current telehealth Platforms in Wales

Wales has embraced several telehealth platforms that have been pivotal in transforming healthcare delivery. These platforms, such as Delta Wellbeing, eConsult, and CWTCH, provide various services ranging from remote consultations to patient monitoring. The effectiveness of these platforms lies in their ability to enhance patient care, improve accessibility, and alleviate the strain on traditional healthcare services (Welsh Government, 2020).

For example, Delta Wellbeing offers an integrated platform for health and social care, supporting vulnerable individuals through digital means (Delta Wellbeing, 2024). The platform allows for real-time monitoring and remote support, which is crucial for maintaining the independence of patients, particularly the elderly. Similarly, eConsult provides a digital triage and consultation service that has been widely adopted by general practices across Wales. This platform allows patients to consult with healthcare professionals online, thereby reducing the need for physical appointments and improving access to care (DHCW, 2021).

3.5.2 Case Study: eConsult & telehealth Platforms in Wales

eConsult in Wales - Summary and Impact eConsult is a leading telehealth platform in Wales, widely used within NHS Wales to facilitate remote consultations. Designed for GP practices, eConsult allows patients to digitally submit symptoms and requests for advice, enabling healthcare professionals to triage and respond efficiently. This system reduces in-person consultations, streamlines care pathways, and enhances healthcare accessibility.

A report by Cardiff and Vale University Health Board (CAVUHB) underscores eConsult's impact, particularly during the COVID-19 pandemic, where it ensured continuity of care while minimising in-person contact. Integrated into existing systems, patients submit health concerns online, which clinicians assess to provide advice, prescriptions, or appointments (CAVUHB, 2024).

Statistically, the platform has shown significant results:

- Over 250,000 eConsult submissions were processed between 2020 and 2023 across Cardiff and Vale (CAVUHB, 2024).
- Around 60% of submissions were resolved without in-person appointments, reducing GP workloads.
- Patient satisfaction rates were high, with 80% stating that the system improved access to healthcare.
- eConsult has played a key role in Wales' digital transformation, managing demand while promoting patient-centred care. Its scalability across multiple health boards highlights its adaptability to the diverse needs of both urban and rural populations. As NHS Wales recovers post-pandemic, platforms like eConsult are set to remain integral to healthcare delivery.

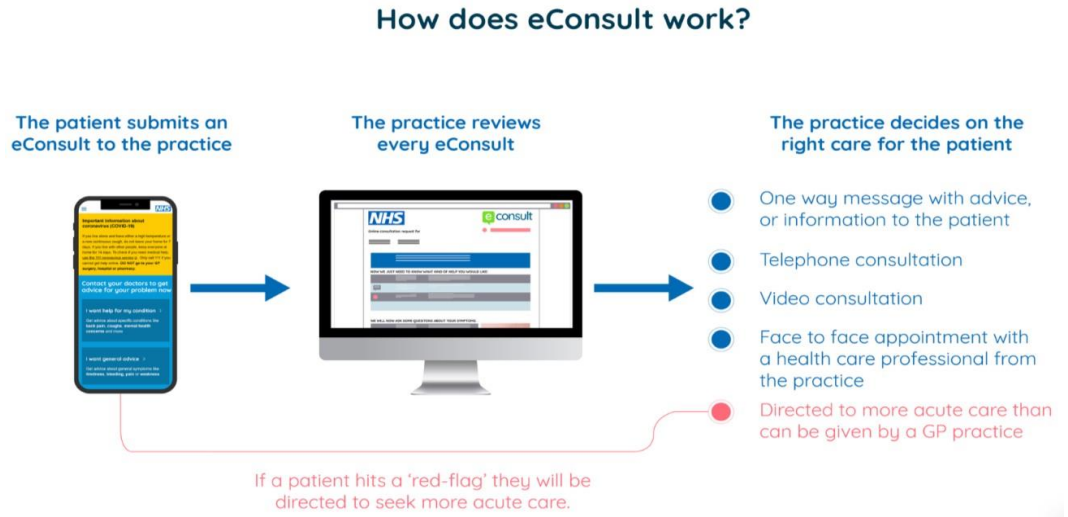


Figure 5. Overview of the eConsult Process for Primary Care, illustrating key steps from patient input to clinical review (Source: eConsult, n.d.)

Table 3. Summary of telehealth Platforms in Wales: Features, Functions, and Impact (Source: Authors Own)

Telehealth Platform	Purpose	Usage	Impact
Delta Wellbeing	Delta Wellbeing provides digital health and care services, designed to support independent living for vulnerable individuals through telecare and telehealth solutions.	The platform integrates emergency response, monitoring, and support systems for older adults or those with chronic conditions.	Delta Wellbeing has been credited with reducing the strain on hospital services by providing remote monitoring and support for over 10,000 users across Wales. It plays a critical role in reducing hospital admissions and enhancing patient autonomy (Delta Wellbeing, 2024).
CWTCH (Connecting with Telehealth to Children in Hospital)	CWTCH facilitates virtual visiting services for children in hospitals, connecting them with their families and healthcare providers via telehealth.	The platform helps reduce feelings of isolation for hospitalised children by allowing families to visit virtually, especially when in-person visits are limited.	CWTCH has been particularly effective during the COVID-19 pandemic, ensuring continued emotional support for paediatric patients and providing a safe way for families to connect with children during long hospital stays (Aneurin Bevan University Health Board, 2024).
eConsult	An online consultation platform allowing patients to submit their symptoms to GPs remotely for triage and consultation.	Implemented across multiple health boards in Wales, eConsult processes thousands of submissions every month.	Around 60% of eConsult submissions were resolved without an in-person appointment, helping to alleviate GP workloads and improve access to care, particularly during the pandemic (CAVUHB, 2024).
TERMS (Technology Enabled Remote Monitoring in Schools)	TERMS is designed to monitor the health of school children remotely, particularly those with chronic conditions.	The platform monitors students' vital signs and health conditions, reducing the need for regular in-person check-ups.	TERMS provides a proactive approach to managing children's health in schools, allowing early intervention for any arising health concerns, and helping prevent unnecessary absences or hospital visits (TEC Cymru, 2024).
Huma Remote Patient Monitoring Pilot	Huma is a remote patient monitoring platform aimed at tracking the health of patients with chronic conditions or post-operative needs.	It uses a mobile app to monitor patient health data, which is then shared with healthcare providers for continuous care management.	Huma has shown significant potential for reducing the need for hospital visits and empowering patients to manage their health more effectively from home, contributing to more personalised and preventative healthcare (TEC Cymru, 2024).
VIPAR (Virtual Pulmonary Rehabilitation)	VIPAR provides virtual rehabilitation services for patients with chronic respiratory conditions like COPD.	It enables patients to access rehabilitation exercises and support remotely, reducing the need for physical visits to healthcare centres.	VIPAR has been instrumental in maintaining rehabilitation services during the COVID-19 pandemic, helping patients to continue their recovery and avoid exacerbations of their conditions. The platform also helps reduce the strain on rehabilitation centres (TEC Cymru, 2024).

Telehealth Platform	Purpose	Usage	Impact
Remote Monitoring – COPD	This telehealth initiative focuses on the remote management of patients with Chronic Obstructive Pulmonary Disease (COPD).	Patients use remote monitoring devices to track vital signs and symptoms, which are then reviewed by healthcare professionals.	By enabling continuous monitoring, this platform helps prevent hospital readmissions and provides timely interventions for patients experiencing exacerbations. It plays a critical role in reducing emergency department visits for COPD patients (TEC Cymru, 2024).
Mobile Respiratory Clinic	A mobile telehealth solution designed to deliver respiratory care to patients in remote areas or those unable to attend clinics physically.	The clinic offers consultations, diagnostics, and monitoring services via a mobile unit, integrating telehealth technologies.	This initiative increases access to respiratory care in rural and underserved communities, helping to manage chronic conditions like asthma and COPD more effectively (TEC Cymru, 2024).
Consultant Connect	Consultant Connect enables clinicians to have rapid phone consultations with specialists to make informed decisions on patient care.	Frequently used by GPs, A&E clinicians, and other healthcare professionals, it connects them with specialists to discuss cases in real-time, helping to avoid unnecessary hospital referrals.	The platform has reduced unnecessary hospital admissions and referrals by enabling quick consultations. It has also contributed to timely, specialist-led patient care (Consultant Connect, 2024).
Attend Anywhere	Attend Anywhere is a video consultation platform used by NHS services across Wales to provide virtual appointments for patients.	Widely adopted during the COVID-19 pandemic, this platform enables patients to have secure video consultations with healthcare providers from their homes.	Attend Anywhere has helped reduce the need for in-person visits, allowing for more efficient consultations and improving patient access to healthcare, especially in rural areas (TEC Cymru, 2024).
My COPD	My COPD is an app designed to help patients manage their chronic obstructive pulmonary disease (COPD) by providing personalised treatment plans, symptom tracking, and education resources.	It allows patients to access healthcare advice and rehabilitation exercises from home, improving disease management.	My COPD has empowered patients to better manage their condition, leading to reduced hospital admissions and improved overall health outcomes (NHS Wales, 2024).

Table 3. Continued - Summary of telehealth Platforms in Wales: Features, Functions, and Impact (Source: Authors Own)

3.5.3 Advancements in telehealth Technologies

Telehealth technologies in Wales have evolved rapidly, driven by the need to improve healthcare accessibility, particularly in remote areas. Key innovations include secure video conferencing for virtual consultations, mobile health applications for remote monitoring, and AI-assisted diagnostics (Snoswell et al., 2020). These advancements have enhanced healthcare efficiency and enabled more personalised care through continuous monitoring.

Platforms like Huma and TERMS (Technology Enabled Remote Monitoring in Schools) lead Wales' telehealth innovation. Huma uses AI and data analytics to offer real-time patient monitoring, enabling healthcare providers to predict and prevent adverse events (TEC Cymru, 2023). TERMS focuses on remote health monitoring within schools, particularly for managing the health of school-aged children, providing a model for other regions.

3.5.4 Implementation and Integration

Successful telehealth integration in Wales requires robust infrastructure, high-speed internet, and user-friendly interfaces (Wager, Lee, & Glaser, 2017). telehealth platforms must also work seamlessly with existing Electronic Health Records (EHR) to provide unified patient care. TEC Cymru plays a pivotal role in

supporting the rollout of these technologies, aligning local initiatives with broader national healthcare goals (Welsh Government, 2022).

For example, the VIPAR program offers virtual rehabilitation for patients with chronic obstructive pulmonary disease (COPD), integrating remote monitoring into routine care. VIPAR exemplifies how telehealth enhances patient outcomes by delivering care remotely (TEC Cymru, 2023).

3.5.5 Impact on Healthcare Delivery

Telehealth has greatly improved healthcare delivery in Wales, particularly for patients with chronic conditions and those in remote areas (Greenhalgh et al., 2018). By facilitating remote consultations and continuous monitoring, telehealth reduces the need for in-person visits, alleviating the burden on healthcare facilities and offering more proactive care.

These platforms also streamline healthcare processes, reducing GP workloads while enhancing patient outcomes. As telehealth continues to evolve, it will further shape healthcare delivery in Wales, making it more patient-centred and efficient (Welsh Government, 2020).

3.5.6 Technological Challenges and Future Directions

Despite the benefits, the implementation of telehealth technologies is not without challenges. Issues related to data security, privacy, and the digital divide must be addressed to ensure equitable access to telehealth services (Campos-Castillo & Anthony, 2020). Additionally, there is a need for ongoing innovation to keep pace with the evolving healthcare landscape, including the development of more sophisticated AI tools, enhanced interoperability standards, and improved user interfaces that cater to diverse patient needs.

In conclusion, the technological viewpoint provides a comprehensive understanding of the role that telehealth platforms play in driving digital transformation within the Welsh healthcare system. By examining current and future telehealth initiatives, it is possible to appreciate the significant impact these technologies have on healthcare delivery and the potential they hold for further innovations.

3.6 Policy Viewpoint

Telehealth is now integral to healthcare systems globally, with Wales embracing its potential through national strategies such as A Healthier Wales. However, the digital divide presents a significant challenge, particularly in rural areas with limited internet access. Policies promoting digital literacy and infrastructure development are essential for ensuring equitable access to telehealth services (Campos-Castillo & Anthony, 2020).

3.6.1 Current Policies in Wales

Telehealth advancements have been driven by policy initiatives aimed at meeting the evolving demands of healthcare, particularly during the COVID-19 pandemic. Innovations like AI-driven diagnostics and remote patient monitoring are supported by these policies, which foster technological advancements while maintaining regulatory oversight to ensure patient safety and data privacy (Snoswell et al., 2020).

Table 4. Current Policies supporting Telehealth Initiatives in Wales (Source: Authors Own).

Policy	Description	Aims	Impact on Telehealth
A Healthier Wales (2018)	A long-term plan for health and social care reform in Wales.	Shifts the focus from reactive care to preventative and wellness-based care, with a strong emphasis on digital transformation and remote health monitoring.	Supports the expansion of Telehealth services by advocating for the integration of digital health solutions into everyday care.
Superfast Cymru (2021)	A broadband infrastructure initiative in Wales.	Designed to ensure high-speed internet access across rural and remote areas in Wales, addressing the digital divide and improving access to digital health services.	Enables greater access to Telehealth services in rural and underserved areas, bridging the digital divide.
General Data Protection Regulation (GDPR)	An EU-wide data protection regulation.	Ensures the protection and privacy of patient data across all digital platforms, including Telehealth, by setting legal standards for how patient data is collected, stored, and shared.	Telehealth platforms must comply with strict data protection rules, ensuring patient confidentiality and secure handling of information.
Digital Health and Care Wales (DHCW)	A national digital strategy for health in Wales.	Focuses on the implementation of digital technologies in healthcare, including Telehealth, to improve efficiency, patient outcomes, and data management.	Encourages the use of remote monitoring, virtual consultations, and mobile health apps across Wales.
Parliamentary Review of Health and Social Care in Wales (2018)	An independent review of Welsh healthcare.	Aimed at modernizing healthcare delivery by leveraging technology to increase efficiency and improve patient care through integrated services and digital solutions.	Encourages the development and adoption of Telehealth platforms as part of a digitally integrated healthcare system.
Digital Inclusion Framework (2021)	A strategy set by the Welsh Government to promote digital inclusion across Wales.	Seeks to tackle digital exclusion by ensuring that everyone in Wales can access and use digital technologies, such as Telehealth platforms, irrespective of their location, skills, or background.	Focuses on bridging the digital divide by improving internet access and digital skills for all, especially the elderly and those in rural communities. This supports greater use of Telehealth services by ensuring patients have the necessary tools and knowledge.
UK National Data Strategy (2021)	A UK-wide framework that seeks to transform how data is used to drive innovation, improve public services, and support economic growth.	The strategy aims to harness the power of data to improve healthcare outcomes, with a particular focus on interoperability, data security, and accessibility for systems like Telehealth.	Provides a data governance framework that ensures patient data is securely managed across Telehealth platforms. It emphasizes the importance of data interoperability between healthcare systems, enabling better use of Telehealth data for care coordination.
NHS Long Term Plan (2019)	A 10-year plan for the NHS in England, published in 2019, focusing on transforming services to meet future health needs.	The plan promotes the use of digital health technologies like Telehealth to manage chronic conditions, reduce unnecessary hospital visits, and offer remote care. It prioritizes digital-first services to improve patient experience and efficiency.	Supports widespread Telehealth adoption across the NHS by prioritizing the shift to digital-first primary care and remote monitoring services, particularly for managing chronic conditions and improving patient outcomes.

3.6.2 Academic Perspectives on telehealth Policies

Academics generally agree that telehealth offers transformative potential for healthcare systems, but they stress that success hinges on robust policy frameworks. Greenhalgh (2020) argues that while telehealth can enhance efficiency and access, policy must address infrastructure and human resource challenges, such as training healthcare providers and ensuring equitable access, particularly in underserved areas.

Shaw et al. (2018) highlight that telehealth innovations must align with patient-centric models. Policymakers should ensure that telehealth systems not only function technically but also maintain high-quality patient-provider interactions, as engaged patients often experience better outcomes (Krukowski, 2017).

Kruse et al. (2017) emphasise the need for legal frameworks to safeguard patient data, as telehealth platforms present cybersecurity risks. Policies must reinforce data protection, especially under regulations like GDPR, to ensure secure and ethical handling of patient information.

Mair et al. (2012) stress that sustainable telehealth requires integration with existing healthcare infrastructures, such as Electronic Health Records (EHRs). Without clear regulatory standards, telehealth services risk being siloed, reducing their overall effectiveness.

The future success of telehealth relies on sustained government support and investments in digital infrastructure, particularly broadband access and digital literacy programs (Beech, 2021). Without such investments, the digital divide will continue to limit access to telehealth services, especially in rural or low-income communities (Welsh Government, 2021).

3.6.3 Impact on Healthcare Delivery

The impact of telehealth on healthcare delivery is profound, with policies playing a critical role in shaping this impact. telehealth has the potential to improve access to healthcare, particularly for patients in remote or underserved areas, reduce the burden on healthcare facilities, and enhance the efficiency of care delivery (Greenhalgh et al., 2018). However, the realisation of these benefits depends on the effectiveness of the policies governing telehealth. Policies must ensure that telehealth services are accessible, affordable, and equitable, preventing the exacerbation of existing health disparities. Furthermore, policies must support the continuous evaluation of telehealth services, allowing for the adaptation and refinement of telehealth strategies to meet the changing needs of the population.

Telehealth has been increasingly recognised as a critical element in modern healthcare systems, driving digital transformation and enhancing healthcare delivery across Wales. As digital health initiatives continue to evolve, several policy-related factors must be considered, particularly in the context of patient experience, technological advancements, implementation strategies, and overall impact on healthcare services.

The broader impact of telehealth on healthcare delivery in Wales is substantial, particularly in terms of improving access to care and reducing the burden on traditional healthcare services. Platforms like eConsult and the Mobile Respiratory Clinic (MRC) have demonstrated how telehealth can enhance service efficiency, reduce waiting times, and allow for more proactive management of chronic conditions (DHCW, 2024). However, these benefits must be balanced against the potential challenges, such as ensuring data security and protecting patient privacy, which are critical considerations in the policy discourse surrounding telehealth.

3.6.4 Government Initiatives and Support

The Welsh Government has been a proactive supporter of telehealth, particularly in response to the challenges posed by the COVID-19 pandemic. Government initiatives such as the DHCW program have been instrumental in driving the adoption of telehealth across the country. This program focuses on integrating digital health technologies into the NHS Wales framework, supporting the development and deployment of telehealth platforms to enhance healthcare accessibility and efficiency (Welsh Government, 2020).

Moreover, TEC Cymru, a national program funded by the Welsh Government, plays a significant role in the implementation of telehealth services across Wales. TEC Cymru's initiatives are designed to facilitate the integration of digital technologies into everyday healthcare practices, providing resources and support to ensure the successful rollout and sustainability of telehealth services. These initiatives are in line with the Welsh Government's broader vision of creating a digitally enabled healthcare system that is patient-centered and accessible to all (TEC Cymru, 2022).

3.6.5 Ethical and Legal Considerations

Ethical and legal considerations are paramount in the implementation and operation of telehealth services. One of the primary ethical concerns is ensuring equitable access to telehealth services. There is a risk that certain populations, such as the elderly or those in rural areas with limited internet access, may be disadvantaged by the shift to digital healthcare (European Commission, 2021). Addressing this digital divide is essential to ensure that telehealth benefits all segments of the population.

In addition to access issues, there are significant legal considerations related to patient consent and data protection. telehealth services must ensure that patients are fully informed about the nature of the services

they are receiving, including any potential risks and benefits, and that their consent is obtained before any treatment is administered. This is particularly important in cases where telehealth services involve the use of AI or other advanced technologies that patients may not fully understand (Royal College of Physicians, 2020).

Furthermore, telehealth providers must adhere to strict data protection laws to safeguard patient information. This includes implementing robust cybersecurity measures to protect against data breaches and ensuring that all patient data is stored and transmitted securely in compliance with General Data Protection Regulation (GDPR) and other relevant regulations (NHS Digital, 2020).

3.7 Primary Research

This study conducted primary research to explore the adoption and effectiveness of telehealth platforms in Wales, aiming to address the key research questions surrounding their role in healthcare transformation. A survey was distributed to healthcare providers, developers, and product managers to gather insights on the enablers, barriers, and impacts of telehealth. The analysis was structured using Rogers' Diffusion of Innovation theory (2003), focusing on the elements of relative advantage, compatibility, trialability, complexity, and observability to assess the factors influencing the diffusion and integration of telehealth within NHS Wales.

3.7.1 Data Collection

The survey received 10 responses from a diverse range of stakeholders, including healthcare professionals, product managers, and technology developers. Platforms such as ICP Triage manager, eConsult, and Patients Know Best were represented.

Limitations of the Study

This study's findings are limited by a small sample size of 10 respondents, which may not fully represent the diverse telehealth landscape in Wales. The concentration of participants from South Wales raises questions about the generalisability of results to rural areas that may face unique challenges (Welsh Government, 2021). Additionally, self-reported data can introduce bias, as participants may unintentionally misrepresent their experiences (Krukowski, 2017). While these limitations are significant, the insights gained provide valuable contributions to the discourse on telehealth. The focused selection of healthcare professionals and technology experts ensures that the findings are grounded in relevant experience. Future research should aim for a larger, more varied sample to validate these insights while retaining the depth of analysis that characterises this study.

Survey Questions and Linked Findings

The table below outlines the survey questions and their corresponding findings. This overview illustrates how each question connects to the core research questions, shedding light on the factors influencing the adoption and effectiveness of telehealth platforms in Wales.

Table 5. Relevant Survey Questions and Linkage to Research Questions (Source: Authors Own)

Survey Question	Linked Research Question	Findings
What is your role?	RQ1	Participants represented diverse roles, indicating broad engagement in Telehealth initiatives and varying perspectives on its effectiveness.
How long have you been using/working with Telehealth platforms?	RQ1	The experience level varied among respondents, affecting their insights into the adoption and integration of Telehealth.
Which region of Wales are you based?	RQ1	Most respondents were based in South Wales, highlighting regional engagement in Telehealth initiatives and the potential impact on service delivery.
Which Telehealth platform do you use?	RQ2	Respondents reported using platforms such as eConsult, Doccla, and Patients Know Best, praising their effectiveness in managing chronic diseases and improving access to care.
How often do you use/work with Telehealth services?	RQ2	Frequency of use varied, with some respondents using the platforms daily while others used them less frequently, indicating varying levels of engagement.
For what purposes are Telehealth services primarily used?	RQ2	The services were primarily used for health monitoring and chronic disease management, showcasing their role in enhancing patient care.
How has Telehealth improved access to healthcare services? (1-5 scale)	RQ2	Many respondents rated Telehealth positively, with most acknowledging its role in improving access to healthcare services.
Has Telehealth improved the quality of care provided? (1-5 scale)	RQ2	Responses varied, but a majority noted that Telehealth had enhanced care quality, emphasizing its effectiveness in managing patient needs.
What challenges have you faced while using/developing Telehealth platforms?	RQ3	Integration issues were highlighted by 60% of respondents, affecting both the adoption and quality of care delivered through these platforms.
How do existing policies impact the implementation and use of Telehealth services?	RQ4	Respondents expressed concerns about policy clarity and alignment, indicating the need for more supportive frameworks for Telehealth integration.
How can Telehealth services be improved?	RQ4	Suggestions included improving digital literacy, enhancing interoperability, and developing consistent policies across health boards.
What innovations in Telehealth have you found most impactful?	RQ3	Respondents identified innovations such as wearable devices and virtual consultations as significant, showcasing their role in transforming healthcare delivery.
Do you believe that Telehealth services should be more widely promoted by policymakers?	RQ4	The majority expressed the need for increased promotion and support from policymakers to facilitate wider adoption and integration of Telehealth services.
How likely are you to continue using/developing Telehealth services in the future? (1-5 scale)	RQ1	Respondents indicated a high likelihood of continued use, reflecting a positive outlook on the future of Telehealth in Wales.
Would you recommend Telehealth services to others? (1-5 scale)	RQ1	A majority expressed willingness to recommend Telehealth services, suggesting overall satisfaction with its benefits and effectiveness.

3.7.2 Findings: Linking to Research Questions

- Relative Advantage (*Linked to RQ2*): Respondents universally recognized the relative advantage of telehealth in improving patient access and reducing the burden on healthcare infrastructure, particularly in rural settings. This aligns with RQ2, as it highlights the positive impact of telehealth on operational efficiency and care quality.
- Compatibility (*Linked to RQ1 & RQ2*): telehealth platforms were reported to be compatible with existing clinical workflows, particularly for managing chronic conditions and routine check-ups. However, challenges around integrating telehealth with legacy systems were noted, underscoring how telehealth is driving digital transformation (*RQ1*) while improving healthcare delivery (*RQ2*).

- Trialability (*Linked to RQ3*): Several respondents emphasized the lack of opportunities to trial telehealth solutions before full implementation, which impacted their adoption rates. This finding is directly linked to RQ3, as the ability to test and pilot new technologies plays a critical role in driving innovation and ensuring effective transformation within healthcare systems.
- Complexity (*Linked to RQ3 & RQ2*): Complexity in using telehealth platforms, particularly for patients with low digital literacy or limited access to technology, emerged as a key barrier. This finding is relevant to both RQ3, highlighting the importance of addressing innovation challenges and RQ2, as it impacts the effectiveness of telehealth in improving care quality and access.
- Observability (*Linked to RQ4*): Respondents highlighted the need for more measurable outcomes to demonstrate the benefits of telehealth. While some improvements in patient monitoring and reduced hospital admissions were noted, broader visibility of successful outcomes is needed to drive wider adoption. This directly informs future telehealth strategies (*RQ4*), emphasising the importance of evidence-based policies and practices.

3.7.3 Findings and Expanded Analysis

A. Digital Literacy and Access

Digital literacy emerged as a critical barrier, with 50% of respondents indicating that limited digital skills among patients hinder telehealth adoption. This reflects broader concerns in the literature regarding digital exclusion (Welsh Government, 2021). Respondents highlighted the need for training programs to support both healthcare providers and patients in using these platforms effectively

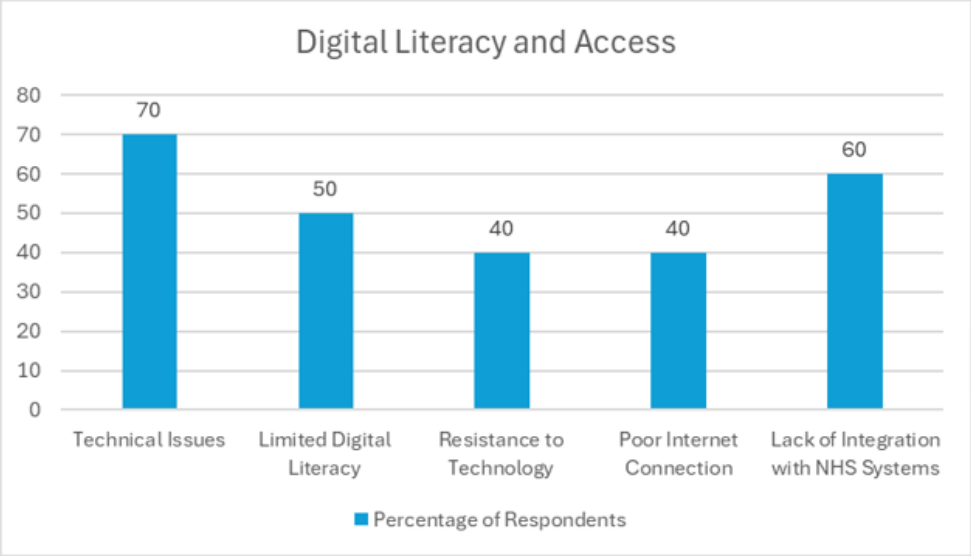


Figure 6. Key Barriers to Telehealth Adoption (n=10) (Source: Authors Own, Survey responses, n=10)

This table shows that technical issues and lack of digital literacy were key barriers, which ties into RQ3, as these factors hinder the adoption and implementation of innovative telehealth platforms.

B. Telehealth Platforms in Wales

The survey explored the usage of specific telehealth platforms in Wales, with respondents utilising tools like eConsult, Doccla, and Patients Know Best. These platforms were generally praised for improving access to healthcare and care management, particularly in chronic disease monitoring.

Quotes from Survey Respondents:

"Telehealth allows for real-time health monitoring in rural areas, making care more accessible to those who would otherwise struggle." – Survey Respondent (ID 1)

However, despite the advantages, 60% of respondents noted integration issues between these platforms and existing NHS Wales systems, highlighting a significant technical barrier that affects both adoption and care quality. This ties back to RQ2, where the impact on operational efficiency is hindered by these integration challenges.

C. Technical Complexity

Technical complexity was cited by 70% of respondents as a key issue, particularly for patients who struggled with user interfaces and healthcare providers who found it challenging to integrate telehealth platforms with existing workflows. The lack of interoperability between these platforms and NHS systems was repeatedly mentioned, supporting the need for stronger infrastructure and system compatibility.

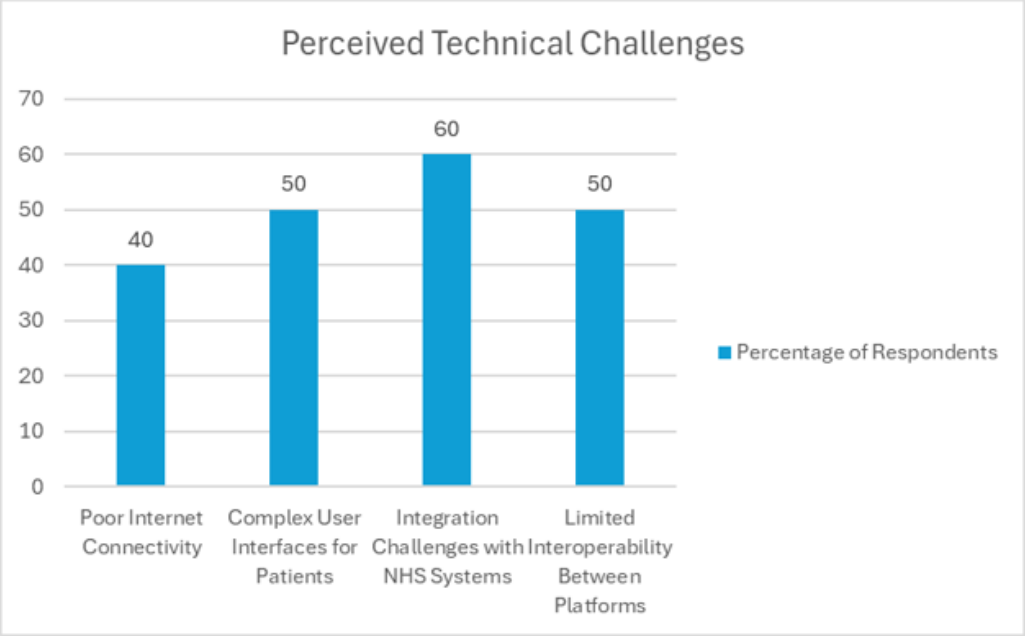


Figure 7. Perceived Technical Challenges in Using Telehealth (n=10) (Source: Authors Own, Survey responses, n=10)

These findings directly address RQ3, highlighting the importance of technical infrastructure in supporting the scalability and usability of telehealth platforms.

D. Policy Viewpoint

Survey participants also raised issues regarding the policy framework surrounding telehealth in Wales. While 70% of respondents were aware of supporting policies, such as GDPR and data protection frameworks, they indicated that there is a lack of policy alignment and regulatory clarity. Respondents suggested that policies need to better support the integration of telehealth with existing NHS systems, as well as address data sharing challenges.

Quote:

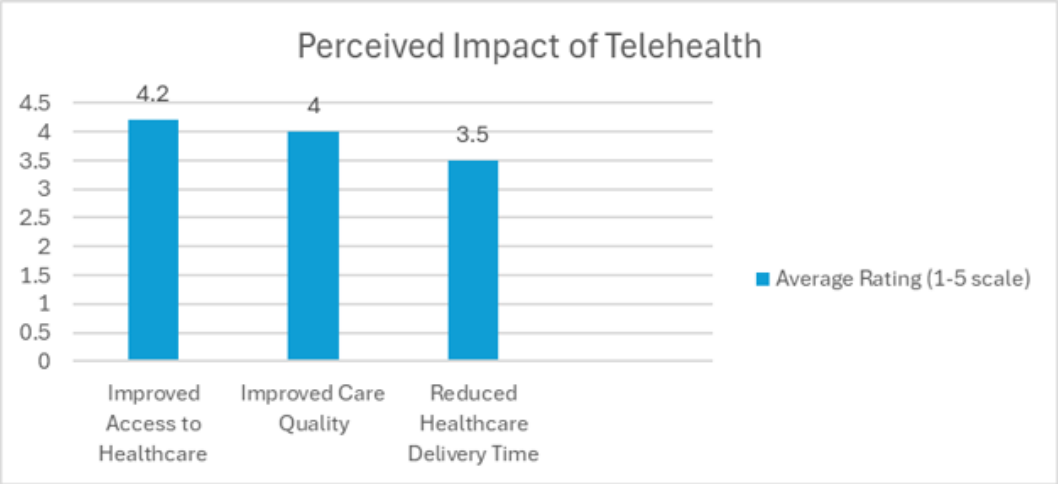
"It's not just the technology, but the lack of clear policies that makes integration difficult. We need standardised regulations across all health boards in Wales." – Survey Respondent (ID 5)

These insights help address RQ4, which focuses on informing future telehealth strategies and policy adjustments to facilitate smoother implementation.

E. Relative Advantage and Observability

Respondents consistently highlighted the relative advantage of telehealth, particularly in rural health and chronic disease management. 80% of respondents reported that telehealth had improved access to care for patients, while 50% agreed that it had improved quality of care.

Table 3: Perceived Impact of telehealth (n=10) Source: Survey responses, n=10



However, observability remains a concern, with 50% of respondents indicating that measurable, visible outcomes are not always clear.

These findings contribute to RQ1 by demonstrating how telehealth has facilitated digital transformation, but they also underscore the need for greater visibility of success to promote broader adoption.

4 Conclusion

This study explored the adoption and impact of telehealth platforms in driving digital transformation within NHS Wales, focusing on patient access, care quality, and operational efficiency. Applying Rogers' Diffusion of Innovation theory (2003), the research identified critical enablers such as relative advantage and compatibility with existing healthcare systems, but also highlighted significant barriers including technical complexity, digital literacy, and policy limitations.

Survey responses demonstrated that telehealth has improved access to care, particularly in rural areas, and enhanced operational efficiency by reducing the need for in-person consultations. However, challenges related to digital literacy and internet access have restricted broader adoption, particularly among vulnerable populations, reflecting findings in the literature that emphasize the importance of addressing digital exclusion (Welsh Government, 2021).

From a technical perspective, the lack of interoperability between telehealth platforms such as eConsult and Patients Know Best and existing NHS systems was a major barrier. Complexity in system integration, along with connectivity issues in rural regions, further hindered full-scale adoption. Addressing these technical challenges is essential to ensure telehealth's success in contributing to the digital transformation of healthcare services.

The policy viewpoint indicated that while there are supportive frameworks in place, such as data protection laws, there is a need for clearer regulatory guidance and alignment of national policies to support innovation. Survey respondents emphasized the importance of streamlining policy to facilitate faster implementation and integration of telehealth solutions, particularly in improving data sharing and interoperability across healthcare providers.

In conclusion, while telehealth has shown substantial potential to transform healthcare in Wales, barriers such as digital literacy, technical infrastructure, and policy alignment need to be addressed to ensure widespread adoption and sustained impact. These findings inform recommendations for enhancing training, improving infrastructure, and aligning policies to achieve the full potential of telehealth in NHS Wales.

5 Key Recommendations

Based on the study's findings and survey data, several key recommendations are proposed to improve the adoption and effectiveness of telehealth platforms in Wales. These recommendations are aimed at addressing the key barriers identified, enhancing innovation, and meeting the client's requirements for digital transformation within the healthcare sector.

5.1. Strengthen Digital Literacy and Training Programs

One of the primary barriers identified in the survey was the digital literacy gap among both patients and healthcare providers. Respondents reported that technical complexity hindered the seamless adoption of telehealth, particularly among older or less tech-savvy patients. To address this, a structured training program should be developed and implemented. This program would focus on:

- Providing healthcare providers with the necessary skills to use and troubleshoot telehealth systems.
- Offering patients, particularly those in rural or underserved areas, access to digital literacy workshops.
- Creating easy-to-use tutorials or support systems integrated within telehealth platforms to help new users onboard.

By building capacity in both healthcare providers and patients, these training programs can significantly reduce resistance to technology and improve the effectiveness of telehealth systems.

5.2. Expand Pilot Programs and Increase Trialability

The limited trialability of telehealth platforms emerged as a key barrier in the survey findings. Several respondents highlighted the need for pilot programs that allow healthcare providers to test telehealth systems before full-scale implementation. This is particularly important as healthcare professionals often hesitate to adopt systems they haven't fully evaluated. To address this, NHS Wales should:

Launch expanded pilot programs for telehealth solutions, particularly in areas of chronic disease management and remote monitoring.

Provide incentives for healthcare providers to participate in these pilots, ensuring robust feedback and assessment of system usability.

Use feedback loops from pilot programs to refine telehealth platforms before their full-scale implementation.

By enhancing trialability, healthcare providers can be more confident in adopting and using telehealth platforms, which will increase the rate of adoption and reduce implementation errors.

5.3 Improve Integration with Existing Healthcare Systems

One of the major concerns highlighted in the survey was the lack of compatibility between telehealth platforms and existing NHS Wales systems. Issues such as data integration and legacy system incompatibility were frequently cited as barriers to the full-scale adoption of telehealth services.

To address this, NHS Wales should:

- Invest in digital infrastructure that supports interoperability between telehealth platforms and existing Electronic Health Records (EHR) systems.
- Work towards creating a centralized data hub where telehealth data can be seamlessly integrated and accessed by healthcare providers across different departments and regions.
- Standardize technical requirements for telehealth platforms to ensure they align with the broader IT ecosystem within NHS Wales.

Improving system compatibility will not only enhance the operational efficiency of telehealth but will also make it easier for healthcare providers to integrate these platforms into their everyday workflows.

5.4 Enhance Technical Infrastructure, Especially in Rural Areas

Respondents in the survey reported technical issues related to connectivity and device limitations, particularly in rural areas. This highlights the need for investment in technical infrastructure to support the widespread use of telehealth platforms.

Recommendations include:

- Expanding broadband and internet coverage in rural areas to ensure patients and healthcare providers can effectively access telehealth services.
- Providing subsidies or government-backed programs to offer affordable devices for telehealth use, particularly for low-income patients who may lack access to essential technology.

- Developing partnerships with technology providers to ensure that the necessary infrastructure is available to support video consultations, remote monitoring, and other telehealth functions.

Addressing these technical challenges is crucial for ensuring equitable access to telehealth services across all regions of Wales.

5.5 Increase Observability and Publicise Successful Outcomes

Several respondents emphasized the importance of observability the ability to see measurable, visible outcomes as a critical factor for driving further adoption. To enhance observability, NHS Wales should:

- Create a monitoring and evaluation framework for all telehealth programs, which systematically tracks key performance indicators (KPIs) such as patient satisfaction, reduced hospital admissions, and improved health outcomes.
- Publicise successful case studies and outcomes to build confidence among healthcare providers and patients. For example, sharing data showing how telehealth reduced waiting times or improved patient outcomes could encourage further adoption.
- Use data-driven insights from these evaluations to refine and adapt telehealth strategies, ensuring that the benefits of telehealth are both understood and visible across the healthcare system.

  Making the benefits of telehealth more visible will drive its adoption and demonstrate its value to stakeholders at all levels.

5.6 Align Policies and Regulations with Innovation Goals

Finally, to ensure the sustainable adoption of telehealth, policy alignment is crucial. The current regulatory framework must evolve to support the broader implementation of digital health solutions. The survey indicated that while some policies exist, gaps in data protection, regulatory clarity, and incentives for telehealth adoption persist.

To address this, NHS Wales should:

- Develop clear policies that standardise data protection, ensuring that all telehealth systems comply with GDPR and other relevant regulations.
- Offer financial and operational incentives to healthcare providers who adopt telehealth platforms, such as funding for infrastructure upgrades or reimbursement schemes for telehealth consultations.
- Align national policies with the Digital Transformation goals of NHS Wales, ensuring that telehealth platforms are positioned as an integral part of the healthcare system.

By addressing regulatory and policy gaps, NHS Wales can create a more supportive environment for innovation, ensuring the successful and sustained adoption of telehealth.

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7 Appendix A: Ethics Approval Form

Swansea University
Prifysgol Abertawe

Approval Date: 18/07/2024

Research Ethics Approval Number: 1 2024 10090 9322

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	The Role of Telehealth in Driving Digital Transformation in Wales
Applicant name	MISS LYDIA SUZANNE JAMES
Submitted by	MISS LYDIA SUZANNE JAMES /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/12178

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

8 Appendix B: Participant Information Sheet



PARTICIPANT INFORMATION SHEET

The analysis of the Role of Telehealth in Driving Digital Transformation in Wales

You are being invited to take part in some research. Before you decide whether to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?
We are conducting research on the analysis of the Role of Telehealth in Driving Digital Transformation in Wales and the synthesis of data to develop, evaluate, and validate strategies for optimising telehealth implementation and sustainability in Wales. The purposes of the study are to analyse the Role of Telehealth in Driving Digital Transformation in Wales, to evaluate the impact of telehealth services on patient access, healthcare delivery, and system efficiency in Wales, and to identify key factors influencing the success and challenges of telehealth adoption in Wales.

Your participation in this study will take approximately 15 minutes to complete the survey.

Who is carrying out the research?
The data is being collected by Lydia James, an MSc student – Advanced Health & Care Management Innovation & Transformation), School of Management, Faculty of Humanities and Social Sciences, Swansea University. The supervisor is Prof. Hamish Laing, MD, Professor of Enhanced Innovation and Outcomes, Value-Based Health and Care Academy, School of Management, Faculty of Humanities and Social Sciences, Swansea University.

The research has been approved by the Faculty of Humanities & Social Sciences Research Ethics Committee.

What happens if I agree to take part?
The participants will be required to complete a survey individually. Each survey will take around 15 minutes. Before every survey, a participant will be informed with all information about the interview and they will be asked whether they consent, and the statement will be recorded. The survey will be done online via Microsoft Forms. The survey will be recorded and transcribed into documents and will be thematic analysed.

Participants will be asked for personal information, including their names, positions, or job titles, as well as their involvement with Telehealth technologies. Then, they will have an MS Forms survey including questions regarding their perspectives and knowledge of Telehealth platforms.

Are there any risks associated with taking part?
There are no known risks associated with this survey. If at the end of this research, participants ask to have their data withdrawn, they can inform the researcher at any time.

Data Protection and Confidentiality
Your data will be processed in accordance with the Data Protection Act 2018 and the UK General Data Protection Regulation (UK GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team.

Swansea University
Prifysgol Abertawe

Participant's personal information will not be exposed, and code number will be assigned for participants that will be used on all research notes and documents. All information collected will be kept strictly confidential. The data will only be viewed by the researcher and research team.

All electronic data will be stored on a password-protected computer file in Swansea University's devices and online systems. All paper records will be stored in a locked filing cabinet at Swansea University.

Please note that the data we will collect for our study will be made anonymous, thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research you decide to have your data withdrawn, please let us know before you leave.

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents. These incidents include, but may not be limited to, incidents of abuse and suicide risk.

What will happen to the information I provide?
An analysis of the information will form part of our report at the end of the study and may be presented to interested parties, and published in scientific journals, and related media. *Note that all information presented in any reports or publications will be anonymous and unidentifiable*.

Is participation voluntary and what if I wish to later withdraw?
Your participation is entirely voluntary – you do not have to participate if you do not want to. If you decide to participate, but later wish to withdraw from the study, then you are free to withdraw at any time, without giving a reason and without penalty.

Data Protection Privacy Notice
The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office.

Your personal data will be processed for the purposes outlined in this information sheet.
Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you.

The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the Faculty of Humanities & Social Sciences Research Ethics Committee, Swansea University.

The legal basis that we will rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

The data will be held for a period of 12 months.

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Prifysgol Abertawe

What are your rights?
You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights.

Any requests or objections should be made in writing to the University Data Protection Officer: -

University Compliance Officer (FOI/DP)
Vice-Chancellor's Office
Swansea University
Singleton Park
Swansea
SA2 8PP
Email: dataprotection@swansea.ac.uk

How to make a complaint
If you are unhappy with the way in which your personal data has been processed, you may in the first instance contact the University Data Protection Officer using the contact details above.

If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: -

Information Commissioner's Office,
Wycliffe House,
Water Lane,
Wilmslow,
Cheshire, SK9
5AF
www.ico.org.uk

What if I have other questions?
If you have further questions about this study, please do not hesitate to contact us:

Researcher
Lydia James,
Value-Based Health and Care Academy,
School of Management, Faculty of
Humanities and
Social Sciences
Swansea University
Email: 862548@Swansea.ac.uk

Supervisor
Prof. Hamish Laing, MD
Value-Based Health and Care Academy, School of Management, Faculty of Humanities and Social Sciences Swansea University.
Email: Hamish.Laing@Swansea.ac.uk

9 Appendix C: Participant Consent Form

Participant Consent Form

Swansea University
Prifysgol Abertawe

Project title. The analysis of the Role of Telehealth in Driving Digital Transformation in Wales

Name and Contact details of the principal researcher

- Principal researcher: Lydia James, MSc student – Advanced Health & Care Management Innovation & Transformation)
- Supervisor: Prof. Hamish Laing, MD, Professor of Enhanced Innovation and Outcomes, Value-Based Health and Care Academy, School of Management, Faculty of Humanities and Social Sciences, Swansea University

		Participant initial
1.	I (the participant) confirm that I have read and understand the information sheet for the above study (dated _____) which is attached to this form.	
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons.	
3.	I understand what my role will be in this research, and all my questions have been answered to my satisfaction.	
4.	I understand that I am free to ask any questions at any time before and during the study.	
5.	I have been informed that the information I provide will be safeguarded	
6.	I am happy for the information I provide to be used (pseudonymously) in academic papers and other formal research outputs	
7.	I am willing for my information to be audio recorded.	
8.	I have been provided with a copy of the Participant Information Sheet.	
9.	I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet.	

Swansea University
Prifysgol Abertawe

Thank you for your participation in this study. Your help is very much appreciated.

Print name of participant	Signature	Date

Print name of researcher	Signature	Date

This study is being conducted by Swansea University.
When complete: Original copy for participant, one copy to be retained by researcher if paper copy.

This study is being conducted by Swansea University

Thank you for your participation in this study. Your help is very much appreciated.

10 Appendix D: Recruitment Email

Dear Team/Participants Name,

I hope this message finds you well. My name is Lydia Farley, and I am conducting a research project titled "The Role of telehealth in Driving Digital Transformation in Wales." The objective of this study is to examine how telehealth platforms, such as those developed by your organisation, are influencing the digital transformation of healthcare in Wales.

Given your organisation's pivotal role in telehealth, I am reaching out to inquire if you or your colleagues would be interested in participating in this research. Specifically, I am looking to connect with both developers and users of your telehealth platforms in Wales to gain valuable insights into their experiences, challenges, and the overall impact of the technology.

If you are interested or know of any individuals (developers or users) who might be willing to participate, I would be grateful for your assistance in connecting with them. Participation would involve completing a brief survey designed to gather insights on various aspects of your telehealth platform.

The information collected will be used strictly for academic purposes and will be kept confidential. Participants will be sent an information sheet and consent form if they agree to take part. The results will contribute to a better understanding of telehealth's role in healthcare transformation in Wales, with the potential to inform policy and practice.

Please let me know if you are interested or if you can provide contact details for potential participants. Should you have any questions or need further information, feel free to contact me at 862548@swansea.ac.uk.

Thank you very much for considering this request. I look forward to your response.

Kind regards,

Lydia Farley
MSc Student - Advanced Health & Care Management (Innovation & Transformation) Swansea University

11 Appendix E: Recruitment Confirmation Email

Dear [Participants Name],

Thank you for agreeing to participate in the research project titled *"The Role of telehealth in Driving Digital Transformation in Wales."* Your insights and experiences are invaluable to this study, and I greatly appreciate your time and willingness to contribute.

Attached to this email, you will find the survey link, along with a Participant Information Sheet and Consent Form. The information sheet provides details about the study, including its purpose, what participation involves, and how your data will be used. Please review these documents carefully and return the completed consent form.

Survey Details:

- Survey Link: https://forms.office.com/e/r4H4rLEVX6
- Estimated Time to Complete: 10-15 minutes
- Confidentiality: All responses will be kept confidential and anonymised. Data will be stored securely and retained for 12 months before being destroyed.

If you have any questions or concerns about the survey or the research project, please do not hesitate to contact me.

Thank you once again for your participation. Your contribution will help in understanding the impact of telehealth on healthcare delivery and digital transformation in Wales.
If you could kindly provide me with the contact details of additional participants for the survey, this would be great.

Best wishes,

Lydia Farley
MSc Student - Advanced Health & Care Management (Innovation & Transformation) Swansea University

12 Appendix F: Research Survey (Conducted via Microsoft Forms)

The Role of telehealth in Driving Digital Transformation in Wales

Dear Participant,

We are conducting research on the analysis of the Role of telehealth in Driving Digital Transformation in Wales and the synthesis of data to develop, evaluate, and validate strategies for optimising telehealth implementation and sustainability in Wales. The purposes of the study are to analyse the Role of telehealth in Driving Digital Transformation in Wales, to evaluate the impact of telehealth services on patient access, healthcare delivery, and system efficiency in Wales, and to identify key factors influencing the success and challenges of telehealth adoption in Wales.

Thank you for participating in this survey, which aims to understand the role of telehealth in driving digital transformation within the Welsh healthcare system. Your insights will be invaluable in assessing the impact of various platforms on patient care, healthcare delivery, and system efficiency. The survey should take approximately 10 minutes to complete. Your responses will be kept confidential and used solely for research purposes.

Section 1 – Demographics:

1. What is your role?
    - Developer
    - Healthcare Provider
    - User
    - Other [Free text]

2. How long have you been using/working with telehealth platforms?
    - Less than 6 months
    - 6 months – 1 year
    - 1 – 3 years
    - More than 3 years

3. Which region of Wales are you based?
    - North Wales
    - Mid Wales
    - South Wales
    - West Wales

Section 2 – telehealth Platform Usage:

4. Which telehealth platform do you use?
    - [Free text]

5. How often do you use/work with telehealth services
    - Daily
    - Weekly
    - Monthly
    - Rarely
    - Never
    - Other [Free text]

6. For what purposes are telehealth services primarily used? (select all that apply)

    - Routine check-ups

- Emergency consultations
- Chronic disease management
- Rehabilitation services
- Health monitoring
- Other [Free text]

Section 3 – Impaction on Healthcare Delivery:

7. How has telehealth improved access to healthcare services? [Rate on a scale of 1-5, where 1 is 'Not at all' and 5 is 'Significantly']

8. Has telehealth improved the quality of care provided? [Rate on a scale of 1-5, where 1 is 'Not at all' and 5 is 'Significantly']

9. What are the main benefits of using telehealth platforms (select all that apply)

    - Increased accessibility
    - Convenience • Time-saving
    - Cost-effective
    - Better health monitoring
    - Enhanced patient engagement
    - Other [Free text]

Section 4 – Challenges and Improvements:

10. What challenges have you faced while using/developing telehealth platforms? (select all that apply)

    - Technical issues
    - Lack of personal interaction
    - Privacy concerns
    - Limited access to necessary devices or internet
    - Resistance to technology
    - Other [Free text]

11. How can telehealth services be improved?

    - [Free text]

Section 5 – Innovation and Transformation:

12. How do you think telehealth has contributed to the digital transformation of the healthcare system in Wales?

    - [Free text]

13. What innovations in telehealth have you found most impactful?

    - [Free text]

14. Do you feel telehealth services have reduced the time taken for healthcare delivery? [Rate on a scale of 1-5, where 1 is 'Not at all' and 5 is 'Significantly']

15. What additional features or services would you like to see in telehealth platforms?

- [Free text]

Section 6 – Policy and Regulation:

16. Are you aware of any policies or regulations that support the use of telehealth in Wales?
    - Yes
    - No
17. How do existing policies impact implementation and use of telehealth services?
    - [Free text]
18. What policy changes do you think are necessary to improve telehealth services?
    - [Free text]
19. How well do current regulations address privacy and security concerns related to telehealth? [Rate on a scale of 1-5, where 1 is 'Not well' and 5 is 'Very well']
20. Do you believe that telehealth services should be more widely promoted by policymakers?
    - Yes
    - No
    - Unsure

Section 7 – Future Directions:

21. How likely are you to continue using/developing telehealth services in the future? [Rate on a scale of 1-5, where 1 is Not likely' and 5 is 'Very likely']
22. Would you recommend telehealth services to others? [Rate on a scale of 1-5, where 1 is Not likely' and 5 is 'Very likely']
23. Would you like to receive a debrief document summarising the findings of this research once the report is complete?
    - Yes
    - No
24. Please provide your email address
    - [Free text]

13 Appendix G: Survey Answers

Section 1 – Demographics:

1. What is your role?

Participant ID	Answer
1	Healthcare Provider
2	Head of Technologies, Delta Wellbeing Ltd
3	Researcher
4	Programme Manager (Digital Inclusion)
5	Product Manager
6	Healthcare Provider
7	Healthcare Provider
8	Supplier
9	Developer
10	Business Analyst

2. How long have you been using/working with telehealth platforms?

Participant ID	Answer
1	1-3 years
2	More than 3 years
3	1-3 years
4	1-3 years
5	More than 3 years
6	More than 3 years
7	More than 3 years
8	More than 3 years
9	More than 3 years
10	More than 3 years

3. Which region of Wales are you based?

Participant ID	Answer

1	South Wales
2	West Wales
3	South Wales
4	South Wales
5	South Wales
6	South Wales
7	South Wales
8	South Wales
9	South Wales
10	South Wales

Section 2 – telehealth Platform Usage:

4. Which telehealth platform do you use

Participant ID	Answer
1	ICP Triagemanager
2	Used Tunstall ICP platform which is no longer available - using bespoke system now
3	eConsult, Doccla
4	N/A
5	Doccla
6	Attend Anywhere
7	nuvoair, tunstall, docubo, dreammapper/philips
8	Patients Know Best
9	RWG
10	Design and implementation of several systems that underpin the delivery of primary care services

5. How often do you use/work with telehealth services

Participant ID	Answer
1	Weekly
2	Daily
3	Never
4	Only in reviewing
5	Daily
6	Weekly
7	Weekly
8	Daily
9	Monthly
10	Depends on the project lifecycle stage

6. For what purposes are telehealth services primarily used? (select all that apply)

Participant ID	Answer
1	Health monitoring
2	Chronic disease management/Rehab services and health monitoring
3	Research
4	N/A
5	Chronic disease management; Health monitoring
6	Rehabilitation services
7	Routine check-ups; Chronic disease management; Health monitoring
8	Chronic disease management; Health monitoring
9	Chronic disease management; Health monitoring
10	Management of Primary Care performer details/services offered to patients

Section 3 – Impaction on Healthcare Delivery:

7. How has telehealth improved access to healthcare services? (scale of 1-5)

Participant ID	Answer
1	4
2	4
3	4
4	5
5	5
6	4
7	4
8	4
9	1
10	4

8. Has telehealth improved the quality of care provided? (scale of 1-5)

Participant ID	Answer
1	3
2	5
3	4
4	5
5	5
6	4
7	4
8	4
9	1
10	4

9. What are the main benefits of using telehealth platforms (select all that apply)

Participant ID	Answer
1	Increased accessibility
2	All of the above
3	Increased accessibility; Convenience; Better health monitoring; Reduced travel + increased workload for staff
4	Increased accessibility; Convenience; Time-saving; Cost-effective; Better health monitoring; Enhanced patient engagement
5	Increased accessibility; Time-saving; Cost-effective; Better health monitoring; Enhanced patient engagement
6	Increased accessibility; Convenience; Enhanced patient engagement
7	Cost-effective; Better health monitoring; Enhanced patient engagement; Increased accessibility
8	Increased accessibility; Convenience; Time-saving; Cost-effective; Better health monitoring; Enhanced patient engagement
9	Better health monitoring; Better management of selective small cohorts
10	Time-saving; Cost-effective; Increased accessibility; Convenience; Better health monitoring

Section 4 – Challenges and Improvements:

10. What challenges have you faced while using/developing telehealth platforms? (select all that apply)

Participant ID	Answer
1	Technical issues
2	Lack of personal interaction / Limited access to necessary devices and some resistance to technology
3	Poor onboarding procedures + explanation for patients; Lack of personal interaction

4	Limited access to necessary devices or internet; Lack of digital skills and confidence
5	Limited access to necessary devices or internet; Resistance to technology; Change management
6	Technical issues; Limited access to necessary devices or internet
7	Technical issues; Resistance to technology; absolutely terrible NHS IG policies; financial
8	Resistance to technology; Privacy concerns
9	Technical issues; Lack of personal interaction; Privacy concerns; Limited access to necessary devices or internet; Resistance to technology; Illusion that Tele health saves money, it is not cost releasing, there is no infrastructure to support monitoring and alert response. The rationale of using telehealth to reduce burden on hospital care at the expense of Primary care offers no value proposition for primary care that ultimately fund it
10	Technical issues; Limited access to necessary devices or internet; Resistance to technology

11. How can telehealth services be improved?

Participant ID	Answer
1	From personal experience, a greater importance on patient screening for eligibility and onboarding support would really improve the service, a significant number of the patients I have interacted with have shown a lack of understanding of what the service is and how to engage with it effectively when it is first delivered and find the initial experience of engaging with the service quite daunting
2	That it is consistent across Wales and its information can be linked to other information such as Telecare or medicine information
3	Easier link up with existing digital platforms e.g. WPAS
4	Ensuring that access to devices and data (connectivity) is factored in for staff and patients, as well as ensuring staff and patients have the required digital skills and confidence in order to use the telehealth services
5	Expansion into new clinical pathways
6	Simplify access
7	single Information Governance policy for ALL WALES to 7 different processes in 7 different HBs

8	National adoption of solutions - promote equitable access to platforms and their services. Help clinicians understand the benefit to be gained from putting time into onboarding / finding new ways of working
9	National adoption of solutions - promote equitable access to platforms and their services. Help clinicians understand the benefit to be gained from putting time into onboarding / finding new ways of working
10	Investment into more competitive and cutting-edge technology to keep up with the everchanging needs of the modern world

12. How do you think telehealth has contributed to the digital transformation of the healthcare system in Wales?

Participant ID	Answer
1	It has meant that at risk patients in more rural areas are better able to access helpful services that they are unable to get to physically. through he digital platform they are able to monitor their health and gain relevant help and advice from their clinicians
2	It has meant that at risk patients in more rural areas are better able to access helpful services that they are unable to get to physically. through he digital platform they are able to monitor their health and gain relevant help and advice from their clinicians
3	Has allowed patients in rural areas to be overseen remotely
4	telehealth has significantly contributed to the digital transformation of the healthcare system in Wales by improving access to care, especially in rural areas, and enhancing the patient experience through convenience and personalized interactions. It has increased efficiency and cost-effectiveness by optimizing resource allocation and reducing travel needs, while also facilitating better collaboration and data sharing among healthcare providers. During the COVID-19 pandemic, telehealth-maintained continuity of care and accelerated technology adoption. Innovations like AI integration and remote monitoring are advancing healthcare delivery, though challenges such as the digital divide and privacy concerns need to be addressed. Overall, telehealth is making healthcare in Wales more accessible, efficient, and patient-centered- but in order to ensure that digital transformation is successful, and no one is left behind, we must ensure staff and patients are digitally included and that non-telehealth options are available still were needed
5	Access to healthcare services and improving patient outcomes
6	Significantly, by improving communication between health professionals across Wales and giving patients extra choice about how to interact with health professionals and reducing traffic on the roads generated by appointments and car parking

7	Not much
8	Using platforms like PKB to give patients access to test results, documents and tools to monitor symptoms & guides for when to get in touch means that fewer patients require face to face appointments or need to phone their clinician with a simple question
9	It hasn't, DHCW are incapable of supporting telehealth and health boards can't integrate it into patient pathways and existing digital processes
10	Covid forced some beneficial changes to drive forward digital transformation e.g. remote access to interact with clinical systems. This has helped to offset some of the negative impacts Covid brought as remote access/viewing is quicker than in-person meetings etc

13. What innovations in telehealth have you found most impactful?

Participant ID	Answer
1	The ease of access to useful services
2	Wearable devices that constantly capture data are the only way to ensure consistent information is gathered
3	6-lead ECG
4	A few - Wearable devices like smartwatches help keep track of vital signs, which is especially helpful for managing chronic conditions and supporting people to return home/stay at home and be independent. Virtual consultations and patient apps, if user friendly, are allowing people see their doctors and access medical records without leaving home. Equally integrating telehealth with electronic health records ensures that doctors have the right information at the right time. We've also seen virtual reality being used for rehabilitation and to support veterans on waiting lists for psychotherapy, providing immersive mindful experiences that aid recovery and learning
5	Virtual Wards
6	Attend Anywhere for patient follow up
7	COPD monitoring; sleep apnoea CPAP compliance downloads. asthma diagnosis; virtual pulmonary rehab
8	Giving patients access to test results: Patients can feel less anxious when they have access to their test results. Sharing test results can help patients and their care providers use appointment time more effectively. Patients can be more involved in decisions about their care

9	Adopting Android platforms and bringing the delivery platform back to the TV. So many tech companies came into Wales with tablets and mobile based solutions that were unsustainable and often unusable by patients. Finally, the flood has receded
10	The desire to move to more self-service type models in systems for people (clinicians or patients) to be able to manage their own details

14. Do you feel telehealth services have reduced the time taken for healthcare delivery? (scale of 1-5)

Participant ID	Answer
1	3
2	3
3	3
4	3
5	4
6	3
7	3
8	4
9	2
10	4

15. What additional features or services would you like to see in telehealth platforms

Participant ID	Answer
1	A dedicated, purpose-built software for meeting with the clinicians, currently the clinicians I interact with use Teams with their patients, which patients have a hard time getting to grips within some cases due to it not being a simple software to understand to less digitally literate individuals
2	The information needs to be able to link to other records to give an overall picture of the client health
3	Video Consultation in-bedded

4	Signposting to digital support services - such as Data Map Cymru's how to help someone get online map, which can identify support with skills and access and allow people to support one another. Benefits realisation of patient facing digital health technologies is only possible if patients and staff are digitally included and this means designing services with users in mind
5	More healthcare pathways
6	I can't think of any
7	They are popular with patients, but we need more data on cost effectiveness
8	NHS Wales app to be used as a front door so all patients know where to go
9	Build telehealth integration into national systems. All telehealth data should go to NDR. Create an interoperability strategy that gives clear guidance on what is technically required of telehealth services. And please stop doing pointless pilots of new systems that are nothing more than pet projects for clinicians that don't know the first thing about digital transformation of their services
10	The gathering of data from these systems to be analysed, in order to inform and improve services across NHS Wales as a whole

Section 5 – Innovation and Transformation:

16. Are you aware of any policies or regulations that support the use of telehealth in Wales?

Participant ID	Answer
1	No
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	No
10	Yes

17. How do existing policies impact implementation and use of telehealth services?

Participant ID	Answer
1	N/A
2	Can take a long time to set up a new system as data protection Impact Assessments, consent agreements etc all have to be developed. It would be good if a set of such assessments and agreement could be pulled together for all Health boards and social care services across Wales could use
3	Highlight of digital inclusion within the digital and data strategy allows for emphasis on elderly care
4	Existing policies play a crucial role in the implementation and use of telehealth services by providing a framework that guides healthcare providers and ensures the safe, effective, and equitable delivery of these services
5	Medical Device Directive and Regulations governing development, GDPR for data privacy
6	Ensuring privacy and data protection
7	Not all -DHCW waste of time
8	Thinking of PKB specifically - the policy to allow access to PKB via NHS Login & in the NHS Wales app one health board at a time impacts implementation as it means that roll out is slower and different patients have unequal access to telehealth services
9	Future wellbeing and Welsh digital policies cannot be classed as enablers or guides
10	We have to ensure that data is handled extremely carefully and securely, due to the sensitive nature of NHS and patient information

18. What policy changes do you think are necessary to improve telehealth services?

Participant ID	Answer
1	N/A
2	That there is a more standardised was to set up and start a telehealth service, but that the service can use any new technologies to gain information. The better systems will then become apparent. It is how the Telecare services started 30+ years ago
3	Unsure

4	first, expand and standardize payments so telehealth services are covered just like inperson visits; strengthen rules to keep patient data safe and secure; focus on digital inclusion by improving internet access in underserved areas and helping those who can't afford the tech needed for telehealth; ensure telehealth systems work well with electronic health records; boost training for both healthcare providers and patients on using these services; encourage new and innovative telehealth solutions; simplify licensing so providers can easily offer services across states; and set up clear ways to measure and improve service quality
5	Enablement policies to support change management
6	Not sure
7	A telehealth Tsar with budget
8	Clear IG and security policies give reassurance to users. Create all policies, where possible, with a nationwide approach in mind
9	Bring back the LIN groups working with social care and give telehealth to GPs to manage. Stop using it as a cash cow got secondary care to fleece primary care
10	Focus on AI related policies, as this is a rapidly emerging realm of unknown opportunities and potential threats

19. How well do current regulations address privacy and security concerns related to telehealth?

Participant ID	Answer
1	3
2	4
3	3
4	3
5	4
6	3
7	3
8	5
9	1
10	3

20. Do you believe that telehealth services should be more widely promoted by policymakers?

Participant ID	Answer
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Unsure
7	Yes
8	Yes
9	Yes
10	Yes

Section 7 – Future Directions:

21. How likely are you to continue using/developing telehealth services in the future?

Participant ID	Answer
1	4
2	5
3	4
4	5
5	5
6	4
7	5
8	5
9	5
10	5

22. Would you recommend telehealth services to others?

Participant ID	Answer

1	3
2	5
3	4
4	5
5	5
6	4
7	5
8	5
9	3
10	5

About the Authors

Lydia Farley. Lydia Farley is currently pursuing a Master's Degree in Advanced Health and Care Management (Innovation and Transformation) at Swansea University. With a strong interest in telehealth, Digital Health Transformation and new innovative technologies. Lydia Farley's academic work focuses on exploring the intersection of healthcare and technology, particularly how digital solutions can improve patient outcomes and operational efficiency in healthcare systems.

In addition to their academic background, Lydia Farley has experience in working in healthcare management, participating in research projects, and digital innovation initiatives. Their recent work on telehealth adoption in Wales contributes to ongoing discussions around the digital transformation of healthcare in the UK.

How can lived experiences improve the quality of healthcare services in Wales?

Dr Rachelle Barlow
Quality and Strategy Manager
NHS Wales
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Abstract:

The involvement of patients and their lived experiences as feedback into the improvement of existing or new services is a vital flow of valuable information for professionals and patients alike. This study explores this pragmatic issue to provide new insights into the views of professionals supporting or delivering healthcare in Wales. A structured literature was conducted and resulted in the clear exposure of a gap in the current body of academic knowledge which calls for greater professional engagement with patients yet offers few studies that show how and in what ways services and professionals' benefit. A conceptual framework was designed to capture the contextual richness of the lived experience for service improvement, and a mixed methods approach was undertaken to gain qualitative insights with purposively selected experts and was supported by a questionnaire to explore the extent of this deficiency in modern health and care service provision. The results clearly indicate significant gaps in professional knowledge and practice despite an overwhelming interest and support for the employment of 'lived experience' methods and their profound impact on current and future service value.

Keywords: health quality improvement, quality management, service design, patient engagement, coproduction.

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Introduction

The quality agenda for healthcare in Wales is set out in the Duty of Quality, a new law which came into effect on 1 April 2023 designed to ensure that 'NHS bodies secure improvements in the quality of services they provide' (Welsh Government, 2023, p.4). In some ways, this philosophy is not new. In their paper on achieving prudent healthcare in NHS Wales, Bradley et al. (2014) highlight the need for the NHS workforce to engage in continuous improvement activities; they believe all staff should have two jobs – do their job and 'every day' improve the job they do (p.28). What the Duty of Quality does, however, is recognise that quality improvement alone is insufficient to meet the challenges our healthcare system is facing. Instead, it mandates that NHS Wales organisations must establish effective quality management systems – comprising quality improvement, quality planning, quality control and quality assurance – that centre around learning (Fig.1).



Figure 1. Quality Management System as outlined in Welsh Government's Quality and Safety Framework (Welsh Government, 2021).

The ability to deliver a quality-driven system of high effectiveness and efficiency, in a multi-stakeholder service setting is predicated on one, often ignored, process – this is converting the lived experience of patients into a 'voice' and focus of service design and redesign efforts which yield greater value by delivering a higher quality service. Batalden (2018) urges us to think of healthcare not as a product made by professionals and sold to consumer-patients, but rather with a 'service dominant' mindset where interactions between patients and professionals shape, or coproduce, healthcare services. Patients (or people with lived experience) are often considered experts-by-experience, yet Gremyr et al.'s (2021) examination of learning health systems found that few studies addressed how users and their families contributed to the design and improvement of healthcare services. Drawing upon the perceptions of professionals supporting delivery of healthcare services in Wales, this research project examines the integration of the 'lived experience' into the design and improvement of healthcare services in Wales.

Identification of the Project Requirements

The research project is aligned to the work of the NHS Wales Executive, a new national support function created in 2023 to 'drive improvements in the quality and safety of care' in Wales (NHS Wales Executive, n.d.-a). Steered by a mandate from Welsh Government, the Executive is designed to enable, support and direct the transformation of NHS Wales services in line with national priorities and standards (NHS Wales Executive, n.d.-a).

Specifically, this research is linked to Quality, Safety and Improvement. From 1 April 2024, Improvement Cymru – the improvement service for NHS Wales – became the Quality, Safety and Improvement (QS&I) directorate of the NHS Wales Executive. Of relevance to this project, QS&I is responsible for providing national support for the Duty of Quality and national leadership for the development of quality management systems across Wales.

Between March 2022 and May 2024, Improvement Cymru/QS&I partnered with the global Institute for Healthcare Improvement (IHI) to support NHS Wales health boards and trusts to deliver projects in community, acute and ambulatory settings to improve patient safety. This national programme was known as the Safe Care Partnership (Fig.2), part of which (the 'Safe Care Collaborative') drew upon IHI's breakthrough series collaborative methodology for testing changes.

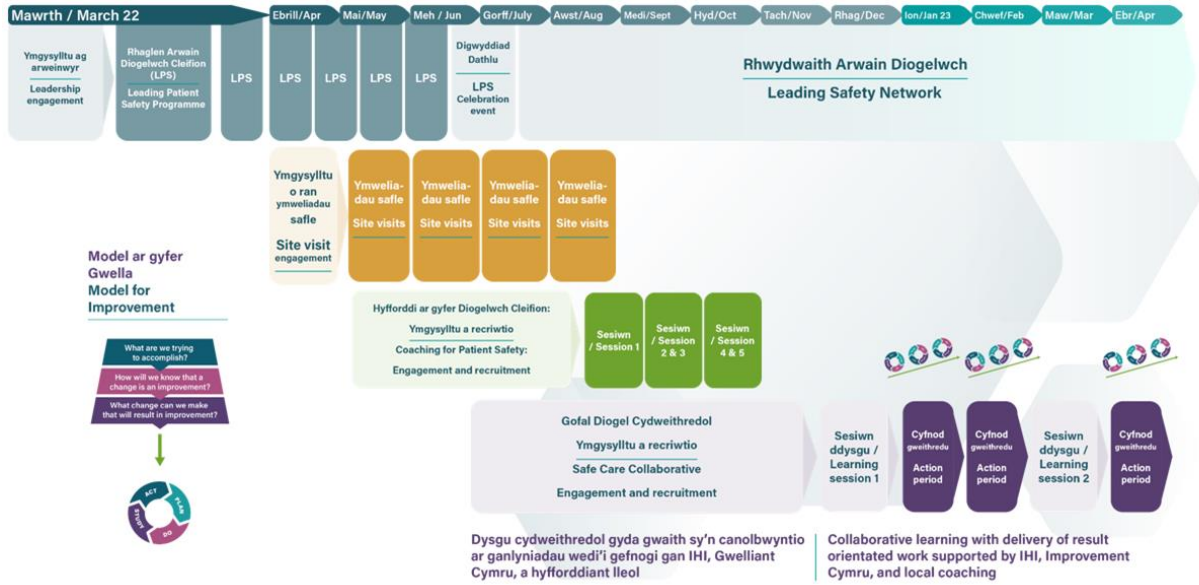


Figure 2. Visual representation of Improvement Cymru's Safe Care Partnership, delivered with IHI (Improvement Cymru, n.d.-b).

While leaders from Improvement Cymru/QS&I recognise people with lived experience as core partners and customers (Q Community, 2024), it is also recognised that the voice of these customers needs to be strengthened in how we design our work and support NHS Wales organisations to deliver quality services. Welsh Government's definition of quality is 'continuously, reliably, and sustainably meeting the needs of the population we serve', reinforcing the vision – or expectation – for patients and members of the public to be actively involved in shaping what we mean by 'quality' services in Wales (Welsh Government, 2023, p.18).

As such, the research question is:

RQ1: How can lived experiences improve the quality of healthcare services in Wales?

Objectives

- To understand what the barriers and enablers are to learning from lived experiences to improve the quality of healthcare services in Wales.
- To understand what good looks like (where are the examples of good practice and what can we learn from them?)
- To create an actionable set of recommendations regarding how lived experiences can be harnessed by NHS Wales to improve the quality of healthcare services via national quality programmes (e.g. Safe Care Collaborative 2 which is due to be launched during 2024/25).

Literature Review

Before examining the reality of how coproduction and quality improvement are, or could be, applied to healthcare within Wales, this section provides an overview of pertinent literature in the field. Of note, Williams & Caley (2020) highlight their belief that 'writings on these two important areas have developed separately and have largely remained discrete in their application' (p.16).

Quality Improvement in Healthcare

Quality improvement (QI) approaches have been applied increasingly to healthcare over the last two decades, yet the underlying philosophies can be traced back further. W. Edwards Deming – a renowned consultant for Japanese industry – developed two central ideas that are pertinent to the current study. First, in his book on transforming American industrial management Out of the Crisis (first published 1982), Deming raises questions about how we define quality; although the production worker and plant manager may have a perspective on quality, ultimately Deming advocates that quality must be defined by the consumer. The foremost principle, he notes, is 'to understand the consumer's needs and wishes, and thus to design product and service that will provide better living for him in the future' (Deming, 1986, p.175). If

translated into a healthcare setting, patients – people with lived experience – should be integral to the service design and improvement processes.

Second, Deming developed a QI methodology to provide a structured, iterative approach to testing changes aimed at improvement. The Plan, Do, Study, Act (PDSA) cycle – itself developed from Walter Shewart's earlier model – is designed to be cyclical, where the learning from one test of change informs the next. PDSA methodology is widely used to support QI in healthcare (see Table 1 for how the method has been adapted), though Taylor et al. (2014) caution that its effectiveness is difficult to discern due to varied application, in some cases lacking scientific rigour (e.g. not regularly using quantitative data to inform cycles). That said, its use is promoted by the IHI through the Model for Improvement (MFI) (Institute for Healthcare Improvement, n.d.). Developed by Associates in Process Improvement, the MFI extends the PDSA by adding three questions to the beginning of the process (Fig.3).

Table 1. Description of the PDSA cycle method according to developers (adapted from Taylor et al., 2014)

	Deming (1986) Original description of the method relating to manufacturing	**Langley (1996) How the PDSA method may be adapted for use in healthcare contexts**
Plan	Plan a change or test aimed at improvement	• Identify objective • Identify questions and predictions • Plan to carry out the cycle (who, when, where)
Do	Carry out the change or test (preferably on a small scale)	• Execute the plan • Document problems and unexpected observations • Begin data analysis
Study	Examine the results. What did we learn? What went wrong?	• Complete the data analysis • Compare data to predictions • Summarise what was learnt
Act	Adopt the change, abandon it or run through cycle again	• What changes are to be made? • What will the next cycle entail?

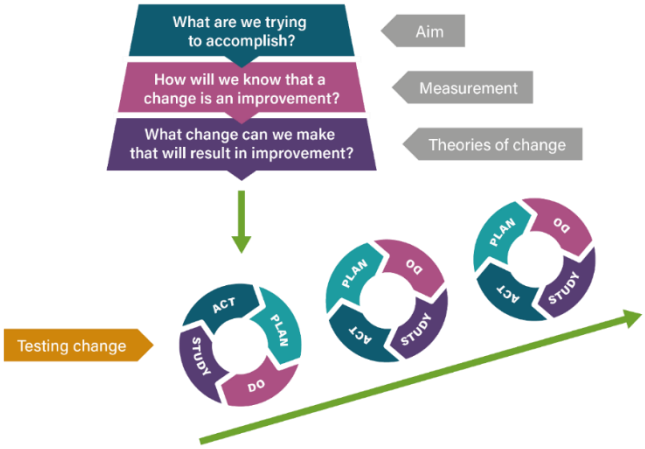


Figure 3. Model for Improvement (Improvement Cymru, n.d.-a).

While such approaches support improvements in quality at a relatively small scale (e.g. project level, in one ward), PDSA and the subsequent MFI are insufficient to engender system-level improvement. In 1994, Paul Batalden – one of IHI's founders – conceptualised a new collaborative model designed to accelerate healthcare improvement 'to the next level' (Institute for Healthcare Improvement, 2003, p.2). The premise of the Breakthrough Series Model (BSM) was to create a structure for learning and tests of change, bringing together subject matter experts with QI experts who can coach project teams to identify, test and implement changes relating to a specific topic. Following the Learning Sessions (timed periodically throughout the 6-15 months of the BSM), teams return to their organisations to test the changes during Action Periods. Results of early BSM collaboratives led by IHI were encouraging. For example, in the first collaborative (1996), 15% of organisations reduced their caesarean rates by 25% or more, and 50% of the organisations reduced their rates by 10-25% (Institute for Healthcare Improvement, 2003).

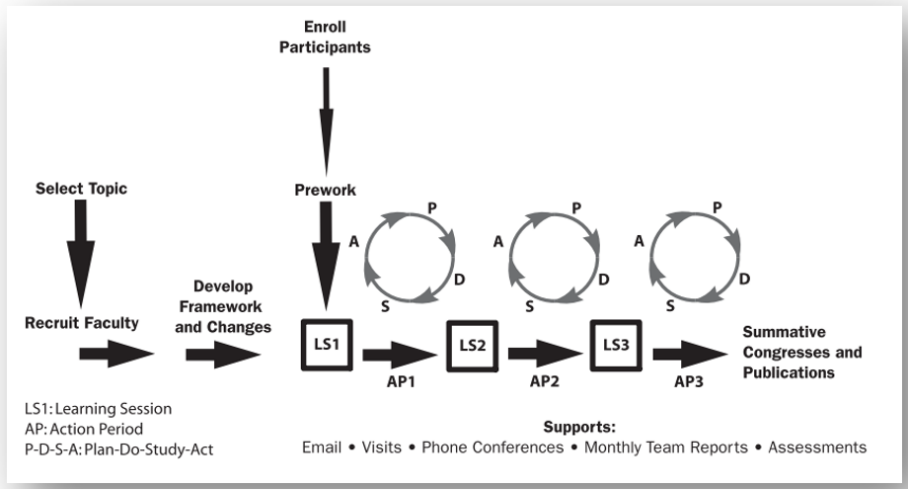


Figure 4. IHI Breakthrough Series Model (Institute for Healthcare Improvement, 2003).

Although seemingly able to achieve improvements, the BSM itself (Fig.2) does not reference the involvement of people with lived experience, and therefore the early stages of QI, such as understanding the problem, and the development of change ideas, can in theory be actioned without end-user input. Literature regarding BSM in practice, however, does show evidence of involving those with lived experience. NHS England's approach for its Cancer Experience of Care Improvement Collaboratives 'intentionally put people with relevant lived experience at the centre of the design and improvement process' (Marshall et al., 2022, p.191). A key learning point that emerged over the programme's three cohorts from 2019 is that lived experience partner involvement is a 'necessity' and 'impacts on project success' (Marshall et al., 2022, p.192). Similarly, Williams et al.'s (2022) evaluation of a QI collaborative held in NHS Wales's Hywel Dda University Health Board notes that patients and carers are a key attribute to multi-professional teams, though little detail is given about how these groups engaged with, or benefitted, from the programme.

Lived Experience and Quality Improvement

By shifting mindsets from viewing healthcare as a product made by professionals and sold to consumer-patients, to a 'service dominant' mindset where interactions between patients and professionals shape, or coproduce, healthcare services, Batalden (2018) argues that we may be able to transform healthcare at both a system and individual level to improve patient and population health. He suggests that the scholarly approach of improvement science (e.g. derived from Deming's perspective on Total Quality Management) needs to be extended to understand how healthcare service coproduction can be utilised for greatest health benefit. Coproducing healthcare services, he argues, relies upon trustworthiness, respect and trust, with healthcare professionals granted 'important permission to be vulnerable and to value more fully the knowledge and skills patients bring' (k3617). The notion of permission is significant since it suggests that greater involvement of patient involvement in shaping healthcare relies upon organisational culture, leadership and management.

The value of patients' knowledge is also an important concept. In tracing the development of healthcare quality improvement from assurance (Quality 1.0), through organisation-wide systems (Quality 2.0), to coproduction of health (Quality 3.0), Batalden & Foster (2021) advocate for integrating and honouring the knowledge, expertise and assets of both patients and professionals. Building on the concept of 'service-making' logic – the goal of which is improved quality and value – they note that coproducing healthcare services is informed by four streams of knowledge:

1. Empathetic understanding of the 'patient' – their lived reality, resources and social support, and aims for their health.
2. 'As is' knowledge of the current system's safety, reliability and coordination (or lack thereof).
3. 'Science-informed practice'.
4. Empathetic understanding of the 'professional' – understanding the 'context, policies and culture which enable[s] – or hinder[s] – the person trying to work interdependently with others (Batalden & Foster, 2021, p.ii12).

Reliability in safety-critical industries, such as healthcare, is a key part of quality and can also be linked to knowledge. Observations from air traffic control centres, the generation and transmission of electrical power, and aircraft carrier flight decks, led Weick & Sutcliffe (2015) to develop five key principles of Highly Reliable Organisations (HROs) (Fig.3).

Five Principles of Highly Reliable Organisations	***Principle 1: Preoccupation with failure*** Direct 'attention to ways in which [...] local activities can conceal or highlight [...] system malfunction, small errors that could enlarge and spread [...and] gradual drifts towards complacency'.
	Principle 2: Reluctance to simplify 'Less simplification allows you to see in more detail what might be causing the unexpected'.
	Principle 3: Sensitivity to operations 'The work itself, about seeing what we are actually doing regardless of intentions, designs and plans'.
	Principle 4: Commitment to resilience 'Develop capabilities to detect, contain and bounce back from those inevitable errors that are part of an indeterminate world'.
	Principle 5: Deference to expertise 'Decisions are made on the front line, and authority migrates to the people with the most expertise, regardless of their rank'.

Figure 5. Five HRO Principles (adapted from Weick & Sutcliffe, 2015).

If a lens of lived experience is applied, an organisation's understanding of its failures (Principle 1) will be incomplete without understanding – and importantly, learning – from those who use its services. Principle 3 concerns sensitivity to operations and, again, lived experience partners can help healthcare professionals understand how the service is experienced in practice, leading to the identification of areas for patient-centric quality improvements. A healthcare professional involved in NHS England's Cancer Experience of Care Improvement Collaborative reflected that 'patients can tell you how the system actually works (not just how it should work – or how you think it works)' (Marshall et al., 2022, p.201); they hold knowledge that is not held by staff (Bergerum et al., 2022). Finally, Principle 5 – deference to expertise – advocates for recognising and being led by expertise wherever that may sit in the system (e.g. not necessarily within leadership and/or management positions). There is a growing recognition that people affected by a particular health condition may be considered 'experts by lived experience' (Hua et al., 2024), though this expertise and knowledge is not consistently being drawn upon to support quality improvements in healthcare. However, benefits are evident where this knowledge has been used in practice (Fig.6).

> *"Listening to the Lived Experience Partners (LEPs) Network group share what matters to them, was enlightening and emphasised the importance of coproduction; we can never assume we know what is best or what matters most to patients. Working with the LEPs provided a completely different perspective to navigating the collaborative, highlighting challenges I had not considered, which made me realise that there is always more to learn and improve."*
> Core Team - Programme Support Officer

Figure 6. Staff reflection on working with lived experience partners (Marshall et al., 2022, p.200).

Palmer et al. (2020) raise that the increasing importance and recognition of experiential knowledge (lived experience) and patient-led change contrasts with the traditional evidence-based paradigm for medicine and healthcare, with a new participatory paradigm now needed to understand and support patient participation in design, delivery and improvement. Similarly, Bergerum et al. (2022) highlight that even though 'QI leaders and hospital managers are expected to organise and support QI efforts to be co-produced with patients', utilising knowledge from lived experience can raise challenges in healthcare organisations where, traditionally, QI efforts need to be systematically planned and 'informed by research

[rather than experiential] knowledge' (p.604). The latter raises another interesting and unexplored fact of embodying the voice of patients and that is the psychological safety afforded by organisations and professionals in allowing patients to be critical of existing services and the intentions/focus of proposed improvements by professionals. While Fukami (2023) asserts that psychological safety improves patient engagement, leading to improved outcomes and patient satisfaction at an individual level, there appears to be a gap in understanding how psychological safety for patients affects co-design and coproduction of service improvements.

Challenges in Coproducing QI

A narrative review of QI literature by Dixon-Woods et al. (2012) uncovered ten key challenges in improving quality in healthcare, aligned to the following themes: (i) design and planning of improvement interventions; (ii) organisational and institutional contexts, professions and leadership; and (iii) sustainability, spread and unintended consequences. Under design and planning, they note a fundamental challenge in engaging healthcare staff with QI is 'convincing' them of the problem; a proposed strategy is to quantify the problem using 'hard data' alongside 'patient stories to secure emotional engagement' (Dixon-Woods et al., 2012, p.879). Here, patient voice serves to connect staff to the bigger picture why – to improve experiences and outcomes for patients. In parallel, the ability of patients to express their voice (health literacy) and organisations to express their interpretations of the lived experience voice is challengeable (Bradley et al., 2014; Holland-Hart et al., 2019).

The literature also highlights other challenges and limitations of coproducing quality healthcare services with people with lived experience. First, it must be recognised that people with lived experience hold diverse perspectives and priorities (Batalden et al., 2016; Conte & Davidson, 2020), meaning that they cannot be considered 'a cohesive and homogenous group' (Palmer et al., 2019). Second, traditional power dynamics between patients and healthcare professionals are altered through coproduction where each is intended to share equal power (as advocated by the prudent healthcare principles). Palmer et al. (2019) describe this as 'a political and sociocultural mindset shift from "experts know and decide everything" to "we need to decide things together"' (p.247). In terms of power and responsibility, Batalden et al. (2016) note that the idea of mutual accountability for outcomes is 'controversial' and they stress that the healthcare system must continue to act as a safety net and not allow the pendulum to swing too far by transferring too much responsibility to patients and families. There is a 'dark side' of coproduction, as Palmer et al. (2019) warn, where inequities may be reinforced through substitution of labour and if coproduction is used to cover political decisions.

Third, further challenges include contextualising standardisation. In line with the prudent healthcare principles, QI efforts are often targeting the reduction of unintended variation as doing so can lead to improvements in quality and safety. However, Batalden et al. (2016) highlight that coproduction invites 'intended' variation by enabling patients and family members to shape healthcare services based upon their own priorities (which may differ between individuals, and from year-to-year); thus, the key becomes to discern necessary and unnecessary variation. Fourth, the organisational environment and its culture can support or hinder efforts to co-produce improvements or service design with people with lived experience. When system pressures (e.g. backlogs and bottlenecks) and political pressures increase, coproduction can be discarded or deprioritised as it is 'difficult' to do well and is perceived as being time consuming (Batalden et al., 2016; Bergerum et al., 2022) and resource demanding (Bergerum et al., 2022).

What does good look like?

The literature indicates that it is possible to draw upon lived experience to coproduce value both for individuals and for health systems. In their scoping review of learning health systems (LHS), Gremyr et al. (2021) found that three LHS conceptualisations – Cincinnati Collaborative LHS Model, Dartmouth Coproduction LHS Model and Michigan Learning Cycle Model – exhibited core characteristics for harnessing coproduction to enhance value co-creation. The LHS concept was conceptualised by the US Institute of Medicine in 2007, and part of its characteristics (Fig.7) include patients as 'vital members of the continuously learning care team' (Gremyr et al., 2021, ii28). Gremyr et al. (2021) concluded that coproduction is fundamental in LHS, with seven guiding principles: (i) shared aim for all relevant stakeholders, including patients, family and friends; (ii) 'navigate towards improved outcomes both for individual patients and for the system overall'; (iii) tailor feedback to specific users depending on purpose; (iv) enable distributed leadership so that patients, professionals and others have a voice to shape decisions

(this 'may challenge hierarchies and expert roles but has potential to enhance co-creation of value'; (v) enable creative solutions and continuous improvement by facilitating interactions between individuals and groups; (vi) 'apply co-design of services and user interfaces to make it easier for individuals and groups to engage in, and build, a culture of sharing, transparency and learning'; (vii) use platforms to support self-organisation to create and share resources to enable transformation at a system level (p.ii30).



Box 1 Characteristics of a continuously learning healthcare system [7]

Science and informatics

- Real-time access to knowledge—A learning healthcare system continuously and reliably captures, curates and delivers the best available evidence to guide, support, tailor and improve clinical decision-making and care safety and quality.
- Digital capture of the care experience—A learning healthcare system captures the care experience on digital platforms for real-time generation and application of knowledge for care improvement.

Patient–clinician partnerships

- Engaged, empowered patients—A learning healthcare system is anchored on patient needs and perspectives and promotes the inclusion of patients, families and other caregivers as vital members of the continuously learning care team.

Incentives

- Incentives aligned for value—A learning healthcare system has incentives actively aligned to encourage continuous improvement, identify and reduce waste, and reward high-value care.
- Full transparency—A learning healthcare system systematically monitors the safety, quality, processes, prices, costs and outcomes of care and makes information available for care improvement and informed choices and decision-making by clinicians, patients and their families.

Continuous learning culture

- Leadership-instilled culture of learning—A learning healthcare system is stewarded by leadership committed to a culture of teamwork, collaboration and adaptability in support of continuous learning as a core aim.
- Supportive system competencies—A learning healthcare system constantly refines complex care operations and processes through ongoing team training and skill building, systems analysis and information development, and creation of the feedback loops for continuous learning and system improvement.

Figure 7. Characteristics of a continuously learning health system (as cited in Gremyr et al., 2021).

Further concerning LHS and co-design, Hedberg et al.'s (2022) exploration of coproduction of health and social care services in Sweden highlighted the infrastructure established at a national level to enable a co-produced LHS, where patients and their next of kin work alongside professionals as partners. Patient involvement is integral to all aspects of care re-design. In 2017, Sweden created a Knowledge Management System as part of a movement towards increased patient engagement; now, each clinical diagnosis working group has a patient representative and, at a national level, each working group also has at least one patient or family representative to share lived experience and patients' perspectives. Sweden's concept as a learning health system relies upon continuous feedback and this is collated via its National Quality Registries – a platform collecting outcome measures for care processes and for different disease groups. However, while conceptualised as a mechanism for real-time quality data that can be used to support improvement and research, Hedberg et al. (2022) admit that more work is needed at a system level to support coproduction and joint understanding.

Recently, strides have been made in NHS England towards putting co-production at the heart of QI work. Helen Lee at NHS England's Experience of Care coproduction team reflected that coproduction 'brings you close to those who use your organisation's services and grounds your thinking in their lived reality' (Q Community, 2023). With expert input from social consultancy We Coproduce, NHS England developed a suite of materials including guidance, case studies and literature to support QI nationally (NHS England, 2023b). Following a national review of changes in response to the COVID-19 pandemic by NHS England's Quality and Innovation Committee, 'coproduction as default' is recommended and the following principles are suggested in terms of what good looks like:

- 'We always start from what matters most to people who use and work in services.
- We work with people who have relevant lived experience (patients, service users, unpaid carers and people in paid lived experience roles) and with staff, in everything we do to directly connect with multiple and diverse voices.
- We build equal and reciprocal partnerships with people who have relevant lived experience and staff, including with those from disadvantaged and minority communities, from the very start of, and throughout, all our work' (NHS England, 2023a).

Following their review of case studies in literature, Williams & Caley (2020) present a theoretical framework for how QI can be more closely integrated with co-production and co-design (Fig.8). Their findings are framed through three theoretical lenses. First, service operations management – Williams & Caley (2020) advocate that a service dominant logic is needed to 'enable service users (patients) to be seen as co-producers rather than receivers of services (care)' (p.105). Second, QI in healthcare – Williams & Caley focussed on lean thinking and model for improvement in healthcare and propose that including tools such as Quality Function Deployment (QFD), SERVQUAL and the Kano model can support the integration of patients' voices into service redesign. Third, co-design and coproduction in healthcare – Williams & Caley highlight a need to integrate storytelling into QI and suggest that emotional mapping can support stories to be meaningfully integrated. In addition, they propose two conceptual models for how their revised theoretical framework may be used in practice (Table 2). That said, a limitation of the study is that the proposed theoretical framework and conceptual models are developed from retrospective case analyses and literature reviews and therefore have not been tested and evaluated in practice.

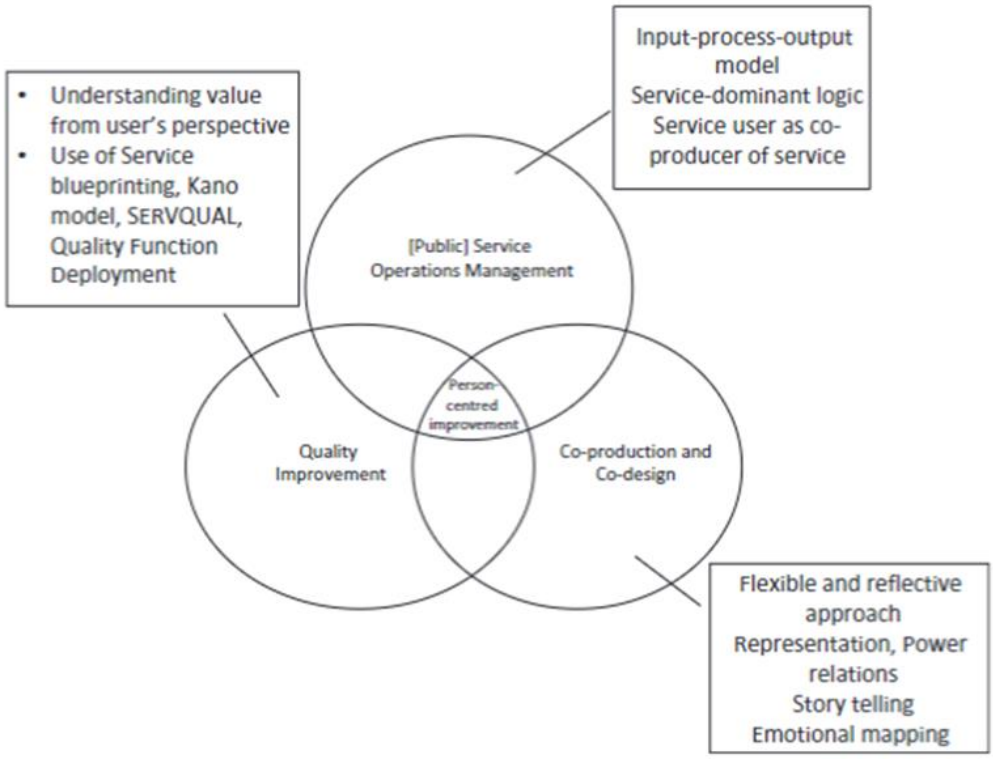


Figure 8. Revised theoretical framework for person-centred improvement (Williams & Caley, 2020).

Table 2. Integrated conceptual models (Williams & Caley, 2020, pp.108-109)

Integrating lean thinking and principles of co-design and coproduction	**Integrating Model for Improvement and principles of co-design and coproduction**
Understanding value (from patient perspective) • define area for improvement • invite patient participants – might need to visit local groups or third sector organisations • patients to attend QI training if appropriate/needed • using key principles of coproduction • workshops with patients and relatives to define value – include Kano model to understand expectations	Definition of problem – what trying to achieve • identify community groups and mechanisms for engagement and any training needs e.g. experience-based co-design (EBCD) • define participation plan – to include representation and selection roles & responsibilities Environment, resources & communication • patient / relatives involved in defining the scope and aim of the improvement activity Managing relationships
Mapping the value stream (pathway) (understanding the context) • study the evidence (what does good look like? • service blueprinting (to identify interactions with patients and 'moments of truth') and mapping – current state and ideal state • walk and observe process/pathway • record information flows • experience based interviews with staff, patients and relatives to record patient flows and emotional flows (if appropriate to project and resources allow film patient / staff stories) • establish baseline measures	Knowing the change is an improvement • tailor patient involvement to QI activity: Patients involved in experience-based co-design activity, process mapping and data collection • patients involved in evaluating improvements
Flow • analysis of patient stories, films and experience-based interviews to understand interruptions of flow, quality issues, areas of good practice • identify areas of the pathway suitable for standardisation or require a person-centred approach	Defining the changes • patients involved in testing small cycles of change
Pull resources as needed by the patient / empower staff • using model for improvement design PDSA small cycles of change – include patients and relatives • implement PDSA small cycles of change to reduce delays, remove duplication and improve flow • review against measures	
Work towards perfection • continually review progress of small cycles of change • sustaining change / feedback loops • update current state and ideal state maps / service blueprints • review against measures to sustain improvements	

Summary

The preceding discussion of the existing literature and its many gaps reinforces the academic urgency to explore and provide meaningful contributions to how the lived experience is and should be embodied in current service provision and the execution of a Duty of Quality and also the methods used to capture and embed this voice in service improvement and design.

To summarise the subject area and to demonstrate the key concepts that interact to result in better or improved service design/delivery, the following conceptual framework was created from the literature review (Fig.9).

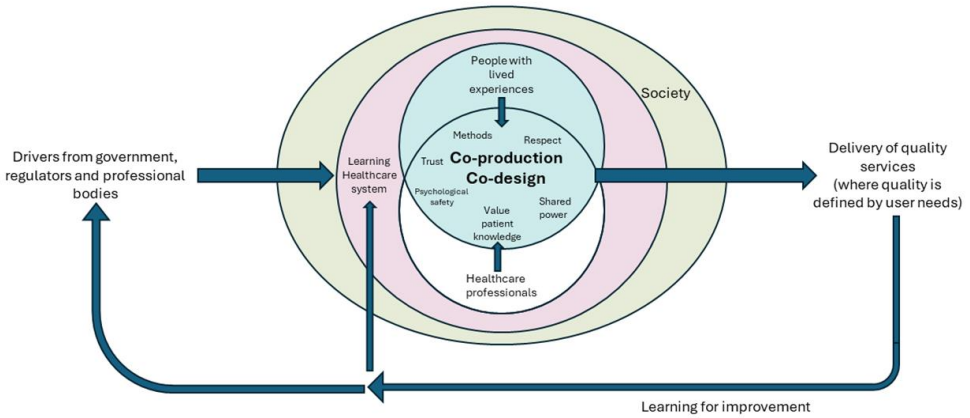


Figure 9. Conceptual Framework (source: developed by researcher).

Research Methodology and Design

Literature Review

The contemporary nature of the 'lived experience' phenomenon and its use for design and improvement activities necessitates an inductive and theory-building approach to this study.

The core methodology involved a traditional literature review using various online repositories and the following Boolean strings of search terms (Table 3).

Table 3. Literature Review Methods

Search criteria	Keyword searches: coproduction AND health AND quality improvement, lived experience AND health AND quality improvement. Language: English. Publications since 2016, though snowball literature searching exposed relevant literature pre-2016 for inclusion.
Repositories used	i-Find; Google Scholar.
Quality of papers	Reviewed publications of high citation and peer review from the health and management literatures.

The review yielded a conceptual framework. The researcher operationalised the study through a combination of mixed methods as detailed below.

Perceptual questionnaires

A questionnaire (Appendix B) was developed to understand general perceptions about the barriers and enablers regarding the use of lived experience for improving or designing quality services.

Table 4. Questionnaire Methods

Participant selection	People who deliver or support delivery of healthcare in Wales, including, but not limited to, NHS Wales, academia, industry and third sector organisations.
Survey distribution	Link distributed on LinkedIn, via the NHS Wales Innovation Leads' Network, via Welsh Government's Innovation, Technology and Partnerships distribution list, to NHS Wales Executive staff working in quality, safety and improvement, to academic researchers (staff and students) of the Innovation Intensive Learning Academy. In all cases, following the principles of snowball sampling, respondents were asked to share the link with their contacts.
Survey design	Designed to test the perceptions of those working in or supporting healthcare in Wales against themes that arose through the literature review. Statements were presented with a five-point likert scale (strongly agree to strongly disagree). An open-ended qualitative question was included to gain a more comprehensive understanding of the respondent's perception and to validate responses to the statements.
Survey format	Qualtrics.

Interviews

Contextually rich semi-structured interviews were undertaken with professionals to gain greater insight into current practices and perceptions of lived experience, and to gather views on recommendations for future ways of working. Interviews were conducted until the point of saturation was reached.

Table 5. Interview Methods

Participant selection	Purposely selected based upon expertise, experience and insights. Not all were known to the researcher.
Interview length	Up to a maximum of 1 hour 31 minutes.
Types of questions	Themed open questions.
Interview themes	Quality drivers; learning healthcare systems; enablers; barriers; methodology; measuring impact; examples of good practice.
Form of recording	With permission, all interviews were recorded and transcribed using Microsoft Teams.

Analysis

The findings were then analysed using a qualitative framework of thematic analysis (Braun & Clarke, 2022) and data displays (Miles et al., 2020), using the questionnaire findings as a check to identify any outliers and to understand if the interview data was confirmed by a wider view of a variety of professionals. It is felt that findings could be generalisable to similar health and care systems that need to incorporate lived experience into service design, delivery and improvement.

Ethical considerations

Ethical approval was awarded for the study by Swansea University in June 2024 (see Appendix A). Survey data was collected anonymously, and interview participants consented to participate on the basis that their data would be anonymised.

Limitations of the study

- Survey and interviews conducted only in English.
- Limited to Wales.
- Project constraints (time and word count) prevented more extensive analyses.

Main Analysis

Findings – Perceptual questionnaires

The questionnaire received 74 responses. All respondents were asked to provide consent prior to accessing the questions and a second prerequisite was that they consider themselves to deliver or support healthcare services in Wales. Information was collected on respondents' level of experience (Fig.10) with 56% of respondents having a decade or more of experience in the field.

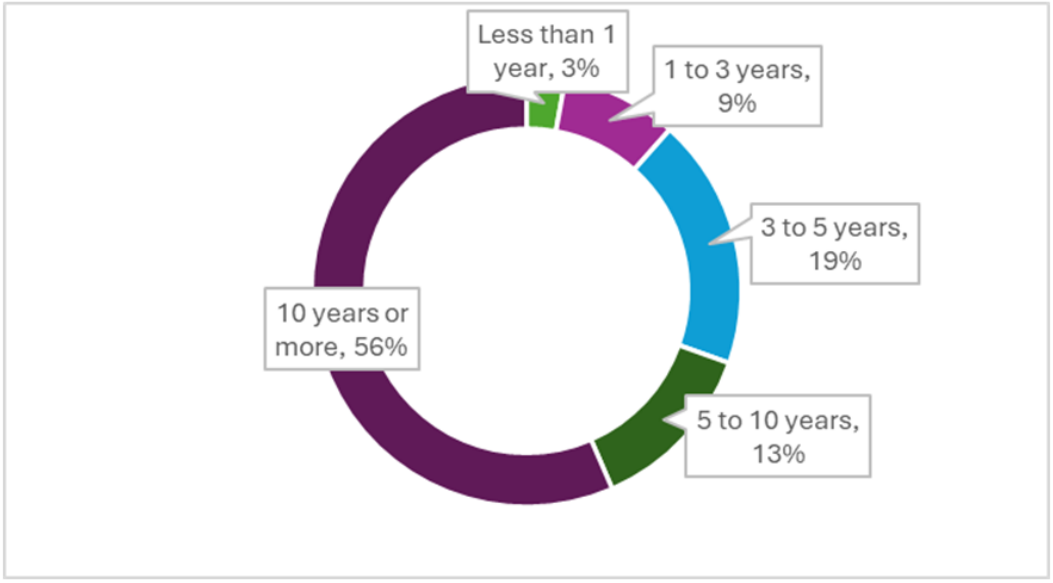


Figure 10. Survey Respondents' Years of Experience in Delivering or Supporting Healthcare in Wales.

To understand more about the demographics of the respondents, they were asked which category best described their employment (Fig.11). Some respondents who selected 'other' listed their employment as: think tank, NHS Executive, third sector provider and arm's length body to Welsh Government.

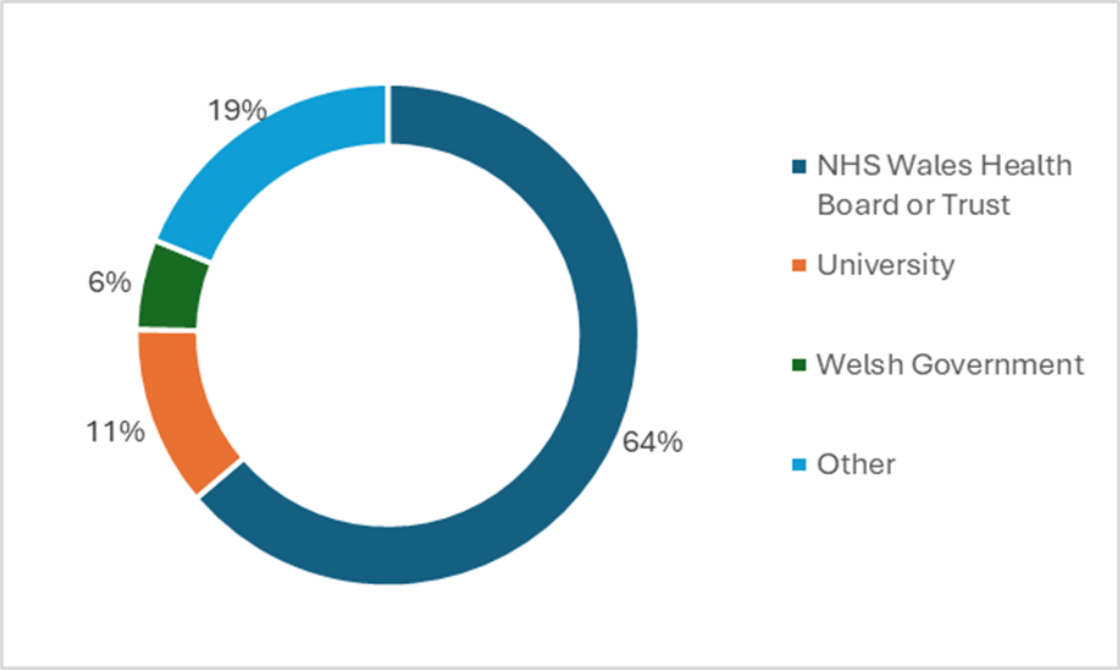


Figure 11. Survey Respondents' Employment.

Most respondents (62%) do not consider themselves as patient-facing, with a further 10% noting that their work is sometimes patient-facing (Fig.12).

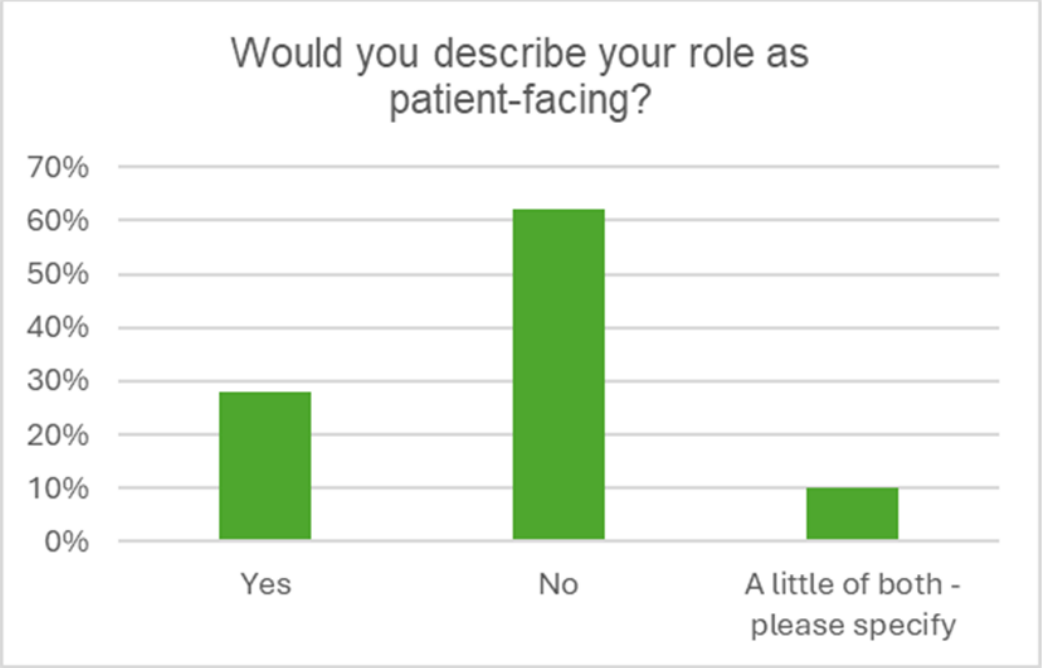


Figure 12. Survey Respondents' Perception of their Role as Patient-Facing.

Respondents were asked to rate a series of statements against their views. While the statements were themed beforehand for analytical purposes, they were presented to respondents in no particular order to test views against statements with similar sentiments.

Themes included: beliefs, culture, current practice, skills and knowledge and system perspective.

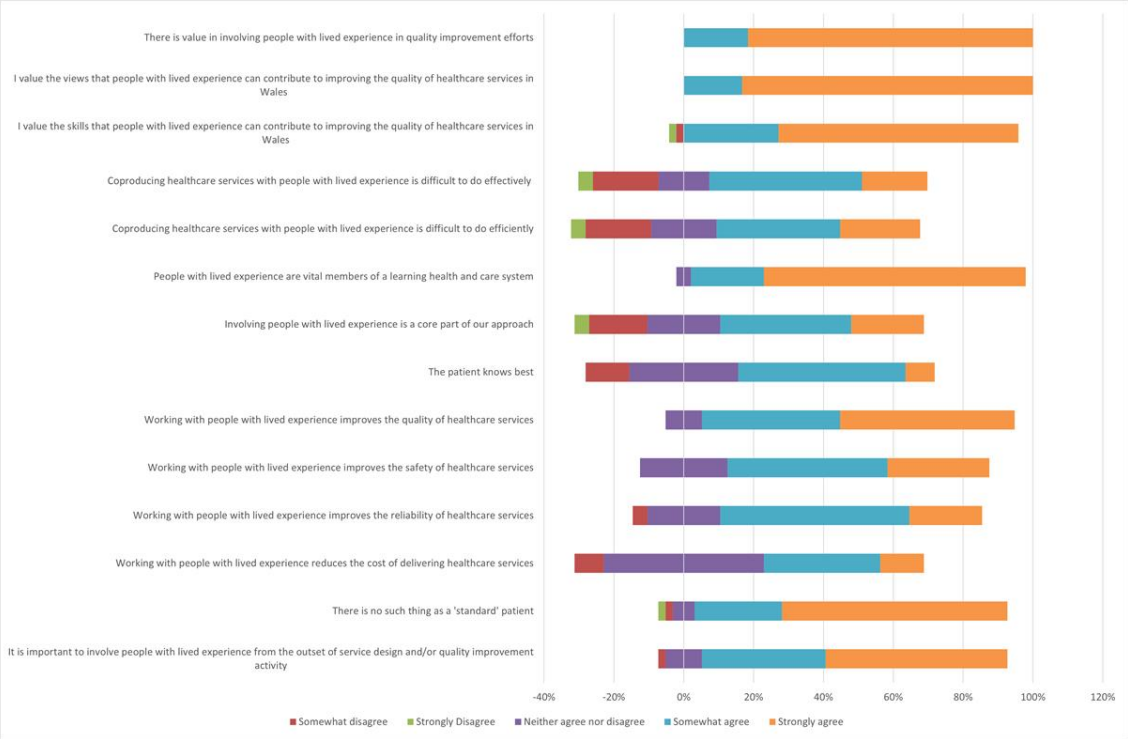


Figure 13. Survey findings aligned to theme: Beliefs.

Table 6. Survey findings aligned to beliefs

Theme	Results
Beliefs	100% of respondents somewhat or strongly agreed that there is value in involving people with lived experience in quality improvement efforts.
	100% of respondents somewhat or strongly agreed that they value the views that people with lived experience can contribute to improving the quality of services.
	96% of respondents somewhat or strongly agreed that they value the skills that people with lived experience can contribute to improving the quality of services.
	63% somewhat or strongly agreed that coproducing healthcare services with people with lived experience is difficult to do effectively.
	58% somewhat or strongly agreed that coproducing healthcare services with people with lived experience is difficult to do efficiently.
	96% of respondents somewhat or strongly agreed that people with lived experience are vital members of a learning health and care system.
	58% of respondents somewhat or strongly agreed that involving people with lived experience is a core part of their organisation's approach.
	31% of respondents neither agreed nor disagreed that the patient knows best, though 56% somewhat or strongly agreed.
	90% of respondents somewhat or strongly agreed that working with people with lived experience improves the quality of healthcare services.
	75% of respondents somewhat or strongly agreed that working with people with lived experience improves the safety of healthcare services.
	75% of respondents somewhat or strongly agreed that working with people with lived experience improves the reliability of healthcare services.
	46% of respondents neither agreed nor disagreed that working with people with lived experience reduces the cost of delivering healthcare services.
	90% of respondents somewhat or strongly agreed that there is no such thing as a 'standard' patient.
	88% of respondents somewhat or strongly agreed that it is important to involve people with lived experience from the outset of service design and/or quality improvement activity.

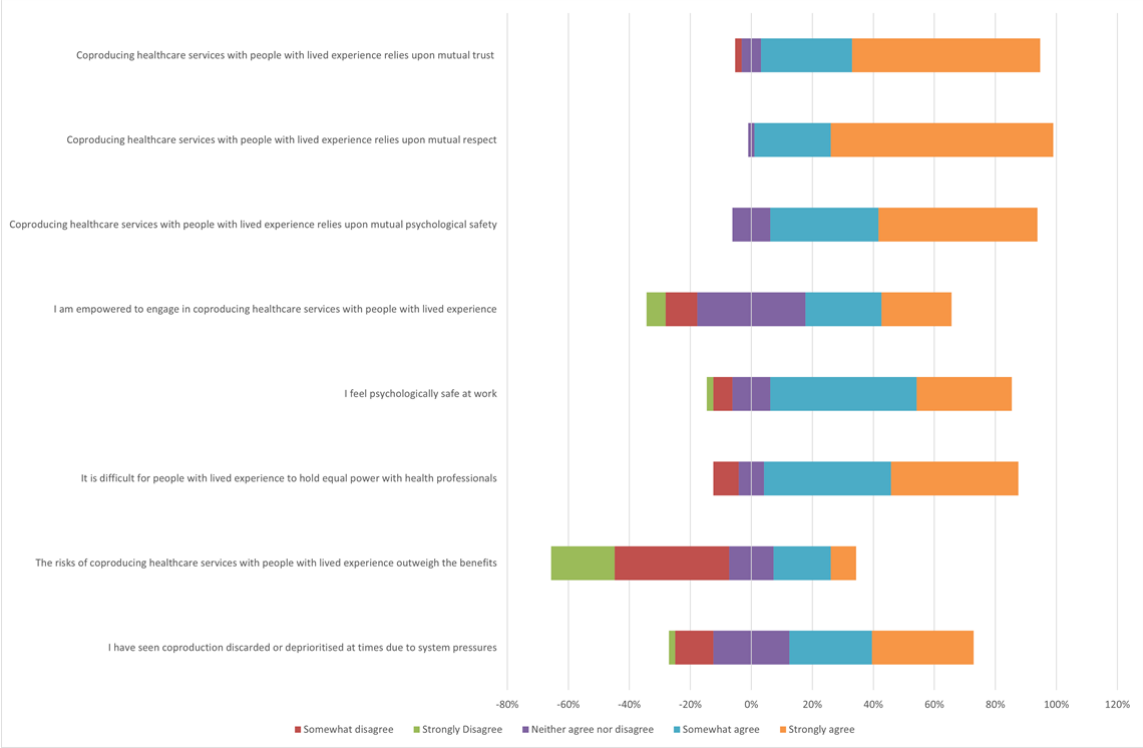


Figure 14. Survey findings aligned to theme: Culture.

Table 7. Survey findings aligned to culture

Theme	Results
Culture	92% of respondents somewhat or strongly agreed that coproducing healthcare services with people with lived experience relies upon mutual trust.
	98% of respondents somewhat or strongly agreed that coproducing healthcare services with people with lived experience relies upon mutual respect.
	88% of respondents somewhat or strongly agreed that coproducing healthcare services with people with lived experience relies upon mutual psychological safety.
	48% of respondents somewhat or strongly agreed that they are empowered to engage in coproducing healthcare services with people with lived experience.
	79% of respondents somewhat or strongly agreed that they feel psychologically safe at work.
	84% of respondents somewhat or strongly agreed that it is difficult for people with lived experience to hold equal power with health professionals.
	58% of respondents somewhat or strongly disagreed that the risks of coproducing healthcare services with people with lived experience outweigh the benefits.
	60% of respondents somewhat or strongly agreed that they had seen coproduction discarded or deprioritised at times due to system pressures.

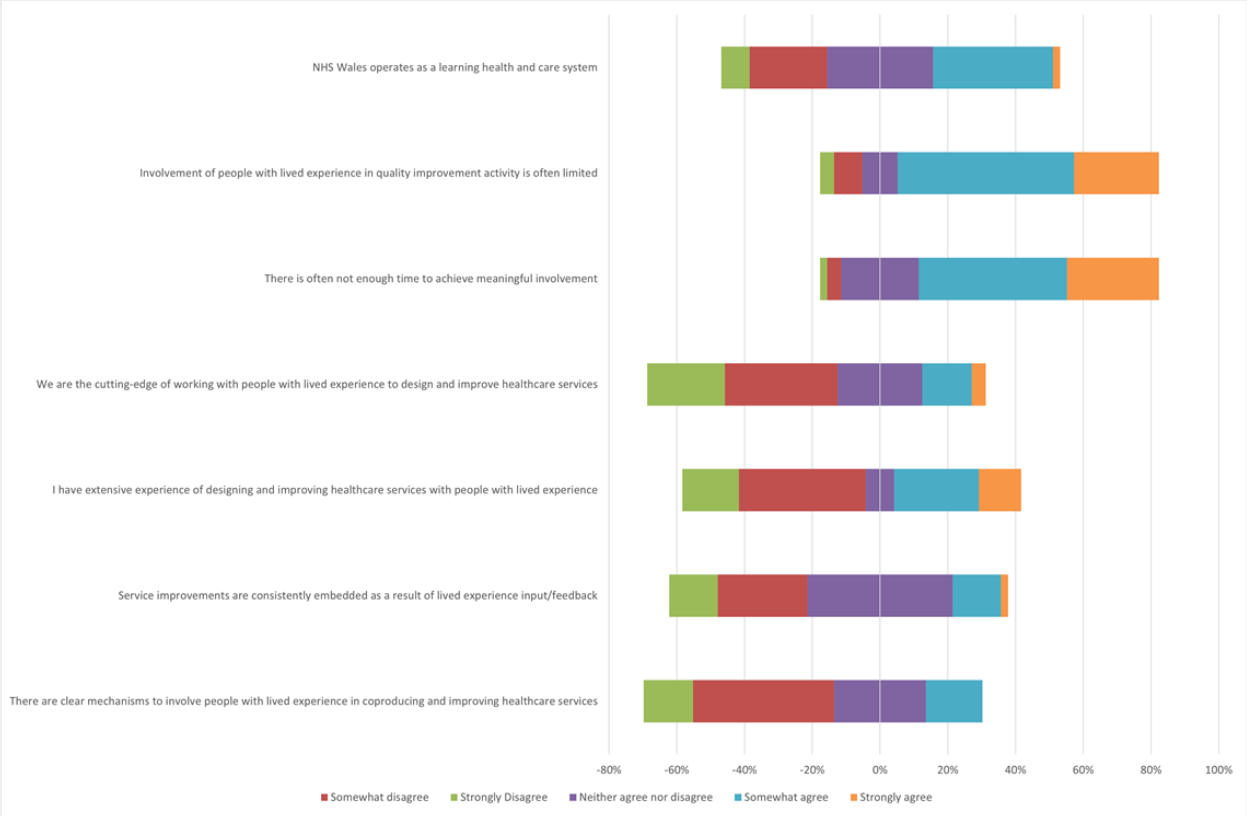


Figure 15. Survey findings aligned to theme: Current practice.

Table 8. Survey findings aligned to current practice

Theme	Results
Current practice	37% of respondents somewhat or strongly agreed that NHS Wales operates as a learning health and care system, while 31% somewhat or strongly disagreed.
	77% of respondents somewhat or strongly agreed that involvement of people with lived experience in quality improvement activity is often limited.
	71% of respondents somewhat or strongly agreed that there is often not enough time to achieve meaningful involvement.
	56% of respondents somewhat or strongly disagreed that we are at the cutting edge of working with people with lived experience to design and improve healthcare services.
	55% of respondents somewhat or strongly disagreed that they had extensive experience of designing and improving healthcare services with people with lived experience.
	42% of respondents somewhat or strongly disagreed that service improvements are consistently embedded as a result of lived experience input/feedback, with a further 44% neither agreeing nor disagreeing.
	57% of respondents somewhat or strongly disagreed that there are clear mechanisms to involve people with lived experience in coproducing and improving healthcare services.

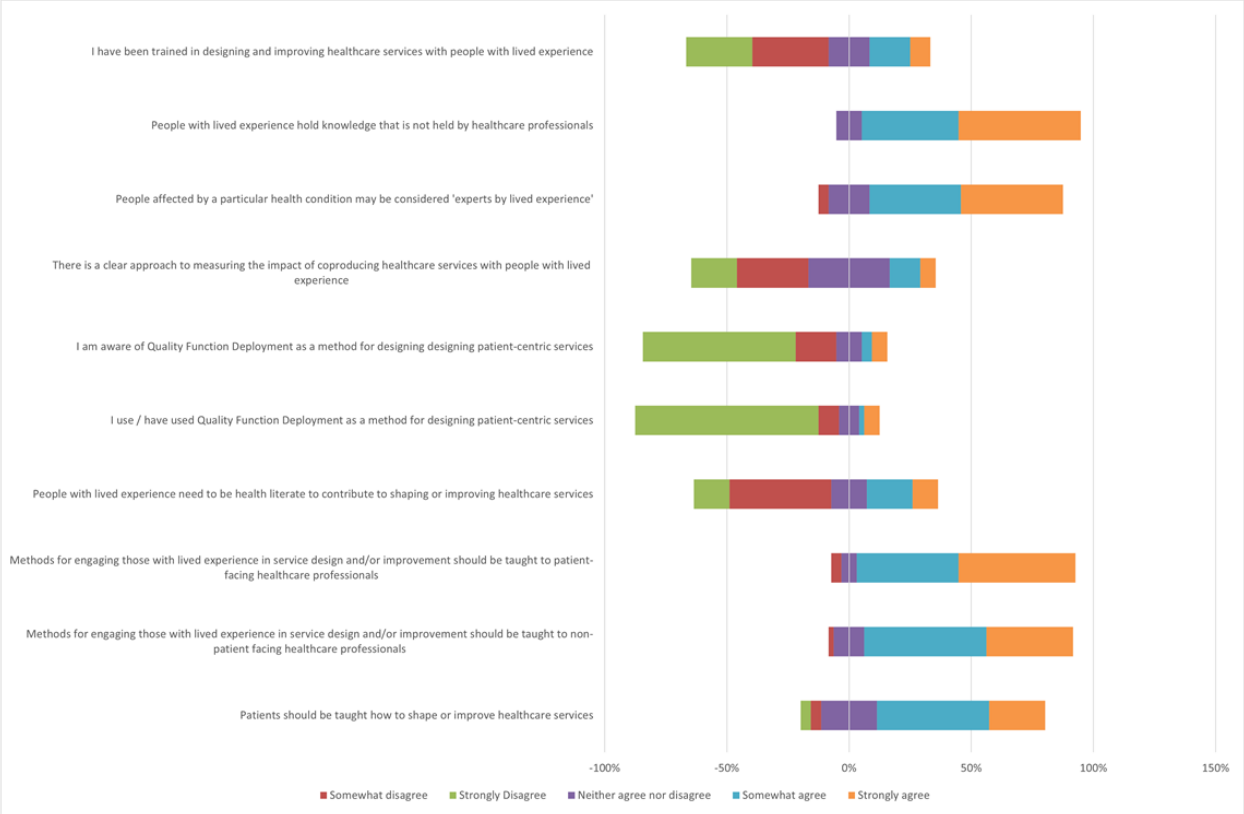


Figure 16. Survey findings aligned to theme: Skills and knowledge.

Table 9. Survey findings aligned to skills and knowledge

Theme	Results
Skills and knowledge	58% of respondents somewhat or strongly disagreed that they have been trained in designing and improving healthcare services with people with lived experience.
	90% of respondents somewhat or strongly agreed that people with lived experience hold knowledge that is not held by healthcare professionals.
	80% of respondents somewhat or strongly agreed that people affected by a particular health condition may be considered 'experts by lived experience'.
	48% of respondents somewhat or strongly disagreed that there is a clear approach to measuring the impact of coproducing healthcare services with people with lived experience.
	80% of respondents somewhat or strongly disagreed that they are aware of Quality Function Deployment as a method for designing patient-centric services.
	81% of respondents somewhat or strongly disagreed that they use / have used Quality Function Deployment as a method for designing patient-centric services.
	57% of respondents somewhat or strongly disagreed that people with lived experience need to be health literate to contribute to shaping or improving healthcare services.
	90% of respondents somewhat or strongly agreed that methods for engaging those with lived experience in service design and/or improvement should be taught to patient-facing healthcare professionals.
	85% of respondents somewhat or strongly agreed that methods for engaging those with lived experience in service design and/or improvement should be taught to non-patient facing healthcare professionals.
	69% of respondents somewhat or strongly agreed that patients should be taught how to shape or improve healthcare services.

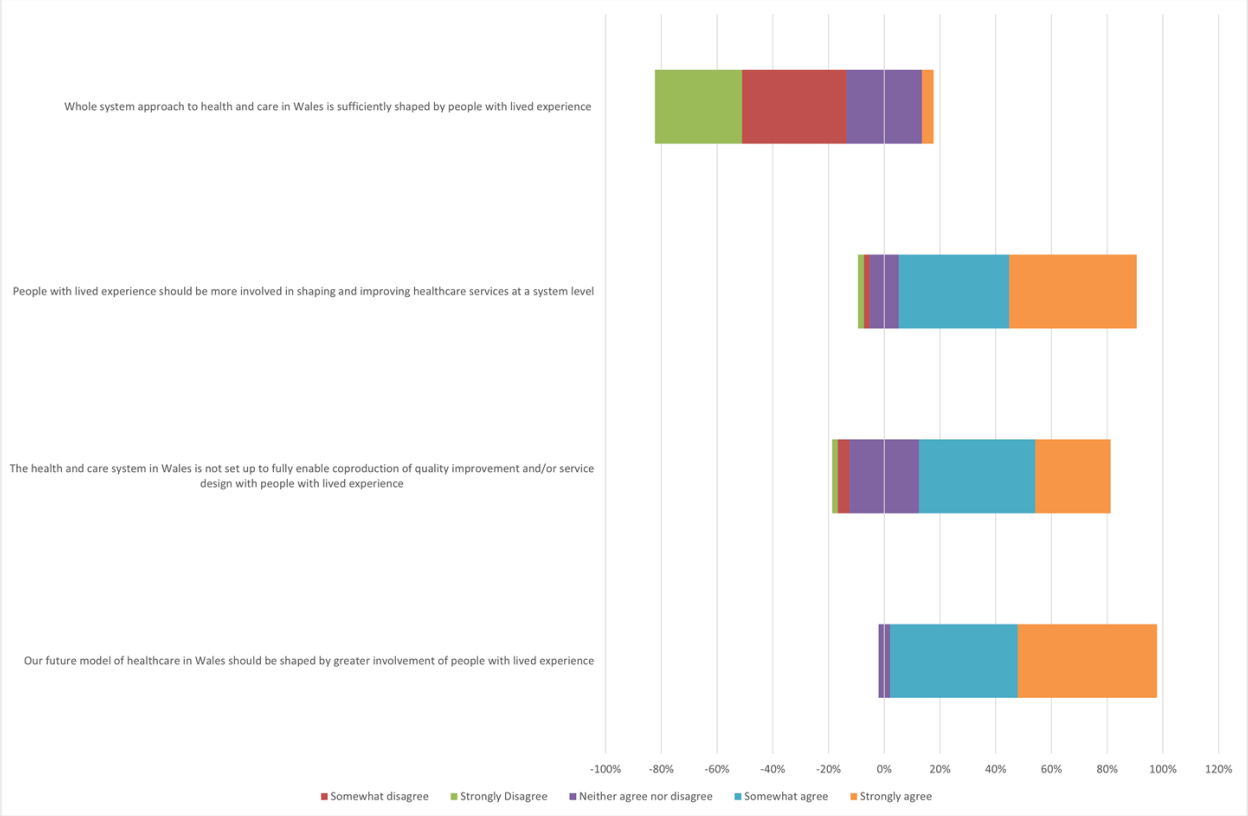


Figure 17. Survey findings aligned to theme: System.

Table 10. Survey findings aligned to system perspective

Theme	Results
System perspective	69% of respondents somewhat or strongly disagreed that the whole system approach to health and care in Wales is sufficiently shaped by people with lived experience.
	86% of respondents somewhat or strongly agreed that people with lived experience should be more involved in shaping and improving healthcare services at a system level.
	69% of respondents somewhat or strongly agreed that the health and care system in Wales is not set up to fully enable coproduction of quality improvement and/or service design with people with lived experience.
	96% of respondents somewhat or strongly agreed that our future model of healthcare in Wales should be shaped by greater involvement of people with lived experience.

Survey participants were also asked:

> **'Is there anything else you would like to share about your views on the barriers and enablers for incorporating lived experiences to improve the quality of healthcare services in Wales?'.**

The responses (n=14) were thematically analysed as outlined in Fig.18.

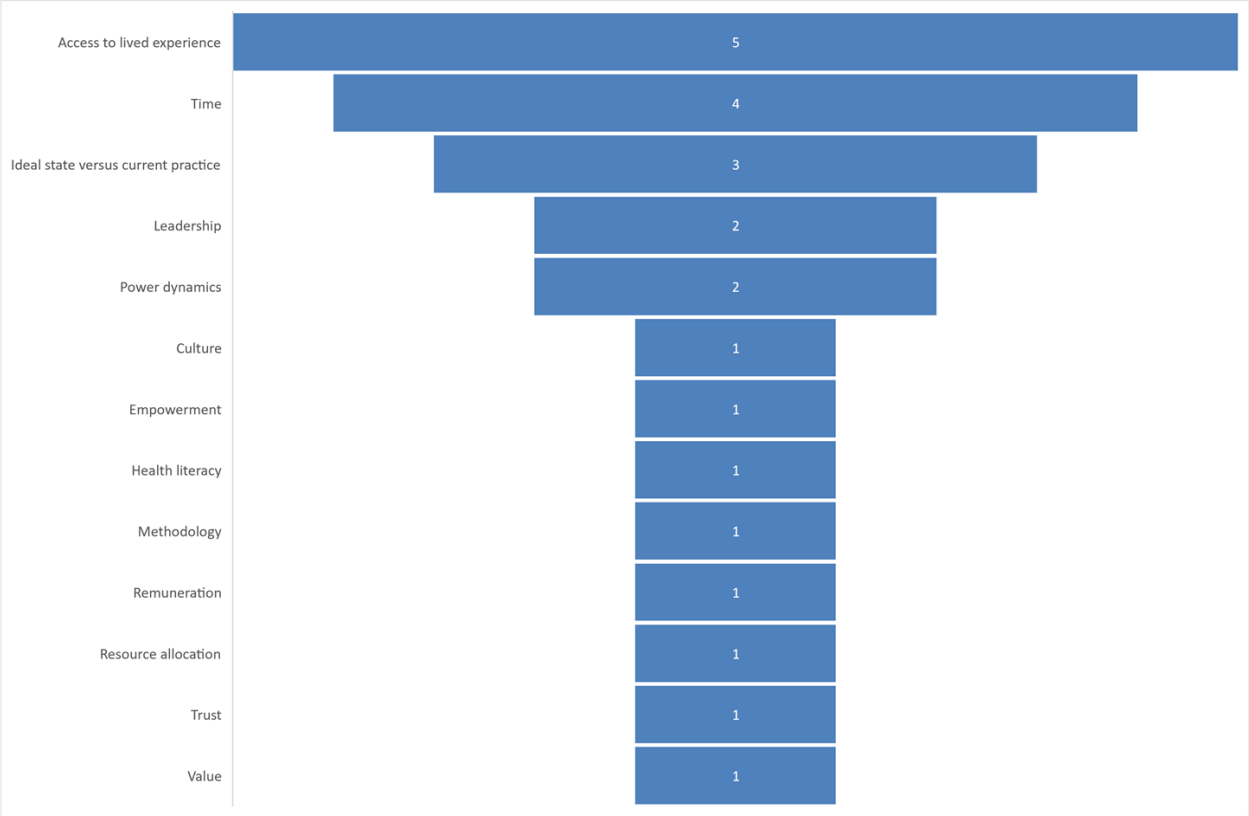


Figure 18. Themes from qualitative responses to survey.

Table 11. Themes from qualitative responses to survey

Theme	Quotation(s)	Comment
Access to lived experience	Having access to people who are willing to engage and be part of service design especially children and young people, there seems to be lots of barriers to achieving this with children and young people'. 'We need to think about how to engage people who are hard to reach, especially those with mental health conditions, dementia and so on'. 'Think more needs to be done to get a diversity of voices (particularly diverse class backgrounds) involved'. 'Greater variety of means to engage with service design is needed and this approach requires continuity, lasting commitment, appropriate funding and measurable outputs'.	
Time	'As an unpaid carer for someone with a learning disability who has also organised events to co-produce strategic documents, I feel that a lot of the nuances are lost when we talk about co-production. Fundamentally, I don't think professionals appreciate people's time enough. I think professionals often assume unpaid carers / people with lived experience will want to / should want to, give up their time to be involved in co-production efforts. Often, professionals don't "get" that these people have very little time to themselves (for example if they're caring) and receive numerous requests from different agencies all the time'. 'Time, empowerment, accessibility (in terms of outreach and stiffness of governance) and trust can frequently act as the bi-directional forces (barrier & enabler- often different sides of the same coin)'. 'Insufficient time and resource is allocated to determining what actually matters at a population and system level'. 'We spend far too little time doing it'.	Time needs to be considered both from a system perspective and from a patient perspective.
Ideal state versus current practice	'Although lots of theory around the importance, the practicality of this is difficult to achieve in reality'.	Recognition that system barriers prevent

	'At the moment, many services, statutory or non-statutory, face barriers which limit their ability to ensure lived experience informs every aspect of service design and delivery - we currently deliver what is possible, rather than what is desirable'. 'Whilst the intention should always be for coproduction of improved healthcare, there are often system barriers and individuals (health care professionals) that are not aligned for the common goal of improved healthcare and the patients experience'.	integration of lived experience into service design and improvement.
Leadership	'There is little support for staff or patients to co-produce care. There is active antagonism to User Centered Design for digital healthcare by [NHS Wales organisation] leadership'. 'Organisation leadership and cultures plays a massive part with barriers and facitlators' (sic).	Leadership and culture are key enablers.
Power dynamics	'Think more needs to be done to […] find people that challenge beliefs and values of healthcare providers. It's too easy to find people that are like you to work with and the power dynamics make it difficult for people who disagree to be heard, but that's where the change really needs to happen'. 'If you did give up your time, if you didn't hear back on what the outcome was, how would you feel? Would you want to give up your time again? How would you feel if you didn't actually have any control over the decisions being made? I think too often we are quick to say things are "co-produced" when actually what we're doing is consultation. The definition of co-production includes co-decision making and from what I can see we're nowhere near'.	Organisations need to share power with people with lived experience and share decisions.
Culture	See above quote 13.	
Empowerment	See above quote 6.	
Health literacy	'We do not support and enable health literacy, even from school age'.	Baseline skill level needed for patients to engage?
Methodology	'We do not follow a robust method. We retrofit what we think the patient wants'.	Service design is not user-led.
Remuneration	'Let's say you're caring and the person you look after goes to the day centre 1-day a week for you to have some time to yourself. Would you want to give up 2 hours of your time, unpaid, to tell people (who are being paid to be there) how to do their jobs better / do their work for them? […] People need remuneration and greater transparency'.	
Resource allocation	See above quote 7.	
Trust	See above quote 6.	
Value	'I think we are our own biggest barrier - by not making the people helping us feel valued, they won't want to engage with us in future'.	Impact of experience (if patients feel valued) upon future engagement.

Interviews

Semi-structured interviews (see Appendix C for questions) were conducted with six informants who each are employed by a different organisation in Wales.

Background

Each of the informants was asked to describe their background and role in improving the quality of healthcare services in Wales. Five informants work for an NHS Wales health board or trust, and the remaining informant works at an academic institution in Wales. Several informants have held long careers spanning multiple roles and sectors and therefore hold a breadth of relevant expertise and knowledge.

Quality drivers

Several themes emerged when informants were asked to outline the main drivers for improving the quality of Welsh healthcare services (Table 12).

Political drivers were explicitly and implicitly highlighted; explicit references included legislation and government direction, whereas implicit references included current system failures and waiting lists which

are the subject of Welsh government transformation initiatives (Senedd Research, 2024; Welsh Government, 2022).

Table 12. Main drivers for improving healthcare service quality in Wales

Informant	Summary of response
1	Policies, national guidance, strategic programmes, recruitment, retention, workforce planning, understanding population health, service redesign post-Covid, legislation, social factors (e.g. wider determinants of health), public expectations, finance, public health concerns (e.g. antimicrobial stewardship).
2	Achieving better outcomes for the patients and the families, or the public of Wales. Dichotomy between individual and population outcomes.
3	Funding - cuts to services; the need to improve current services. Reducing waiting lists. Patient experience. Delivering services that meet user needs. Prevention agenda.
4	Finance. Personal motivation of staff. Drive for efficiency. Key performance indicators (KPIs). Focus on measurement (not what matters to patients).
5	Government direction and targets. Professional body endorsement for changes. Drives for efficiencies. Progression in total quality management terms - understand user needs.
6	Current system failure e.g. long waiting lists. Staff motivation.

Two informants cited staff motivation as a key driver:

> *'ultimately I think when we get up in the morning, there's something that makes people want to make something better with the work that they do.'*

Drawing upon a comparison with Japan where efficiency and effectiveness drive industries such as manufacturing, one informant said of Wales:

> *'our motivation […] is much more linked to that kind of passion to do things and for others, more than some sort of drive to be, you know, the same all the time, right? Which is a shame really 'cause I think that one of the biggest problems that we've got at the moment is our failure to be consistent in in doing things. […which] I think is driving failure in general.'*

While some informants referenced patient outcomes, experiences and public expectations, others reflected that these are not strong enough drivers in current practice:

> *'the drive sometimes is that we all want to do something to have an impact, but it's not necessarily what we should be doing because we're not double checking […] what patients say that means that's important.'*

> *'how can we actually say we've got a good service when we've never asked the service user what they want and we haven't actually got a clue what the service user is in some worlds?'*

Lived experience and learning health and care system

Informants were asked: 'what would you say the role is for people with lived experience within a learning health and care system?'. One stated *'the patient should be at the centre of everything we do, that is embedded in my blood'*. Benefits noted by others included:

> *'If I'm totally honest, this is the last untapped natural resource of real value in a healthcare system'.*

> *'Even if we got 10% more value by listening to the patients, you get 50% more value and efficiency in PREMs and probably PROMs'.*

'You might have something in six months that you might think differently [about] because you've had the opportunity to listen to people there. And for me, I think that's a bit that we're missing. Yes, it's about quality improvement. It's about changing the system, but more than that, it's about learning and understanding'.

However, several themes emerged when informants reflected on how well this is realised in current practice (Table 13).

Table 13. Themes from current practice regarding lived experience

Theme	Comment	Quotation(s)
Power dynamics	Power imbalance in current practice. Recognition that system changes need	*'I observe on a daily basis senior managers making decisions without talking to staff, without talking to patients and viewing the other people's participation in the decision making as irritating and interfering with their own with their own godliness of how they do this'.*

	to be made *with* people.	*'the onus for improvement and quality improvement should really be where the power lies because it is a very lopsided power relationship, isn't it? And it shouldn't be, but it is because that's just the system that we work in. So I think the driving force and the willingness to improve services, but not only services, you know, processes, everything, that has to come from the people that have the responsibility for changing those services […] But we have to change it with people. And for people, rather than just doing. So, it's moving from that, "doing to" to "doing with"'.*
'Doing to' not 'doing with'	In practice, service design and improvement is often led by healthcare professionals without input of service users.	*'Everybody sees the patient as the object. So we've decided that this is the way the service should look and we're going to ask the patient afterwards what they thought of it, right. We want to make the service look like this. I don't really understand why I have to talk to the patient at all. Right. And this I think is fundamentally the problem in the way that that we deliver health services, is that we view the patient as the object and not the partner or collaborator in their own health'.* *'We can't cope with the struggle and we're trying to make those changes because we can't cope this end, but we're not making maybe the right changes for the patient ultimately'.* *'Everybody comes at it from the view that just doesn't adopt the patient's perspective'.*
Lived experience within workforce is underutilised	Recognition that professionals are also consumers of healthcare services and have own lived experience.	*'people have got a lot to offer with their individual experiences of, we're all users of healthcare somewhere along the lines, aren't they. Even if we only go to the GP […] if you get involved in improvement work as a patient, you are doing something for somebody else and if we can try and like harbour that even in our workforce, it's something about doing that in your workforce as well'.*
Informed patients	Suggests that people with lived experience need to understand the healthcare system to help with service improvement and/or design.	*'We learn from our patients, but we also have to have an informed patient cohort as well. They have to be on the journey with us. […] they have to understand our barriers and our opportunities because they play a key role in that. And an example of that is antimicrobial stewardship public health. You know, that starts with the patient being informed, educated to be able to make choices'.* *'An informed patient is a powerful patient'.*

Enablers and Barriers

Informants were asked to describe, at a system level, the enablers for co-producing improvements in quality or co-designing services with people with lived experience. The following themes emerged (Table 14).

Table 14. Themes on enablers

Theme	Comment	Quotation(s)
Common understanding of coproduction	Examples given of where work is labelled as coproduced but does not follow the principles of coproduction.	*'We don't operate to a single definition of coproduction in the NHS […] Coproduction is not bringing someone in to listen to that experience, thanking them for their experience and then developing an action plan off book which is going to be delivered by another group of professionals, which is only going to be monitored by a group of professionals'.* *'What we tend to do is have the evidence, develop, know what we want to do and then go into communities and say this is what we want. What do you think? Or this is the website, what do you think of the colours? That's not coproduction'.* *'It's not coproduction unless […] patients are involved in the delivery of a service and you're sharing […] decisions'.*
Ability to relinquish power	Linked to earlier section on power dynamics. An organisation's ability to relinquish some of its power to people with lived experience is a key enabler. There needs to be flexibility to enable outputs and services to be shaped by user needs and wants.	*'The biggest enabler […] has to be the ability from the organisation, sorry, to relinquish power'.* *'What we should be doing is going into these communities with the evidence, presenting the evidence to them, and then saying to them, how can we solve this and then really allow them to take the lead and solve it with our support. […] Organisations [need to] realise that what you initially intended may not be what you end up with at the end and I don't think we as organisations are mature enough'.*

Access to people with lived experience as a collective	A single lived experience (e.g. a patient representative) is insufficient on its own to shape the pathway for multiple types of service users, and therefore a multitude of groups needs to be engaged.	*'I think it's collectivising the service users, profiling them so we can sort them into little subgroups. So the digitally literate versus the digitally illiterate or the ones that are more likely to have a social network around them to ones that are isolated'.* *'[I'm told] "we want a patient partner". And I'm like, yeah, that's great. That's one person. And they're only ever going to come from their perspective'.* *'You often find the same amount, the same type of people will always have a voice and sometimes it's the unheard voice that potentially could have the right answer and [it's] how we reach out to those patients'*
Understanding user needs from the outset	Service design and improvement should start with gaining a comprehensive and empathetic understanding of service user needs.	*'In an ideal situation, I think it would be if you decided you wanted to make a change or a quality improvement, […] that you actually went out there and engaged with the patients at the time before you go ahead and do anything, to understand what the challenges are for them. […] So that you really understand from the patient's perspective what needs to change'.* *'With our patient populations, I suppose it's really difficult because we're talking about, you know, a huge scale. But it's understanding your area, your community, the culture of your community, and you know what are their barriers and challenges'.* *'[People with lived experience] should be involved at the beginning because they are our experts aren't they, and then we get our experts to respond to it, rather than the experts choose and then patients respond because that's what we do'.*
Staff capability (knowledge)	A key enabler is staff having the right skills and knowledge to engage people with lived experience in service design and/or improvement.	*'I think it's training of the senior clinicians in listening and understanding. We don't teach people design techniques. If you look across Wales, we've taught people how to problem solve, but we don't teach them how to design right first time so there's no need to problem solve'.* *'I think the number one problem is that nobody actually designs services'.* *'The first job is to actually work out what they do in terms of mapping services. And one of the reasons they don't do that is that they haven't been trained in mapping services […] fundamentally, the skill and the desire to actually map your service and know how things work for you is removed at some point in in the career of NHS management and staff'.*
Patient capability (knowledge)	Informants felt strongly that people with lived experience also need knowledge of the system to contextualise their input, and its feasibility.	*'I think it's training of them as well so that they understand their impact and what they consider to be insignificant is probably not'.* *'We can guide them and say OK, that's a fantastic idea. But you know it needs to XY and Z to fit into the NHS system'.* *'The difficulty you have is not every patient wants to be engaged. And the ones that do sometimes aren't the most… they're the loudest speaking rather than the ones that understand the system as much. Do you know what I mean? So sometimes [you] don't get the right people that you want to coproduce with'.*
Staff motivation	See below also under measuring impact: Staff satisfaction / happiness at work	*'you've got to know your team to be able to understand what their drivers are'.*
Patient motivation	Important for people with lived experience to understand what will happen as a result of their engagement. Without this, it is felt that they will be less likely to engage.	*'Patients are more willing to engage if they understand the why, you know, and they're going to have some feedback and it's the "so what?" isn't it? […] the "So what?" often isn't there'.* *'Because we ask afterwards, don't we? And we go oh, how was it for you? And I get them all the text messages and I just think I'm not going to fill that in. […] because I'm like, well, what are you going to do with it because you're never going to come back to me and tell me about what you've got from it'.*
Leadership	For lived experience to become more embedded in current practice, ways of working need to change which must be supported by leaders.	*'If you've got leadership that is open to challenge, open to thinking about different ways of working, then coproduction can work'.* *'Leadership is where you make the biggest difference. So that's for me […] everybody trusting people to have an idea and to try it out'.*

Culture of trust	Key enabler also highlighted in literature review.	*'Trust is a biggie, you know. So we can trust what patients say. We might not like it, but we've got to trust it and we've got to trust what staff say'.*
Adaptive governance systems		*'It will be the speed at which our governance systems can adjust to accept what is a safe process of care for people with [a particular] typology'.*

Informants were also asked to describe the barriers to co-producing improvements in quality or co-designing services with people with lived experience, some of which were the inverse of enablers listed above such as not understanding user needs. New themes, however, were also identified (Table 15).

Table 15. Themes on barriers

Theme	Comment	Quotation(s)
Lived experience considered secondary to service priorities	Highlights potential misalignment between how service priorities are set versus user needs.	*'I suppose it's when you've got your priorities set as a service. How is that then aligning to what is going on in the community? Because it might be completely amiss to what people are saying, you know, in the local shop'.*
Welsh Government	As above, potential misalignment with user needs.	*'I think it's not helpful having an NHS so closely linked to government and government policy. […] you end up doing things that are a Minister's priority but not necessarily the best thing in terms of what the evidence and community say'.*
Lack of intelligence from lived experience to realise service change	Consideration needed for what the threshold is regarding number of lived experiences to enable change / feed into design.	*'It's very difficult sometimes to make service changes based on a small number or perhaps individual patient stories. Because you could be making changes that are just pertinent to one person. […] A barrier would be lack of intelligence really, enough intelligence for that lived experience to inform any sort of mass further change'.* *'You wouldn't change a system based on a single lived story, because obviously if you've got an outpatient department and you're seeing 1000 people a day, you're not going to change that outpatients for one person's experience. But you can learn from it'.*
Time/resource	Most frequently mentioned, but as time is finite we can only create time by stopping doing other things or invest further human resource into the system.	*'Unless you had a lot of people saying the same thing and then you could make a service change. But if you want to do that on a scale, you'd need resource so resource would be the barrier. You'd need time to sit with the patients' [to obtain the lived experiences].* *'Time is a huge [one], you know if you are to consult and to bring the public in on something and you're doing a group session with the public, it's the time, the planning, the organisation that goes into that and then it's the considerations of the different types of people that you need to engage with'.* *'Time from the staff side that they all think it's not worth the transaction. How many hours do I have to put into it? What benefits will I get?'* *'Time is a problem […] operational teams […] are locked into much of what they do by the system that they operate within and the expectations of that system'.*
Short term delivery focus	Current ways of working align to short-term problem solving to address acute issues. Longer term focus is needed for meaningful engagement to deliver and improve person-centred services.	*'They [staff] think too short term'.* *'Our planning cycle for the NHS is, is bonkers […] And not conducive to coproducing any long-term solutions with communities. […] 12-month operational plans [are] not conducive to any sort of partnership working, let alone working with communities so I think for me that has to be the biggest barrier'.* *'You know there's a saying, isn't it? That that if you invest £1.00 in prevention, you'll save X amount in treatment but in order to do that you need to have the money and the time to do so. So how do we move an NHS system that is very focused on delivering for here and now to think about delivering for 20 years' time. There is a huge challenge'.* *'The way we do work is: problem, solve it. Problem, solve it, problem, solve it right? So we create unstable processes where we create an unstable system and we maintain that unstable system by failing to deal with the problem, which is the way that we are working in the first place'.*
Contextual pressures on services	Recognition that engaging with people with lived experience is not prioritised in some areas (e.g.	*'Staff are so under pressure and quite often we need that clinical input into lots of the stuff that we're doing, lots of the quality improvement, lots of the patient experience you need that clinical input. And if you haven't got that, it's not as credible […] services are stretched, they're really stretched'.*

	acute settings) due to system pressures.	*'There's definitely some services that I think could be influenced more; planned services, more perhaps educational health promotion platforms than perhaps unplanned care, unscheduled care where it's very quick firefighting and things aren't always the ideal situation. So I think the barriers are the environment, the type of service'.* *'We're just not mindful that when you're talking about health boards, you can't close down an A&E to coproduce a project, you have to deliver a service. You can't pause some of their clinical work. But then equally you can't free up resources, so it's that real challenge, isn't it?'.*
Fear of failure	Requires a supportive culture (see above enabler: Leadership).	*'We're worried about litigation, aren't we? We're worried about somebody coming back and going, "That wasn't perfect". But actually, I think we expect a lot of people now, but I also think if you treat people well, even if it's not perfect, they'll still know, they'll still have a good experience'.* *'It's a fear of failure I'm sure it is. We don't celebrate failure as being a good thing to learn from'.*
Lack of staff confidence	Even with willingness and skills in some cases, staff lack confidence when it comes to engaging people and their lived experiences to improve or design services.	*It is 'not a lack of willingness, just a lack of confidence'.* *'And we can do it together, be great, because it's quite scary trying to do [process mapping] on your own'.*

Actions to strengthen

When informants were asked to provide tangible actions to strengthen the input of lived experiences into improving the quality of healthcare services in Wales, the following themes emerged (Table 16).

Table 16. Themes on strengthening lived experiences for quality services

Theme	Comment	Quotation(s)
Define parameters for 'valuable' lived experience	As services change over time, a cut-off point is suggested when using lived experience for service development or improvement.	*'When we sort of narrow it down to lived experience of a service, […] I do think that that we have a role in defining it even further. So in order for that type of lived experience to be valuable, it has to be fairly recent. […] Five years […] would be a good cut off point'.*
Create opportunities for sharing learning	Highlights potential for identifying what elements of good lived experience could be translated into other services. Role identified for case studies and sharing this knowledge into education of patient-facing healthcare professionals.	*A 'platform' to 'share learning for other services as well […] especially if we can get them involved to say this was part of a quality improvement, this patient's lived experience led us on to deliver XY and Z […] What's working well in this service that we can have this, you know, influence in this really good lived experience in this patient that we can influence in another service?'.* *'Some good benchmark role models, some good before and after cases would be spot on.* *This is what you did. This is what I told you I wanted on a mental health crisis unit. And this is what the unit did in response. That would be really powerful and put that back into nurse education and doctor education, senior laboratory team education. That would be brilliant because I think at the moment people, people see process improvements, but it doesn't mean much. Oh, you can do another 30 tests today. I can't translate that to anything I do that's patient facing'.*
Mandate lived experience into policy and ways of working	Suggested that lived experience is mandated for services. The Duty of Quality does place a legal requirement upon organisations to deliver services aligned to user needs, though these findings	*'We have to appreciate that people are really, really busy. So they only really follow things that they have to follow that are laid out in legislational policy. So to a degree, you have to mandate things. So I think I think having lived experience intertwined into policy, I think, would really propel it. […] I think the next step is how do we ensure that people and organisations are following and we do that by reporting requirements'.* *'I think every single department should prove that they are delivering to the lived experience of the patient. And I think that also includes getting the indirect staff there as well'.*

	could suggest that the requirements are not yet fully embedded in practice.	*'It needs to be completely and utterly central to, in allowing a decision to be made. […] If you bring a business case for change and investment - whether that is a cost neutral business case or otherwise, if you have a feature of the process must be to engage with people about the thing, not to engage with them at the back end, like asking their opinion about what you've done and putting it in the feedback form, but to include them in the process.[…] Let's look equality impact assessments is another interesting one on this front right and quality impact assessment'.*
Create safe and 'brave' spaces for staff and people with lived experience	Linked to psychological safety (cf. literature review).	*'We need to challenge our own assumptions. So we need to get into that space of being able to challenge our own assumptions, which means it has to be safe and brave, doesn't it?'.*

Understanding of methodology

None of the informants believe that there is a common understanding of what methodologies can be used to design or improve person-centred services. One informant felt that there is a danger of overcomplicating the process, where instead we need to *'do the basics of "let's have a conversation"'*, though this view was not held by others. Several themes emerged from discussions (Table 17).

Table 17. Themes on methodologies

Theme	Comment	Quotation(s)
Education	Lack of opportunities to gain knowledge of the methodologies. Baseline knowledge suggested: Failure Modes Effect Analysis (FMEA), Kano and Quality Function Deployment (QFD).	*'We don't have methodology, […] it's not taught'.* *'People are so busy that they're not looking unless they're actively doing something specific around a project […] I think generally, people don't know what's out there. […] You don't see any frontline staff going on those because they can't be spared or there's no funding for them to go or they're told there's no expenses for them to go'.* *'We should certainly know the FMEA risk analysis because that's what goes wrong with our current process […] but that's not totally patient focused. So we're going to need the Kano model. When we come to investing millions of pounds in a new service we don't, we lack QFD in the house of quality, the real deep one that would unpack everything. […] And probably some type of methodology where they have to fill in have you done an analysis of the lived experience of your patients? If so, how many patients? And what did you find?'*
Transferring knowledge into practice	Gap between knowing and doing.	*'We tend to see perhaps somebody in a leadership role, that's […] done some education training and understand the methodology and they will bring that in. And that's great because they can potentially influence and share that learning with their teams. But I don't think it's something that's standardised enough because we're often asked to deliver projects, whether you've got that experience training or not, but you're going to be delivering on it so often you can be then just sort of finding your way through the dark and learning your lessons as you go along by making mistakes, which isn't ideal, it wastes time, it reduces efficiency'.* *'I've learned a lot on the innovation transformation [MSc]. But even I still feel as if I haven't had enough experience delivering some of that methodology and that sort of process, you know, I just, I haven't had that sort of interface of taking the education into practice'* *'So we all do these […] Masters [degrees] but we don't get to use it, do we? And I really really want to be able to see it, use it and to try and kind of work my way around it in a real life scenario, not in a made-up one'.*
Language	Need to consider how language impacts engagement.	*'We have this old patient experience set of questions, which we reviewed as part of the work that I'm doing. One of the questions in there was to do with Welsh language. So if you wanted to speak Welsh, were you able to? And then a likert scale.* *I managed to get that changed. So it now asks: what is your preferred language of communication? And we offer, I think, 12 languages based on the ONS [Office for National Statistics] results so people can pick with 'other'. And then we ask: were you able to communicate in your preferred language?'*

Measuring impact

Informants were asked how we might measure the impact of coproducing healthcare services with people with lived experiences, and the following themes emerged (Table 18).

Table 18. Themes on measuring impact

Theme	Comment	Quotation(s)
Patient reported outcome measures (PROMs) and patient reported experience measures (PREMs)	Mentioned most frequently though current practice does not seem to use these metrics to inform service improvement and design (see below).	*'those PROMs and those PREMs will be your easiest best way to measure the differences and whether it makes any impact'* *'Every single PREMs type survey and staff survey would be in an upward trajectory'.*
Lack of using intelligence to influence service change	No mechanism to feed collected metrics back into service improvement and design.	*'I like the PROMs and the PREMs stuff that is happening [but] I don't see much evidence of it being particularly clever. I don't see much evidence outside of a few people that I've spoken to that they are using that as a way of making decisions about what to do in the first place'.* *'One of the things that astounded me was the complete absence of any follow up following operations right? Not helping people with recovery or anything like that. You know, but basically just knowing whether the operation was successful or not. Did it improve anything? […] the complete absence of that kind of contribution to service improvement and development has been a long long term amazement and amusement for me'.*
Timing of measures	Current practice attempts to measure impact at the end of the process, without clarity upfront.	*'You need to ask on a regular enough basis, not right at the end. We tend to just do the right at the end bit'.* *'These things do tend to be a little bit back end […] I've seen things like the people setting their objectives before they go into a conversation. I've only really seen that happen once. […] people are walking into that conversation with a little form in front of them, you know? Tell me about what you'd like to get out of today's conversation. So the clinician has a piece of paper in front of them and they start there. And I think that, you know, just doing that would be helpful'.*
Measures must be meaningful	Success should be measured against what matters to the people with lived experience, and their experience of being involved in the process.	*'An outcome for me […] is not that we produced an evidence piece and published on our website. It's also not how many people have visited that website. We need to find a way of how is this impacted on, how is this report for example impacted on ultimately, the lives of people in Wales, but after this the system as well. […] We're still using hits on websites and hits on websites doesn't tell you anything'.* *'For me, it's just knowing […] what the problem is you're trying to solve, that's the really important bit and then you measure against that, not how many people [were] in the room'.* *'The outcome measures [PROMs] are not linked necessarily to the outcomes that the patient wanted. They're linked to a[n] academically validated questionnaire. Yep. So things spring to mind might be things like EQ5L5D. […] how well do you feel today? Great. […] What you what you want to do is look at what you initially wanted, make sure that you're getting the process or the procedure or the support that you wanted to get to achieve what you wanted'.* *'When it comes to coproduction work it's like well you know, how were you treated? Do you feel you were respected?'*
Staff satisfaction / happiness at work	Ability to connect staff to sense of purpose / what called them into the profession	*'Your patients are going to be happy and you're going to get better experiences of dealing with your patients. So it's going to be better job satisfaction for you as well'.* *'Staff reported happiness at work, definitely'.* *'What patient stories do for me personally is they impact on my emotion. They motivate me. […] We know wellbeing of staff is so important now […] We can demonstrate that there's pockets of services that are doing really well and here's your patient telling you with that experience, I think it's really powerful, really powerful for our staff […] Staff benefit immensely from patient stories because to us that means more to us*

		than the performance metrics that we were all held accountable to […] [such as] four-hour waits'.
Reduction of cost and waste		*'You would reduce waste because it'll be a more comprehensive service […] if we could get it right the first time, that would mean that everyone was better off because financially we wouldn't be paying for those patients coming back through the system'.* *'We'd have less cost because we're not investigating things that went wrong'.* *'The opportunity cost of not doing it is high, probably up to 30% of the total operating costs of a hospital, I'd have thought. And that's all hidden capacity losses. What's the on cost per patient of not getting it right? That and a lot more'.*

Good practice

All informants struggled to provide an example of good practice (UK or international) where people with lived experience have influenced or shaped the quality of services. One said: '*I don't think any of us are doing it well. I still think it's very tokenistic'*. After reflection, another informant cited the hospital design of Gold Coast University Hospital in Australia:

> *'they were very good at the built environment and the lived experience. […] They did their one stop shopping in a horseshoe so that when you came to the hospital, the whole process was designed around you and you didn't walk very far and there weren't great big waiting areas. And you felt as if you were being seen as an individual.'*

Another felt that health research commissioners were helping the cause by tying lived experience into funding applications, with many making it mandatory for researchers to engage with people with lived experience.

One informant raised an example of how a significant care failing led to service change. Following his avoidable death in 2009, Paul Ridd's family and others campaigned for healthcare staff to be trained to deliver safer care for people with a learning disability; the training is now mandatory for all public-facing NHS Wales staff (NHS Wales Executive, n.d.). They explained:

> *'his family have really advocated that his voice continues to be heard through practice […] when we do have those catastrophic events, lessons do have to be learned, I do strongly believe it is non-negotiable.'*

Two informants highlighted that opportunities are often being missed to learn from other sectors, such as manufacturing and the third sector. One called upon their experience of learning from banking when establishing a client relation management system within healthcare:

> *'we engaged with Barclays Bank, their high net worth individual side of it. And some of the work that they were doing in terms of the culture, […] the expectation of records keeping, of constantly having contact with these individuals was absolutely fantastic. And you know you could take so much from there in terms of that patient element, yes, you don't have people with millions and millions of pounds, but that same culture around ensuring that notes are always up to date, ensuring that handovers are done properly, there's loads of elements that we can take over, but we don't.'*

Discussion

This study has highlighted the potential for healthcare services to be transformed by shifting the focus of service delivery towards understanding the needs of people with lived experience and shaping the design and delivery of NHS Wales services accordingly and in collaboration. This requires the ability of individuals (e.g. healthcare professionals) and organisations to relinquish some of their power in order to empower people with lived experience as equal partners within the process. As highlighted in the literature and confirmed through the study findings, this is perceived as difficult to achieve, however doing so is recognised as a key enabler towards embedding patients' lived experiences into co-design and co-development. Of the 80 informants for this study, all unanimously agreed that there is value in involving people with lived experience in quality improvement efforts.

While the benefit to patients is envisaged through services better aligned to needs, leading to better patient experience and, it is hoped, better outcomes, the study also uncovered a finding relating to staff morale. Half of the interview informants felt that increasing the engagement with patients by embedding lived experiences into service delivery would have a measurable impact upon staff satisfaction and happiness at work. Several referenced a link to meaning and purpose which links to IHI's Framework for Improving Joy in Work; Perlo et al. (2017) assert that 'the compassion and dedication of health care staff are key assets that, if nurtured and not impeded, can lead to joy as well as effective and empathetic care' (p.6). Given the ongoing challenges with staff retention in NHS Wales (RCN Wales, 2023), adopting the recommendations in this paper may also help support the workforce agenda.

Key Recommendations

The implications for NHS Wales:

- A clear research finding is that there is not a common understanding of methodologies that can be used to design or improve person-centred services. Therefore, the promotion of the right methods to interpret the 'lived experience' of patients and to equip NHS professionals and managers with access to such resources is a logical next step to improve services to be effective as well as efficient in delivery. Such capability building must, however, be supported with related capacity to use the newly-acquired skills in practice – and importantly, to increase staff confidence in this area.
- Key enablers for leaders to nurture are supportive cultures built upon trust and respect. Leaders also have a role in taking a longer-term perspective towards service design and improvement; findings showed that a perceived current barrier is a focus that is too short-term.
- NHS Wales should continue to promote the importance of psychological safety for staff (through e.g. use of IHI's Framework for Safe, Reliable and Effective Care to underpin national improvement efforts, Frankel et al., 2017) – but should extend promotion to highlight that people with lived experience need safe spaces too to feel comfortable in outlining their needs and current service failures.
- Opportunities for shared learning through, for example, identifying and sharing good practice case studies at a national level would help boost the lived experience agenda.

The implications for professionals:

- While the Duty of Quality has been mandated for NHS professionals in Wales – placing clear expectations about the engagement and involvement of patients in service delivery – study findings show a gap between policy intent and actual practice. The addition of the methods of embedding lived experience into service design, coupled with the above enablers driven by leadership, will help bridge the gap for the benefit of future patients.

The Implications for teaching:

- The teaching of service design methods tends to focus on the method itself and ignores 'lived experience' as a distinct group of contributors. Instead, most teaching comes from operations management where manufacturing businesses will establish user groups of persons who regularly interact with an organisation (many patients may only experience a service once). This deficiency needs to be addressed through student engagement with case studies and experiencing how to (re)design services using a lived experience approach.
- Teaching should not be reserved only for healthcare professionals; 85% of survey respondents agreed or strongly agreed that methods for engaging those with lived experience in service design and/or improvement should be taught to non-patient facing healthcare professionals. This should include key staff from the NHS Wales Executive who directly support and coach health boards in service improvement, such as (Senior) Improvement Managers.

The implications for patients:

- People with lived experience require capability, opportunities and motivation to engage in co-design and development of healthcare services with professionals.
- In terms of capability, 69% of respondents somewhat or strongly agreed that patients should be taught how to shape or improve healthcare services – a finding that was echoed by interview informants to ensure that suggestions made are feasible within the wider system context. A

balance must be struck, however, in terms of how much is expected of patients, especially as some may be managing multiple health conditions.

- In terms of motivation, patients are more likely to engage if they understand the purpose of the 'ask' and trust that their input will be meaningfully considered and acted upon when appropriate. (Informants warned that a threshold of input may be required before a service change is made.)

The implications for further research:

- A repeat of this study should include patients (as these were not included in the current study due to scope limitations) to complement the current service review which draws upon the perspectives of professional staff who deliver or support delivery of healthcare services in Wales.
- Compare Wales with other nations and regional groups so that the scope limitation (identified in the methods section) can be reduced and greater generalisation achieved.
- Capture patient and professionals' experiences of methods and processes so that the 'experience' of the lived experience process can be assessed, understood and iterated as required.

Conclusion

In summary, this study has addressed a very poorly understood aspect of healthcare service delivery and ironically an activity which is the basis of all forms of Total Quality Management – that of the 'voice of the customer' – in the form of the lived experience of the patient and its use as a feedback/design mechanism for higher quality service delivery. As highlighted in the interview findings, cited examples of improvement initiatives have focused on 'doing things right' and 'doing things better' from the limited perspective of staff, whereas truly improving a service to meet user needs requires much greater empathy and more meaningful engagement with those who have lived experiences.

This study has taken many hundreds of hours to design and execute and has attracted a significant response rate from staff who are keen to learn more about embedding the lived experience of their patients into how services are designed, delivered and improved in order to better serve them. It is hoped that other researchers will be inspired to take this study and build upon its lessons and new areas of fruitful and meaningful improvement of professional practice.

If the Duty of Quality legislation defines quality as 'continuously, reliably and sustainably meeting the needs of the population we serve' (Welsh Government, 2023, p.18), then we – as healthcare professionals – need to ensure that a significant part of our work is dedicated to understanding those needs, in order to provide tailored healthcare that is safe, timely, efficient, effective, equitable and person-centred. As one interview informant put it, the inclusion of the lived experience for modern service delivery represents 'a new transformative capability and power of much greater utility and value than any other form of investment of our professional time'.

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Appendix A: Ethical Approval

Swansea University
Prifysgol Abertawe

Approval Date: 25/06/2024

Research Ethics Approval Number: 1 2024 10122 9025

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	RB Lived Experience Research 2024
Applicant name	PROF Nicholas Rich
Submitted by	PROF Nicholas Rich /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/12211

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Appendix B: Perceptual Survey

We are conducting research to understand the barriers and enablers for how lived experiences can improve the quality of healthcare services in Wales. The study is part of an MSc in Advanced Health and Care Management for Innovation and Transformation. The data is being collected by Dr Rachelle Barlow, final-year MSc student at Swansea University's School of Management. Rachelle can be contacted by emailing 2229815@swansea.ac.uk. The research has been approved by the School of Management Research Ethics Committee and is being supervised by Professor Nick Rich and Alan Price. By completing this perceptual questionnaire, you are consenting to be included in this study. All data will be collected anonymously.

1. Do you provide your willing consent to participate in this study?
    a. Yes
    b. No

2. Do you deliver or support healthcare services in Wales?
    a. Yes
    b. No

3. How long have you been involved in delivering or supporting healthcare services in Wales?
    a. Less than 1 year
    b. 1 to 3 years
    c. 3 to 5 years
    d. 5 to 10 years
    e. 10 years or more

4. What category best fits your employment?
    a. NHS Wales Health Board or Trust
    b. University
    c. Welsh Government
    d. Other – please specify

5. Would you describe your role as patient-facing?
    a. Yes
    b. No
    c. A little of both – please specify

6. For each statement below, please click on the option that best describes your view and opinion.

	Strongly disagree	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**
There is value in involving people with lived experience in quality improvement efforts					
I value the views that people with lived experience can contribute to improving the quality of healthcare services in Wales					
I value the skills that people with lived experience can contribute to improving the quality of healthcare services in Wales					

Coproducing healthcare services with people with lived experience is difficult to do effectively					
Coproducing healthcare services with people with lived experience is difficult to do efficiently					
People with lived experience are vital members of a learning health and care system					
Involving people with lived experience is a core part of our approach					
The patient knows best					
Coproducing healthcare services with people with lived experience relies upon mutual trust					
Coproducing healthcare services with people with lived experience relies upon mutual respect					
Coproducing healthcare services with people with lived experience relies upon mutual psychological safety					
I am empowered to engage in coproducing healthcare services with people with lived experience					
I feel psychologically safe at work					
It is difficult for people with lived experience to hold equal power with health professionals					
The risks of coproducing healthcare services with people with lived experience outweigh the benefits					
I have seen coproduction discarded or deprioritised at times due to system pressures					
NHS Wales operates as a learning health and care system					
Involvement of people with lived experience in quality improvement activity is often limited					
There is often not enough time to achieve meaningful involvement					
We are the cutting-edge of working with people with lived experience to design and improve healthcare services					
I have extensive experience of designing and improving healthcare services with people with lived experience					

I have been trained in designing and improving healthcare services with people with lived experience					
People with lived experience hold knowledge that is not held by healthcare professionals					
People affected by a particular health condition may be considered 'experts by lived experience'					
There is a clear approach to measuring the impact of coproducing healthcare services with people with lived experience					
I am aware of Quality Function Deployment as a method for designing patient-centric services					
I use / have used Quality Function Deployment as a method for designing patient-centric services					
Working with people with lived experience improves the quality of healthcare services					
Working with people with lived experience improves the safety of healthcare services					
Working with people with lived experience improves the reliability of healthcare services					
Working with people with lived experience reduces the cost of delivering healthcare services					
There is no such thing as a 'standard' patient					
There are clear mechanisms to involve people with lived experience in coproducing and improving healthcare services					
It is important to involve people with lived experience from the outset of service design and/or quality improvement activity					
People with lived experience need to be health literate to contribute to shaping or improving healthcare services					
Whole system approach to health and care in Wales is sufficiently shaped by people with lived experience					
People with lived experience should be more involved in shaping and improving healthcare services at a system level					
The health and care system in Wales is not set up to fully enable coproduction of quality improvement and/or service design with people with lived experience					

Our future model of healthcare in Wales should be shaped by greater involvement of people with lived experience					
Methods for engaging those with lived experience in service design and/or improvement should be taught to patient-facing healthcare professionals					
Methods for engaging those with lived experience in service design and/or improvement should be taught to non-patient facing healthcare professionals					
Patients should be taught how to shape or improve healthcare services					
Service improvements are consistently embedded as a result of lived experience input/feedback					

7. Is there anything else you would like to share about your views on the barriers and enablers for incorporating lived experiences to improve the quality of healthcare services in Wales?

[Enter answer]

Appendix C: Interview Questions

1. Tell me about your background and your role in improving the quality of healthcare services in Wales.

2. What do you consider to be the main drivers for improving the quality of healthcare services [in Wales]?

3. What would you say the role is for people with lived experience within a learning healthcare system? Are there benefits?
    a. Would you say this is realised within current practice [in Wales]? Yes/no – what makes you say that?

4. In your opinion, at a system level, what do you think are the ENABLERS for co-producing improvements in quality or co-designing services with people with lived experience?

5. What do you think are the BARRIERS? (again, at a system level)

6. In your opinion, what needs to be done to strengthen the input of lived experiences into improving the quality of healthcare services in Wales? What kind of support is required?

7. Do you think there is a common understanding of what methodology (or methodologies) can be used to design or improve person-centred services?

8. How might we measure the impact of coproducing healthcare services with people with lived experience?

9. Are there any examples of good practice (based in the UK or internationally) that you can think of where people with lived experience are influencing and shaping the quality of healthcare services?

    a. If no – can you think of any examples from sectors other than healthcare?

10. Is there anything else you would like to add about how lived experiences can improve the quality of healthcare services in Wales?

About the Author

Rachelle Barlow is seconded (until April 2025) as Quality and Strategy Manager within the Quality, Safety and Improvement directorate of the NHS Wales Executive. Rachelle holds a PhD in Ethnomusicology and has presented her research at national and international conferences. More recently, her work on developing an Improvement and Innovation Hub for Public Health Wales was presented at the 2023 BMJ/IHI International Forum on Quality and Safety in Healthcare in Copenhagen. Prior to joining the NHS in 2021, Rachelle was involved in several projects as a patient and family member with lived experience. For 3.5 years, she was part of the Research Advisory Group for Welsh cancer charity, Tenovus Cancer Care. She was also part of a policy and advocacy change maker project for a UK-wide charity (Cardiomyopathy UK) working to develop a Change Agenda to improve the healthcare pathway for patients and families with heart muscle condition.

Enhancing Access: Evaluating the Information, Advice, and Assistance Service by a Welsh Primary Care Organisation (WPCO) and its Local Authority Partner

Rebecca Davies
Head of Operations
Llesiant Delta Wellbeing

Abstract:

This research report presents a comprehensive evaluation of the Information, Advice, and Assistance (IAA) service provided by Welsh Primary Care Organisation (WPCO) for a Local Authority. The study employs a mixed-methods approach, combining qualitative interviews, quantitative surveys, and analysis of secondary data to assess the service's effectiveness, accessibility, and impact on the community.

Key findings reveal that the IAA service is generally well-regarded, with 93.3% of respondents rating its performance as good or better. The service significantly impacts users' lives by enhancing feelings of safety, enabling independent living, and providing reassurance to families. However, challenges persist in data integration, resource allocation, and managing increasing demand.

The evaluation identifies areas for improvement, including streamlining information access across systems, addressing funding and staffing inadequacies, and enhancing technology integration. Recommendations focus on optimizing resource allocation at the service's "front door," improving first-call resolution rates, and leveraging digital platforms to enhance accessibility.

This report contributes to the understanding of effective single point of access models in social care and offers actionable insights for service improvement, aligning with broader strategic objectives of preventative care and community well-being.

Keywords: Service Evaluation, case study, WPCO, Access, Support, Assessment, Improvement, Quality, Effectiveness, Efficiency, Stakeholders, Community, Feedback, Performance, Impact, Recommendations

Acronyms, Tables, and Figures

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1.2	Key trends in the legislative landscape
2	IAA process map
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Introduction

The primary care system in Wales faces significant challenges, with demand expected to double by 2040 due to an aging population and increasing chronic conditions (Audit Wales, 2019; NHS Wales, 2024). Limited physical space, workforce capacity, and recruitment difficulties exacerbate these pressures (Audit Wales, 2019; NHS Wales, 2024).

To address these challenges, efforts are underway to integrate health and social care services, implement the Primary Care Model for Wales, and leverage digital technologies to enhance service delivery (Audit Wales, 2019; NHS Wales, 2024-2027). Prevention and early intervention are emphasised to reduce the need for intensive care (Welsh Government, 2023). It is argued that in this context, adopting High Reliability Organisation (HRO) principles can enhance safety and reliability in service delivery (Weick & Sutcliffe, 2007; Chassin & Loeb, 2013; Hines et al., 2008). The Information, Advice, and Assistance (IAA) service provided by WPCO for Carmarthenshire County Council was established in response to the Social Services and Well-being (Wales) Act 2014. This service supports community well-being and aligns with the Well-being of Future Generations (Wales) Act 2015 objectives.

This research aims to evaluate the IAA service's effectiveness, accessibility, and community impact. The evaluation will build on existing research, critically examining the service's impact and providing insights to validate or adjust current strategies. By leveraging expertise in social work, public administration, community development, and program evaluation, this study seeks to identify strengths and areas for improvement, ultimately offering evidence-based recommendations to optimise service delivery and meet the diverse needs of the local regional population.

The IAA service plays a crucial role in promoting social enterprises, providing preventative services, and connecting individuals to community resources, thereby reshaping the perception of social care and support in Wales.

Identification of project requirements

A project to evaluate the IAA service is highly relevant and valuable to WPCO and its Local Authority partner for several reasons:

- Since the inception of the service in 2018, the service has never been evaluated, the service has grown considerably going from approximately 80 referrals a week with 6% preventative outcomes, increasing to +400 referrals a week with +40% preventative outcomes.
- Considering the financial challenges faced by the organisation, Local Authorities and Health Boards, now seems to be a pertinent time to conduct an evaluation. By identifying the strengths and areas for improvement, the evaluation will provide concrete evidence to guide the enhancement of the IAA service. This can lead to more effective and efficient delivery service, better meeting the needs of the community.

The evaluation process, the core of this research, involved gathering feedback from various stakeholders, fostering a sense of involvement and ownership which enhanced stakeholder satisfaction and trust in the service. The findings ensured that the IAA service aligns with the strategic objectives and priorities of both WPCO and its Local Authority. This alignment of interests was crucial for the long-term sustainability and effectiveness of the service. By providing detailed insights into the service's performance, the evaluation better informs resource allocation decisions which can lead to more targeted and efficient use of resources, ultimately benefiting the community.

The evaluation has produced robust data and evidence that supports decision-making, can be used to justify changes, secure funding, and support strategic planning efforts. Community Well-Being: Ultimately, the evaluation aims to enhance the well-being and quality of life for the residents of Carmarthenshire by ensuring that they have access to high-quality information, advice, and assistance services.

Given the policy and regulatory frameworks and documents that set out government policy, the review of the service fit with this new dynamic environment was timely. The key policy and systems change documents that have impacted on the service, and it's fit with government intentions are shown in the tables below.

Table 1.1. Key Documents shaping modern primary care processes.

Title	Year	Publisher	Main Recommendations
Social Service and Wellbeing (Wales) Act	2014	GOV	Person Cantered Care, Integration and Collaboration, Prevention and Early Intervention, Information Advice and Assistance services, Advocacy Services, Support for Carers.
The Well-being of Future Generations (Wales) Act	2015	GOV	Long Term Thinking, Integration, collaboration, Prevention, Involvement, Sustainable Development Principles, Establishment of the Future Generations Commissioner
Healthier Wales	2023	GOV	Focus on Prevention and Early Intervention, Community Based Care, Use of Technology and Innovation, Person Centred Care, Strong Leadership and Collaboration, Addressing Health Inequalities.
Strategic Workforce Plan for Primary care 24/25-29/30 Health Education and improvements Wales (HEIW)	2024	NHS	Increase Workforce Supply, Develop New Workforce Models, Enhance Education and Training, Promote Leadership Developments, Foster a Digital Ready Workforce, Support Workforce Wellbeing.

Table 1.2. Key Trends in Legislative Landscape.

Key Trend	Description	Associated Legislation
Increasing Integration	There's a clear trend towards greater integration and collaboration across services and sectors	Lewis et al. (2010); Cameron et al. (2014)
Prevention and Early Intervention	This theme has been consistently emphasised, reflecting a shift from reactive to proactive healthcare.	Checkland et al. (2019); Morris et al. (2018)
Person-Centred Approach:	The focus has steadily moved towards tailoring services to individual needs and preferences.	Greenhalgh et al. (2019); Lloyd & Wait (2020)
Future-Oriented Planning	Later legislation shows increased consideration for long-term impacts and sustainability.	Bardsley et al. (2016)
Technological Integration	Recent policies highlight the growing importance of technology and innovation in healthcare delivery	Shaw et al. (2018); Greenhalgh et al. (2019)
Workforce Development	The latest plan recognises the critical role of a well-prepared workforce in implementing these changes.	Checkland et al. (2019)
Addressing Inequalities	There's an increasing recognition of the need to tackle health disparities.	Crawford et al. (2011); Barnett et al. (2014)

Research Question, Aim and Objectives

How does enhancing Access (through more effective Information, Advice, and Assistance) by a Primary Care Organisation in partnership with their Local Authority improve outcomes for the community?

Aims:
The aims of the research project are to critically evaluate the Information Advice and Assistance service to address the challenges faced by the organisation, which are:
1. Managing increasing demand
2. Addressing resource constraints
3. Maintaining high-quality care amidst evolving health and social care needs
4. Tackling challenges related to the integration and management of diverse data sources and systems that impact service delivery and decision-making

Objectives:
1. To conduct and extensive analysis of secondary data to assess the demand on the service over a 12-month period.
2. To assess team performance and preventative outcomes.
3. To gather and analyse stakeholder feedback to gain insights into stakeholder opinions and potential improvements in service delivery. 4. To provide evidence-based recommendations for further research and analysis to support the findings and improve the IAA service.

Personal Motivation of the Researcher

The researcher's personal motivation for undertaking this research project is deeply rooted in their professional aspirations and commitment to excellence in health and care management. The choice to focus on evaluating the Information, Advice, and Assistance service provided by WPCO demonstrates a keen interest in applying academic knowledge to address real-world challenges within their professional context. This alignment between academic pursuits and professional responsibilities creates an opportunity to contribute to their organisation's service improvement. The researcher also has a strong dedication to continuous learning and professional development, indicating that they view this academic journey as an integral part of their career growth in health and care management. The emphasis on balancing theoretical knowledge with practical application displays motivation to become a more effective and informed practitioner in the field. By engaging in this research, the researcher not only sought to expand their academic understanding but also to gain insights that could directly inform and enhance their professional practice, thereby bridging the gap between academic theory and real-world implementation in healthcare management.

The Structure of the report

The report follows a structured format designed to comprehensively address the research project. It begins with an Introduction that sets the context for the study, outlines the research objectives, and provides an overview of the Information, Advice, and Assistance service provided by WPCO for the local authority partner. This is followed by an Identification of Project Requirements section, which details the specific aims, scope, and methodological approach of the research. The Main Analysis forms the core of the report, presenting the findings from both quantitative (questionnaire responses) and qualitative (interviews) data collection methods, offering a thorough examination of the service's effectiveness and areas for improvement. The Conclusion synthesis's key findings, reflecting on their implications for healthcare management and service delivery. Finally, the report culminates in Key Recommendations, proposing actionable strategies for enhancing the Information, Advice, and Assistance service based on the research outcomes, thus providing practical value to stakeholders and contributing to the broader field of healthcare management innovation and transformation.

Literature Review: Service Design for Health and Care

Services and Service Management

Services are defined as intangible processes involving interactions between providers and customers to create value (Berthod and Sydow, 2021). Modern services increasingly rely on information management and technology to enhance delivery and coordination (Burnett et al., 2012). Service management focuses on designing and optimising these processes to meet customer needs efficiently and effectively.

The Role of Effective Management in Primary Care

Effective management is crucial for high-performing primary care services, involving strategic planning, resource allocation, and continuous improvement efforts leading to better patient care (Burnett et al., 2012). Leadership that fosters a culture of safety and reliability is particularly important (Cantu et al., 2020).

Studies show the key enablers include strong organisational culture focused on safety (Cantu et al., 2020), effective use of information technology (Burnett et al., 2012), and collaborative practices (Berthod and Sydow, 2021).

Equally common inhibitors to optimal service delivery include inconsistent understanding of HRO principles across professional groups (Cantu et al., 2020), inadequate clinical systems (Burnett et al., 2012), and resistance to change (Berthod and Sydow, 2021).

Measures of a Primary Care Service and How We Know the Service is Improving

Measuring primary care performance involves assessing dimensions such as patient safety, clinical quality, patient experience, operational efficiency, and staff engagement. Improvement is demonstrated through positive trends in these measures over time (Burnett et al., 2012).

Effectiveness of Single Point of Access (SPA)

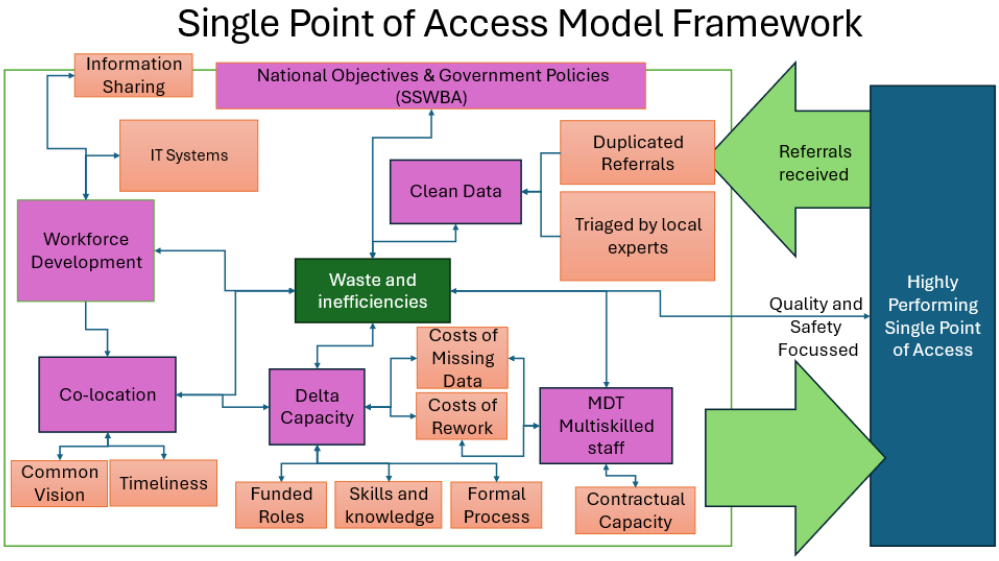
Single points of access (SPA) have been shown to streamline referral processes, reduce wait times, and improve patient satisfaction (Health Harmonie). SPA's centralise referral management, ensuring patients are directed to appropriate care pathways efficiently (BMJ Open). SPAs are particularly beneficial in managing access to mental health services, reducing barriers and facilitating timely support (BMC Health Services Research).

High Performance Service Design

High performance in healthcare services encompasses safety and quality (Cantu et al., 2020). The concept of high reliability organisations (HROs) from industries like aviation has been applied to healthcare to achieve exceptional safety records despite hazardous conditions (Bourrier, 2011). HROs exhibit key principles such as preoccupation with failure and commitment to resilience (Weick and Sutcliffe, cited in Cantu et al., 2020).

A New Conceptual Model

The new conceptual model for high-performance primary care flow systems, drawn from the literature review, reveals that such SPA services should integrate HRO principles, employ effective service management practices, enable successful implementation, and overcome common change management inhibitors. The model also incorporates the benefits of SPAs to enhance access and efficiency. Drawing on the key information identified in the literature review to form a new conceptual model.



Source: The Researcher (2024)

The conceptual model and framework are a contribution to the study of primary care services and is an outcome developed by the researcher. The framework will be used to explore the case studies and their performance.

Summary and Conclusions

The literature review highlights the complexity of designing and implementing high-performance primary care services. In parallel, these systems must also be reliable and embody principles of Highly Reliable Organisations (HRO). Whilst HRO principles offer valuable insights, their application requires careful adaptation. Effective management, strong organisational culture, robust information systems, and SPAs emerge as critical factors that support optimal care. The gap in the research reveals comprehensive care models should integrate these HRO elements for improved primary care patient flow.

Methodology

This study employed a mixed methods approach to comprehensively evaluate the Information, Advice, and Assistance (IAA) Service provided by WPCO organisation for their local authority partner. The research design combines qualitative and quantitative methods to provide a holistic assessment of the service's effectiveness, challenges, and potential improvements. The research design had the following design features:

1. Literature Review: A comprehensive review of existing theories and research related to service quality, customer satisfaction, and community well-being in the context of primary care and social services was conducted.
2. Semi-structured Interviews: In-depth interviews were conducted with stakeholders including service leads, managers, and policymakers to gather insights into the design and management of primary care systems.
3. Perceptual Questionnaire: A survey was distributed to stakeholders to capture perceptions regarding the effectiveness and challenges of current practices. These included frontline staff, professionals' clinicians and managers.

4. Secondary Data Analysis of existing data sources were analysed to contextualise findings and support conclusions drawn from primary data.
5. Direct Observation: Teams were observed in action to understand their dynamics and processes, with reflective sessions providing additional insights.

Sample Selection

A diverse sample of stakeholders, including staff, community leaders, and policymakers, were engaged using purposive sampling. Informants were selected based on their roles in designing and managing primary care systems, ensuring representation across different demographics and service utilisation patterns.

Data Collection and Analysis

In-depth interviews and observational data (qualitative data) were subjected to thematic analysis to explore experiences, perceptions, and challenges related to the service. Survey responses and numerical data were analysed to quantify service satisfaction levels, identify trends, and assess the impact of demographic variables on service utilisation and outcomes. Triangulation of the mixed methods findings was employed to enhance the validity and comprehensiveness of the research outcomes.

Ethical Considerations

Ethical principles, including informed consent, confidentiality, and voluntary participation, were strictly adhered to throughout the research process. Ethical approval was granted by Swansea University in June 2024.

Limitations

The study is based on a single case study and may not represent the entire population of primary care services in Wales. However, the findings offer valuable insights due to the similarity of processes, technologies, and staff across organisations.

Conclusions

This section has detailed the research methods used to collect context-rich data on professional practices within a primary care setting. These methods provide a foundation for understanding and improving primary care services.

Introducing the Case Study: The Case Study of Welsh Primary Care Organisation (WPCO)

A case study strategy was employed, focusing on a specific primary care organization (WPCO) was selected for its representativeness and accessibility. The study was conducted from August 2023 to August 2024, providing a comprehensive view of the organisation's operations over a year. The organisation was established on the 1st of June 2018 and has a social care DNA at the heart of all activities. The organisation provides a technology enabled care service, including emergency falls response, alongside, an information advice and assistance service, community wellbeing officers and hospital-based staff all working towards the pro-active and preventative agenda. The Welsh Primary Care Organisation (WPCO) was established to deliver comprehensive primary care services, including general practice, community health, and integrated social care services.

The Welsh Primary Care Organisation

The Welsh Primary Care Organisation (WPCO) has received recognition for its innovative approaches to care and has won several awards for excellence in service delivery, making it an ideal case subject. The WPCO has won several awards, some of which are: Great British Care Awards (Wales region) Work Force Development, Home Care Team award, Care Innovator Award, Putting People First Award, Best Initiative in Care. IESE Public Sector Transformation Awards: HomeFirst with Hywel Dda University Health Board. Great British Care Awards UK: Putting People First Award.

The Current Challenges and Issues are:

1. Changes in Data Sources: The organisation faces challenges related to the integration and management of diverse data sources, impacting service delivery and decision-making.
2. Operational Challenges: These include managing increasing demand, resource constraints, and maintaining high-quality care amidst evolving health and social care needs.

The Focus of the Study

The study focuses on understanding how WPCO manages these challenges and explores strategies for enhancing service delivery, particularly through the effective use of data and technology. The insights gained aim to inform best practices and drive improvements in primary care processes.

Main Analysis and Findings

The literature review explored the principles and practices shaping high-performance service design in healthcare, with a focus on primary care. It synthesised the current knowledge on service management, high reliability organisations (HROs), and the effectiveness of single points of access (SPA) in improving healthcare delivery. The review informed the development of the researcher's conceptual model for optimising primary care processes.

The next section of this report will focus on the survey results derived from the study.

Staff Composition and Service Usage

The survey included 18 respondents from various professional roles, with Team Leaders and IAA Advisers being the most common (17% each). The data shows that social work assessments are the primary reason for contacting WPCO, reported by (56% of respondents), followed by CONNECT referrals (28%).

The researcher asked this question to test what the main reason was for contacting the service, and to see how this compared to the conceptual framework.

Service Utilisation:
The most frequently used services were found to be:
- Social work assessments: 60% of respondents use this often or always
- CONNECT referrals: 66.7% use this often or always
- Information for carers: 46.7% use this often or always
Physio and occupational therapy referrals are used less frequently, according to survey results.

The researcher asked this question to test the overall satisfaction levels, and to see how this compared to the conceptual framework.

Overall Performance Rating:
The satisfaction ratings reported by respondents for WPCO are generally positive:
- 33.3% rated the services as "Excellent"
- 40% rated it as "Very good"
- 20% rated it as "Good"
- 6.7% rated it as "Fair"
- 93.3% of respondents view the WPCO's performance as good or better.

The researcher asked this question to test what impact the service has on service users' lives, and how these fit in with the conceptual framework.

WPCO's 'Impact on Users' Lives
-The service significantly impacts users' lives by:
- Enhancing feelings of safety and security at home
- Enabling independent living for longer periods
- Providing reassurance to family members

The researcher asked this question to test the respondent's perception of the quality of the service, to see how this fits in with the conceptual framework.

Service Quality Perceptions
Respondents perceive the quality of information and service provided by WPCO as high:
- 86.7% rated the quality of information as very good
- 93.3% rated the relevance of information as very good
- 93.3% rated the completeness of service requests as very good

The researcher asked this question to test how diverse and inclusive the service is and to see how this fits in with the conceptual framework.

Diversity and Inclusivity
- The service is perceived to address the needs of diverse communities well:
- 66.7% believe it always meets the language diversity needs
- 80% believe it always meets cultural diversity needs
- 80% believe that it always provides equity of access to care

The researcher asked this question to test the respondent's views on what the service delivery challenges are, and how these fit with the conceptual framework.

Challenges in Service Delivery
Key challenges identified include:
1. Maintaining up-to-date information on local services
2. Prioritising statutory services
3. Process delays
4. Waiting for expert oversight in the referral process

Recommendations for Improvement
Staff suggestions for optimising service delivery include:
1. Better communication with partner organisations
2. Increasing front-line staff to prevent bottlenecks and backlogs
3. Promoting a TEC (Technology Enabled Care) first approach
3. Promoting a TEC (Technology Enabled Care) first approach
4. Investing in preventative services to reduce long-term statutory needs

Section Conclusions

WPCO is generally perceived as providing a valuable and high-quality service, with strong performance in Key areas such as overall impact on users' lives. However, there are opportunities for improvement in communication, and resource allocation to better meet community needs and optimise service delivery.

Findings: Team Process Reviews

The IAA (Information, Advice, and Assistance) process map illustrates the complexity of the single point of access system for WPCO. Multiple entry points and scenarios converge at the IAA/Single Point of Access, creating a potential bottleneck in service delivery. This visual representation aligns with the survey respondents' concerns about resource allocation at the "front door" of the service. The diagram clearly shows how various pathways - including self-referrals, professional referrals, and different types of assessments - all funnel into the IAA process. This concentration of diverse needs and requests at a single point can lead to delays in processing and responding to individual cases, especially when staffing levels are insufficient to manage the volume of incoming work.

Survey respondents highlighted the need for additional resources at this crucial entry point, suggesting that increasing front-line staff could help prevent bottlenecks and backlogs. The process map provides visual evidence supporting these recommendations, demonstrating how additional resources at the IAA stage could potentially streamline the flow of cases and improve overall service delivery efficiency.

This analysis underscores the importance of aligning staffing and resources with the complex, multi-faceted nature of the IAA process to ensure timely access to services for individuals in need.

IAA process map [2]

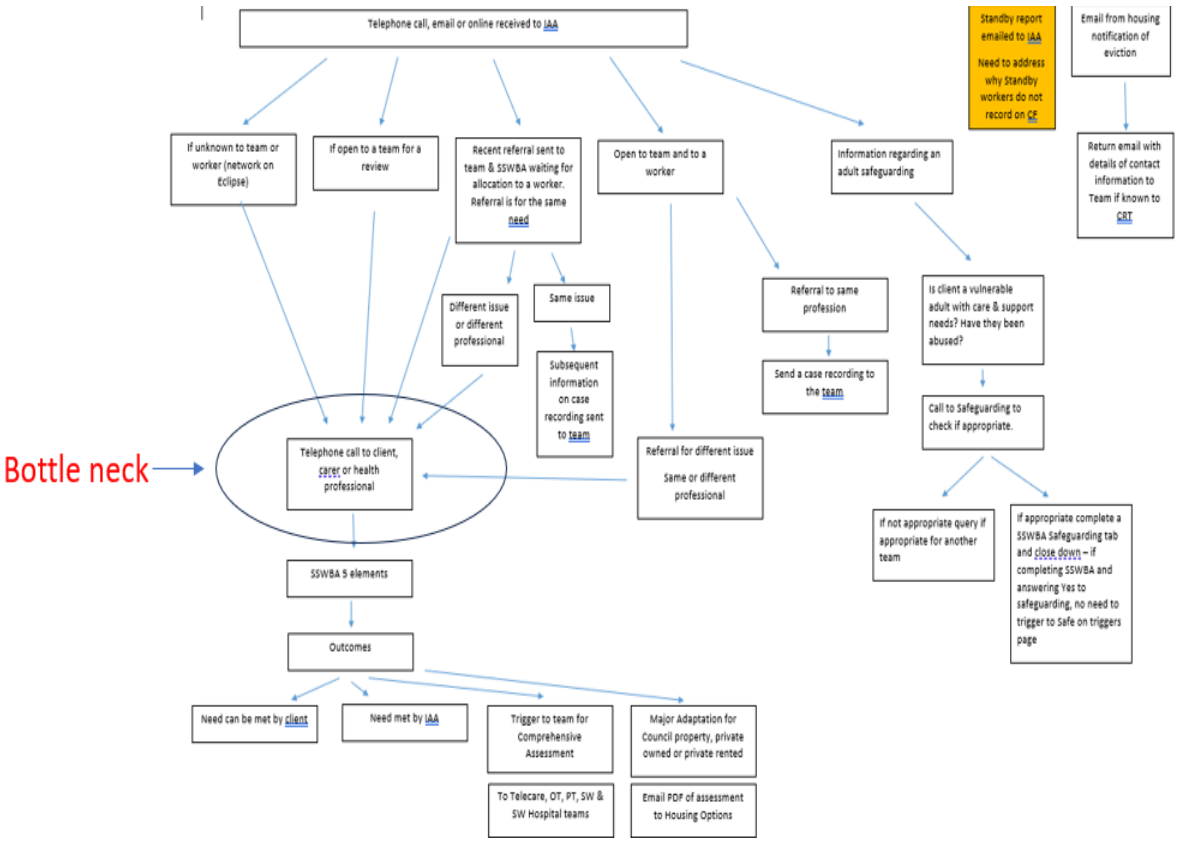


Figure 1. IAA referrals and outcomes annual report 2022-2023.

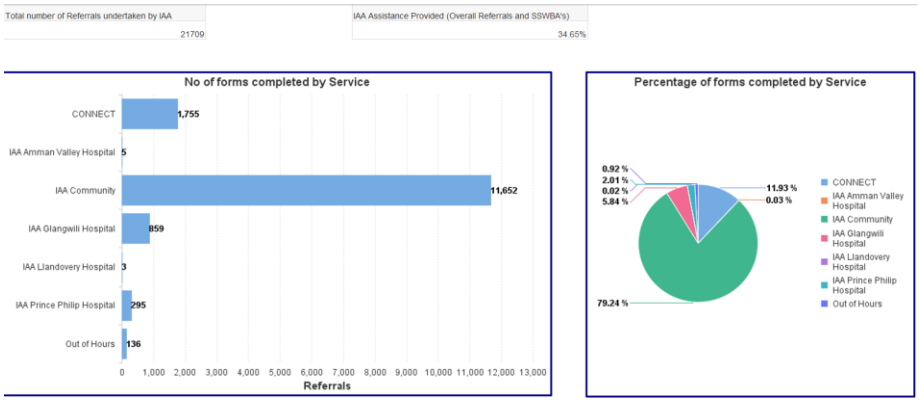
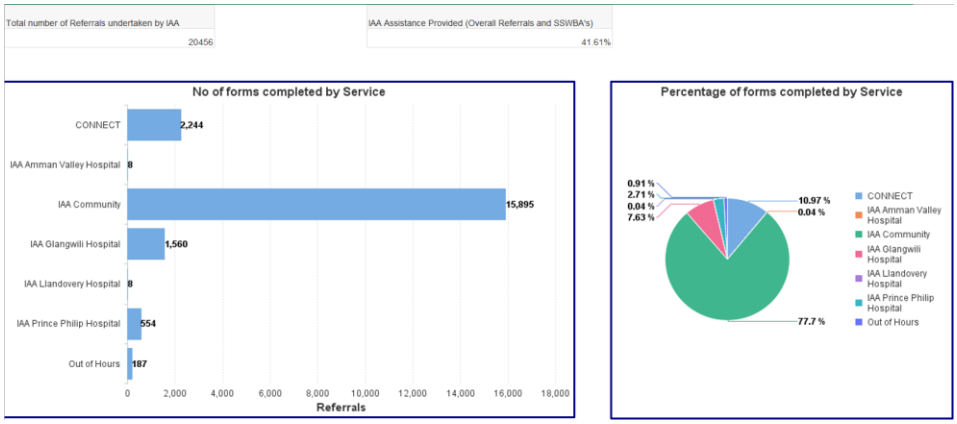


Figure 2. IAA referrals and outcomes annual report 2023-2024.



Analysis of IAA Referrals and Outcomes (2022-2023 vs. 2023-2024)

The report compares the IAA (Information, Advice, and Assistance) service's performance between the years 2022-2023 and 2023-2024. The focus is on the total number of referrals handled and the outcomes, particularly those classified as preventative.

Total Referrals:
1. 2022-2023: The IAA service handled a total of 21,709 referrals.
2. 2023-2024: The number of referrals decreased to 20,456, which is a reduction of 1,253 referrals compared to the previous year. This decrease represents approximately a 5.8% drop in total referrals.

Team Contributions:
1. IAA Community Team: This team is highlighted as the main service provider, handling the largest share of referrals.
2. 2023-2024: Despite the overall decrease in referrals, the IAA community team processed an additional 4,243 referrals compared to 2022-2023.

Preventative Outcomes:
1.The data indicates an improvement in preventative outcomes, 13.14%. Preventative outcomes refer to situations where early interventions or assistance prevent further escalation, which is a key indicator of service effectiveness.

Key Points:
1. Decrease in Total Referrals: The overall reduction in referrals could be due to a backlog of individual waiting for services, or that initial interventions are becoming more effective, reducing the need for repeat referrals.
2. Increased Role of IAA Community Team: The IAA Community Team's increased workload (+4,243 referrals) is notable, as it suggests that while total referrals decreased, this team's activity and contribution increased, meaning they are producing more work with the same resource, this could be related to stringent performance management of the staff or less sickness within the team.
3. Improvement in Preventative Outcomes: The rise of 13.14% in preventative outcomes indicates that the IAA service is becoming more effective at addressing issues before they require more intensive intervention, and with the right resource this could be even better.

Section Summary

The data from 2023-2024 shows a mixed performance, with a slight decline in overall referrals but an increase in both the contributions of the IAA Community Team and the effectiveness of preventative measures. This could imply a more focused and effective service despite handling fewer overall cases.

Figure 3. Client location and referral count report 2023-2024.

Where is the Client at the time of Referral ?	Referrals Total Count
At Home	16054
Care Home	896
Hospital - GGH	1955
Hospital - Other	384
Hospital - PPH	840
Other	327
Total	**20456**

The table above presents data on the location of clients at the time of referral, along with the total number of referrals from each location for the period 2023-2024. Here's a summary and analysis of the data:

Analysis

Majority of Referrals from Home: The largest proportion of referrals, 16,054 (approximately 78.5%), came from clients who were at home at the time of referral. This suggests that the majority of clients are either self-referring to or being referred to by family members, primary care physicians, or home care services.

Hospital Referrals:
1. Hospital - GGH: This is the largest hospital category with 1,955 referrals (about 9.6% of total referrals).
2. Hospital - Other: A smaller proportion, 384 referrals (about 1.9%), came from other unspecified hospitals.
3. Hospital - PPH: There were 840 referrals (about 4.1%) from this hospital.

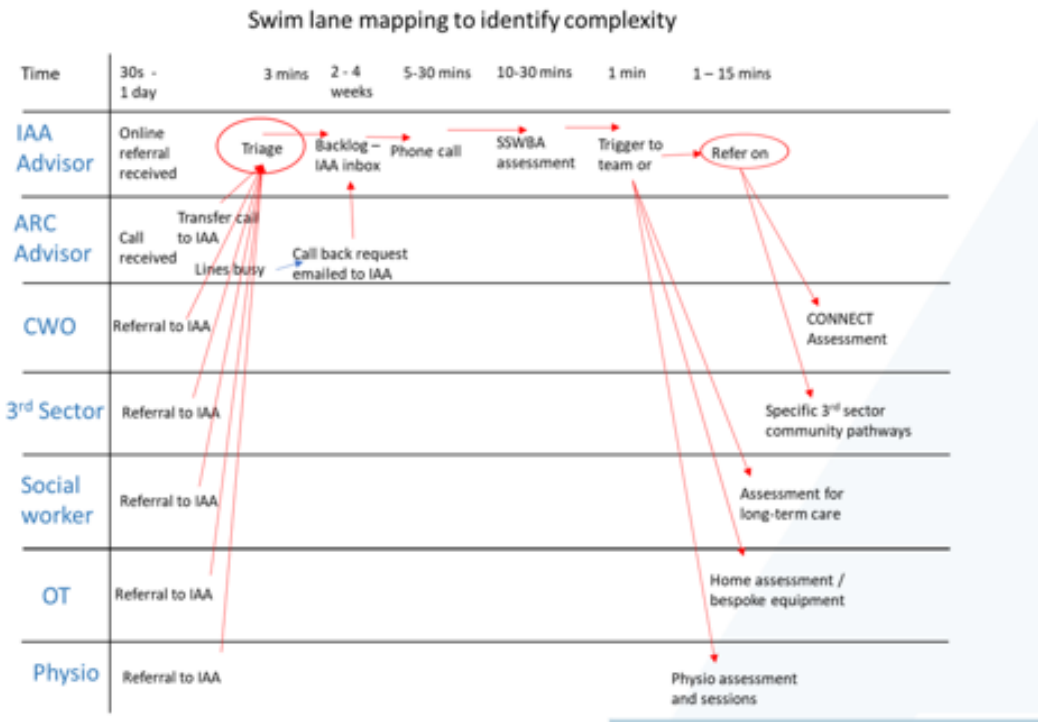
Care Homes and Other Locations:
1. Care Home: 896 referrals (about 4.4%) came from care homes, indicating that a smaller segment of the client population resides in care facilities.
2. Other Locations: 327 referrals (about 1.6%) are from unspecified or other locations, which may include a variety of settings not captured in the other categories.

Summary

The data indicates that the majority of clients referred during 2023-2024 were living at home at the time of referral, followed by those in hospitals. This distribution could reflect the healthcare and social service dynamics, where in-home care and community-based services play a significant role in patient referrals. It

also suggests the importance of home-based healthcare services in the overall healthcare ecosystem during this period.

IAA swim lane mapping [3].



The swim lane mapping provides a visual representation of the challenges faced at the front door/Single Point of Access (SPOA) for WPCO.

Swim lane mapping findings

1. Complex workflow: The diagram illustrates a complex process with multiple steps and decision points across different departments or roles (represented by the swim lanes).
2. Multiple entry points: The mapping shows various ways requests can enter the system, including phone calls, emails, and referrals from different sources.
3. Bottlenecks: Several points in the process where work can accumulate are visible, particularly at the initial triage and assessment stages.
4. Interdependencies: The diagram highlights how different departments or roles need to interact and depend on each other to process requests, which can lead to delays if one area is overwhelmed.
5. Decision points: Multiple decision points are shown throughout the process, each of which can potentially slow down the flow of work if not handled efficiently.
6. Feedback loops: The mapping shows several instances where cases may need to be referred back or reconsidered, potentially creating additional work and delays.
7. Resource allocation challenges: The complexity of the process suggests that efficient resource allocation across different stages is crucial to prevent bottlenecks.

This swim lane mapping indeed provides a clear visual representation of the workflow challenges, particularly the potential for bottlenecks at the front door/SPOA. It supports the survey respondents' comments about the need for additional resources at the front end of the process to manage the volume and complexity of incoming requests efficiently.

Quotes from the interviews

The researcher conducted 7 interviews as part of the evaluation process, and the key findings are as follows:

Purpose and Effectiveness of IAA Service

- Empowerment and Prevention: The IAA service is designed to empower individuals by offering early intervention to help them take ownership of their lives and conditions. It also aims to prevent issues from escalating to require traditional social care services. As one interviewee stated, “IAA is to enable people to have early intervention to take ownership of their lives... and help to resolve their problems in a preventative manner.”
- Community Resilience: The service contributes to building resilience within the community by involving local businesses and third-sector organisations. This partnership strengthens support systems, ensuring that people receive assistance tailored to their needs.

Accessibility and Usability

Multiple Access Points: The IAA service is accessible via online forms, a 24/7 telephone line, and referrals through local government and partner agencies. However, there is room for improvement in the response process. One interviewee suggested, “If we could have more knowledgeable people answering the telephone to resolve the issue first time, that would probably be an improvement.” When an individual contacts the Single Point of Contact (SPOC), they are directed to the main monitoring centre. A staff member handles the call and directs it to the appropriate department. These initial staff members are not trained to resolve issues at the first point of contact, but rather to transfer calls to specialist departments.

Suggested Improvements

- An interviewee noted: "If we could have more knowledgeable people answering the telephone to resolve the issue first time, that would probably be an improvement." This suggests a need for enhanced training or restructuring of the initial contact process to improve first-call resolution rates.
- Technology Integration: While options like text lines exist, their usage is low. There’s a call to better integrate social media and other digital tools to enhance service accessibility.
- While WPCO has implemented some modern communication channels, there's potential for further improvement:
- Text Lines: These exist but are underutilised. This could be due to lack of awareness or user preference.
- Social media and Digital Tools: There's a call for better integration of these platforms to enhance service accessibility. This aligns with current trends in customer service and could potentially reach a broader audience, especially younger caregivers or family members of service users.
- Digital Transformation: The partnership with CGI aims to develop an innovative digital monitoring and response system. This initiative could significantly enhance the accessibility and usability of WPCO ‘s services, potentially addressing some of the current limitations.

Recommendations

- First-Call Resolution: Invest in training for front-line staff to handle a wider range of inquiries without the need for transfers.
- Technology Adoption: Increase promotion and education around existing text line services. Consider implementing a chatbot or live chat feature on the website for immediate assistance.
- Social Media Integration: Develop a strategy to effectively use social media platforms for service delivery and communication.
- User-Cantered Design: As new digital systems are developed, ensure they are designed with input from all user groups, including those with varying levels of tech-savviness and different accessibility needs.

By addressing these areas, WPCO can enhance the accessibility and usability of its services, potentially leading to improved user satisfaction and more efficient service delivery.

Challenges in Service Delivery

- Management: A significant challenge is collecting and verifying data across different platforms, which can impact service accuracy and timeliness. An interviewee highlighted this by saying, “Collecting data from different systems and checking data for the right person can be difficult.”

- Resource Knowledge: The ever-changing landscape of community resources makes it challenging to direct people effectively. The need to keep information up to date is crucial but resource intensive.
- Balancing Demand: High demand for services often leads to prioritisations challenges, where preventive work may be overlooked in favour of more urgent cases. This can potentially escalate issues that could have been managed earlier.

Alignment with Strategic Objectives

- Prevention and Delaying Traditional Care: The IAA service aligns well with strategic goals, particularly in preventing and delaying the need for more intensive social care services, which supports the broader objectives of both WPCO and its local authority partner.
- Technology-Enabled Care: There is a strong focus on using technology to support people in maintaining their independence, which is a key strategic priority.

Triage and Assessment Process

- Triage Effectiveness: The current triage process can sometimes result in missing critical information due to the limitations of online referrals. This was noted by an interviewee: “If you’re just acting on the online referral or the message given, then that’s where you can get the mistakes.”
- Risk of Missing Preventative Opportunities: The high volume of referrals can lead to a focus on immediate needs, potentially overlooking opportunities for preventative care that could reduce future demand.

Section Conclusions

The analysis of interview responses reveals several consistent themes regarding the Information, Advice, and Assistance service provided by WPCO for Carmarthenshire County Council. All seven interviewees expressed a positive view of WPCO, indicating a generally favorable perception of the organisation among stakeholders. Similarly, there was unanimous agreement on the accessibility and effectiveness of the service, as well as the quality of information provided. These findings suggest that WPCO has successfully established itself as a reliable and valuable resource in the community.

However, the data also highlights areas of concern and potential improvement. The theme of data integration, specifically relating to the multiple systems staffs need to access for essential information about individuals seeking services, received mixed responses. Only three out of seven interviewees affirmed its adequacy. This underscores significant challenges in information management and sharing. The need for staff to navigate numerous systems to gather essential data about service users points to inefficiencies in the current setup. These findings highlight the complexities and inconsistencies in how information is accessed, shared, and utilised across different parts of the service and with partner organisations. Such fragmentation in data systems could potentially impact the efficiency and effectiveness of service delivery, suggesting a clear area for improvement in streamlining information access and integration.

A critical issue unanimously highlighted by all interviewees was the inadequacy of both funding and staffing levels. This consistent feedback underscores a significant challenge that requires immediate attention. Despite the current positive reception of the service, the lack of adequate resources, both financial and human, poses a potential threat to its long-term sustainability and effectiveness. Notably, all interviewees were highly complementary about the staff and services, emphasising that they perform admirably within the constraints of the allocated budget. The majority of the budget is directed towards staffing costs; however, the demand for services frequently exceeds the capacity of the available staff. This imbalance often results in backlogs and delays in service delivery. The situation highlights a critical tension between the quality of service provided and the resources available to sustain and expand it, suggesting that additional funding and staffing could significantly enhance the service's ability to meet growing demands efficiently.

In conclusion, the evaluation of WPCO ‘s Information, Advice, and Assistance service for the local authority reveals both strengths and challenges. While the service enjoys a positive perception among stakeholders, high accessibility, and quality information provision, it faces significant hurdles in data integration and resource constraints. WPCO has established itself as a valuable community resource with highly praised staff performance. However, current demand often exceeds staff capacity, leading to backlogs and delays.

To address these issues, recommendations include streamlining information access across systems, addressing funding and staffing inadequacies, and exploring ways to balance service quality with available resources. By tackling these challenges, particularly in data management and resource allocation, the service could significantly enhance its efficiency and ability to meet growing demands, building on its strong potential.

This series of sections has provided the reader with the findings from the major activities undertaken and facilitated by the researcher. The next section will review the findings and compare them with the literature review and research question.

Discussion

The study set out to answer the following research question: *"How does enhancing Access (through more effective Information, Advice, and Assistance) by a Primary Care Organisation in partnership with their Local Authority improve outcomes for the community?"*

Enhancing access through more effective Information, Advice, and Assistance IAA by a WPCO can significantly improve outcomes for the community. This approach enables people to make informed choices about their care and support, helps individuals access the right support at the right time, and improves overall health and wellbeing. By leveraging their strengths, WPCOs can lead to wider access to advice for hard-to-reach communities, foster more inclusive and resilient communities, strengthen civic participation, and support better delivery of services to residents.

Incorporating new technologies and adopting community-centered approaches can further enhance the delivery of IAA. However, success depends on overcoming common barriers such as low capacity and reduced budgets. By addressing these challenges and implementing collaborative strategies, WPCOs can work to significantly improve community outcomes through enhanced access to effective IAA.

Exploring the Findings and the Literature/Conceptual Model

Single Points of Access (SPA) are a key concept in healthcare and social care systems designed to streamline access to services for patients and service users. These models aim to simplify the referral process, improve coordination between different services, and enhance the efficiency of care delivery. Below are the dominant models of Single Points of Access and key academic studies related to them:

Centralised Single Point of Access (SPA) Model

Overview: In this model, a central hub is established where all referrals for primary care and social care services are processed. This hub is typically staffed by a multidisciplinary team who can triage cases, offer advice, and coordinate service delivery.

Key Features:
1. Centralised management of referrals.
2. Integration of health and social care services.
3. Use of standardised assessment tools.
4. Facilitation of multi-agency collaboration including the importance of co-locating specialists into teams that share a common and open plan office workspace.
5. Benefits: Improved coordination of care, reduction in duplication of services, enhanced patient experience. (Ctrl)

Key Studies:
1. Study on Integrated Health and Social Care (Lewis et al., 2010): Examined the impact of SPAs in integrating health and social care services, finding that centralised SPAs can significantly reduce fragmentation and improve service delivery.
2. Evaluation of Single Point of Access in Community Mental Health Services (Cameron et al., 2014): This study evaluated a SPA model in mental health services, highlighting improvements in accessibility and patient satisfaction.

Decentralised Single Point of Access Model

Overview: Unlike the centralised model, a decentralised SPA model operates through multiple access points, usually within local community settings. Each access point can refer to and coordinate with other services as needed.

Key Studies:
1. Local SPAs and Community Health (Checkland et al., 2019): Analysed how decentralised SPAs in primary care can improve community health outcomes by providing tailored services based on local needs.
2. Impact of Decentralised SPAs on Access to Care (Morris et al., 2018): Found that decentralised SPAs improved patient satisfaction and reduced waiting times by bringing services closer to the community.

Digital Single Point of Access (e-SPA)

Overview: With the rise of digital health, e-SPAs have emerged as a model where patients and service users can access services through online platforms or digital apps. These platforms often include self-referral options, information resources, and direct links to health and social care professionals.

Key Features:
1. Online self-referral and appointment booking.
2. Digital triage and assessment tools.
3. Integration with electronic health records (EHRs). Benefits: Greater convenience for users, reduced administrative burden, 24/7 accessibility.

Key Studies:
1. Digital Health Platforms as Single Points of Access (Shaw et al., 2018): Explored the effectiveness of digital SPAs in primary care, showing that these platforms can enhance access to services, particularly for younger, tech-savvy populations.
2. Evaluating e-SPA Models in Integrated Care (Greenhalgh et al., 2019): This study looked at the role of digital SPAs in integrated care systems, concluding that they can improve efficiency but require robust digital infrastructure and support.

Hybrid Single Point of Access Model

Overview: A hybrid SPA combines elements of centralised, decentralised, and digital models. It may involve a central hub for complex cases and digital access for routine needs, with local points for community-specific services.

Key Features:
1. Centralised and local access points working in tandem.
2. Digital platforms for easy access.
3. Flexibility in addressing diverse patient needs.
4. Benefits: Combines the strengths of multiple models, offering a comprehensive and adaptable approach to access.

Key Studies:
1. Hybrid Models of Access in Health and Social Care (Lloyd & Wait, 2020): Investigated hybrid SPAs in integrated care systems, noting their potential for providing a more balanced and patient-centred approach.
2. Efficiency of Hybrid SPAs in Primary Care (Bardsley et al., 2016): This study analysed the cost-effectiveness, and patient outcomes associated with hybrid SPAs, finding that they can offer improved service delivery while being cost-effective. (Ctrl)

Condition-Specific Single Point of Access Overview

Some SPAs are designed specifically for certain conditions or patient groups, such as mental health, chronic illnesses, or elderly care. These SPAs offer specialised services and support, often integrating primary, secondary, and social care services.

Key Features:
1. Focused expertise and resources for specific conditions.
2. Integrated care pathways.
3. Dedicated case management teams.
4. Benefits: Tailored care, improved outcomes for specific patient groups, reduced fragmentation of services.

Key Studies:
1. Single Point of Access for Mental Health Services (Crawford et al., 2011): This study examined SPAs specifically designed for mental health, finding that they improve access to care and patient outcomes through specialised, coordinated services.
2. Condition-Specific SPAs in Chronic Disease Management (Barnett et al., 2014): Evaluated SPAs for chronic diseases, showing improved management of long-term conditions through integrated care pathways.

Conclusion

These models of Single Points of Access have been studied extensively, with findings generally supporting their role in improving access, coordination, and efficiency in primary and social care services. The choice of model often depends on the specific healthcare setting, patient population, and available resources, but each model has demonstrated potential benefits in different contexts. To enhance the Single Point of Access Model Framework, several elements can be incorporated to align with the goals of improving patient outcomes, reducing inefficiencies, and optimising healthcare costs.

1. Patient-centred Care
Patient Engagement: Patient-centred care focuses on tailoring care to meet individual patient needs and preferences, which enhances patient satisfaction and engagement (Greenhalgh et al., 2019).
Feedback Loops: Engaging patients in feedback loops is crucial for continuous improvement and addressing patient concerns effectively (Lloyd & Wait, 2020).

2. Technology Integration
Digital Health Platforms: The integration of digital health platforms such as telemedicine and patient portals can enhance efficiency and patient access to services (Shaw et al., 2018).
Data Analytics: Utilising big data and analytics is invaluable for improving patient outcomes, resource allocation, and cost containment (Greenhalgh et al., 2019).

3. Collaboration and Partnerships
Interagency Collaboration: Interdisciplinary cooperation in healthcare is associated with increased patient safety, lower hospitalisation rates, and improved care coordination (Checkland et al.,2019).
Public-Private Partnerships: Collaborations between public and private sectors can enhance resources and care delivery, aligning with value-based care models (Greenhalgh et al., 2019).

4. Quality Assurance and Continuous Improvement
Continuous Training Programs: Ongoing professional development and training are essential for improving healthcare workers' skills and capacity (Lloyd & Wait, 2020).
Quality Metrics and Reporting: Implementing KPIs and data analysis to monitor and assess patient outcomes is crucial for quality improvements (Greenhalgh et al., 2019).

5. Financial and Operational Efficiency
Funding Models: Exploring alternative funding models, such as performance-based incentives, can motivate better healthcare outcomes (Greenhalgh et al., 2019).
Cost-Benefit Analysis: Analysing the financial impact of interventions helps in making informed decisions about resource allocation (Greenhalgh et al., 2019).

6. Workforce Optimisation
Workforce: Addressing staff, workload management, and burnout prevention is critical for maintaining workforce capacity and performance (Checkland et al., 2019).
Flexible Workforce Models: Flexible staffing models that adapt to patient needs and demand can optimise workforce efficiency (Shaw et al., 2018). (Ctrl)

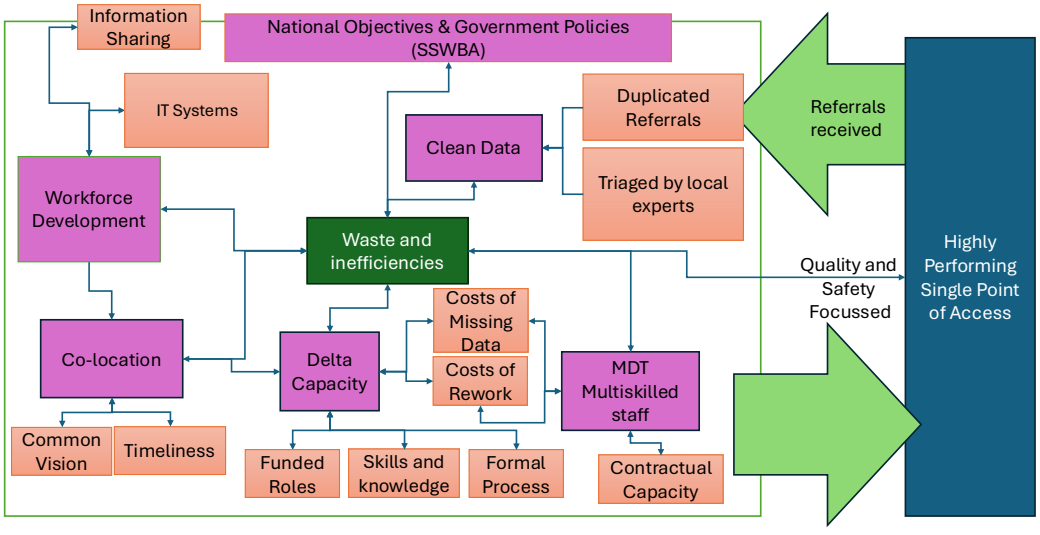
7. Sustainability and Environmental Impact
Sustainable Practices: Incorporating environmentally sustainable practices in healthcare delivery can contribute to long-term sustainability (Shaw et al., 2018).

8. Risk Management and Contingency Planning
Risk Assessment and Management: Implementing strategies to manage risks and develop contingency plans for crises is essential for healthcare resilience (Bardsley et al., 2016).

10. Governance and Accountability
Clear Accountability Structures: Strengthening governance and accountability within the framework ensures oversight and regular audits, enhancing overall system effectiveness (Cameron et al., 2014).

The literature on Single Points of Access (SPA) suggests that these systems are designed to streamline service access, improve coordination, and enhance care delivery efficiency (Lewis et al., 2010; Cameron et al., 2014). Successful SPAs are characterised by centralised referral management, integration of health and social care services, standardised assessment tools, and multi-agency collaboration, leading to improved care coordination, reduced service duplication, and enhanced patient experience (Checkland et al., 2019; Morris et al., 2018). Digital SPAs offer additional benefits such as greater convenience, reduced administrative burden, and 24/7 accessibility (Shaw et al., 2018; Greenhalgh et al., 2019). Hybrid models, which combine centralised, decentralised, and digital approaches, can provide a comprehensive and adaptable solution (Lloyd & Wait, 2020; Bardsley et al., 2016). Furthermore, condition-specific SPAs have shown promise in offering tailored care and improved outcomes for specific patient groups (Crawford et al., 2011; Barnett et al., 2014).

Single Point of Access Model Framework



Source: The Researcher (2024)

If you compare the framework (shown above from the literature stage) with the findings of the study, the researcher believes that the framework has been validated.

The information provided covers a comprehensive range of elements that contribute to an effective Single Point of Access (SPA) model:

1. Various SPA models (Centralised, Decentralised, Digital, Hybrid, and Condition-Specific) are described, each with their unique strengths and applications.
2. Key features of successful SPAs are outlined, including centralised management, integration of services, standardised assessment tools, and multi-agency collaboration.
3. The benefits of different SPA models are highlighted, such as improved coordination, reduced duplication, enhanced patient experience, and increased accessibility.
4. Additional elements for enhancing the SPA framework are provided, including patient-centred care, technology integration, collaboration and partnerships, quality assurance, financial efficiency, workforce optimisation, sustainability, risk management, addressing social determinants of health, and governance.
5. The importance of adapting the model to local needs and available resources is emphasised.
6. The provided process map and swim lane mapping visually represent the complexities and potential bottlenecks in the system, highlighting areas for improvement.

By combining these key points, this would indeed inform a comprehensive framework for a high-performing Single Point of Access. This framework would be adaptable, patient-centred, technologically integrated, and focused on continuous improvement and efficiency.

Conclusions

Summary of key findings and relevance

This study of WPCO ‘s Single Point of Access (SPA) model reveals both strengths and areas for improvement. The service demonstrates high user satisfaction, with 93.3% rating it as good or better. Key strengths include increasing numbers of preventative outcomes, high turnover of referrals, and the provision of peace of mind for users and families. However, challenges persist in technology integration, communication, and resource allocation at the front door.

These challenges are exacerbated by structural constraints:

1. Budget limitations: WPCO is provided with a set budget by the local authority, which predominantly covers staff wages, leaving little/no room for growth or an increase in volume or demand.
2. Lack of system resilience: The current structure doesn't allow for flexibility in staffing, meaning that sickness or leave has immediate adverse effects on waiting times and service delivery.
3. Limited control over technology: The systems WPCO utilises for most of their activities are owned by the local authority or the health board, limiting WPCO's ability to update or change these systems to meet evolving needs.

These constraints place WPCO in a difficult position, hindering their ability to address identified areas for improvement independently. This situation underscores the need for greater collaboration and flexibility in resource allocation between WPCO and its partnering organisations to fully optimize the SPA model.

Implications for the case company

WPCO should focus on addressing the identified bottlenecks in their SPA, particularly at the initial triage and assessment stages. However, given the constraints of their set budget from the local authority and limited control over technology systems, WPCO needs to explore creative solutions. They should prioritise optimising existing resources through enhanced staff training and workflow improvements. It's important to note that WPCO staff are already trained and qualified in line with the requirements of the Social Services and Wales Act 2014, and they undertake all training in line with the local authority requirements. Additionally, WPCO invests in bespoke training provided through private companies to ensure their staff receive the best training available. However, a challenge remains in providing staff opportunities to attend local community events while maintaining adequate staffing levels. These events often provide valuable "little gems" of information about bespoke services through word of mouth, which WPCO would benefit from accessing.

To address these systemic challenges, WPCO should advocate greater flexibility in budget allocation and technology access with their partnering organisations. This could include exploring ways to create more

flexible staffing arrangements that would allow for attendance at community events without compromising service delivery.

Furthermore, WPCO could consider developing virtual or digital methods of gathering community information to supplement physical attendance at events, which might be more feasible within their current constraints.

Implications for management practice and profession primary service delivery

The findings underscore the importance of a well-resourced and efficiently managed front door in SPA models. Managers in similar services should prioritise staff training, process optimisation, and build resilience in their systems to manage fluctuations in demand and staff availability. The study highlights the need for flexible, hybrid models that combine centralised, decentralised, and digital approaches, while also emphasising the importance of strong partnerships and clear communication channels between service providers and funding bodies.

Implications for Government Policy

Policymakers should consider the resource implications of implementing SPA models, ensuring adequate and flexible funding for staffing, technology, and system upgrades. Policies should promote integration between health and social care services to enhance coordination and reduce duplication. Furthermore, policies should address the need for greater autonomy and decision-making power for service providers like WPCO in managing their resources and technology systems, while maintaining accountability.

Implications for university teaching

Universities should incorporate case studies of SPA models like WPCO into their health and social care curricula. This would provide students with practical insights into the challenges and opportunities in implementing such models, including the complexities of working within constrained budgets and shared technology systems. Courses should also focus on developing skills in resource optimisation, partnership building, and advocating for systemic changes within complex organisational structures.

Future Research

- Compare WPCO with other SPA providers to identify the best practices and areas for improvement.
- Conduct a longitudinal study of WPCO over the next 3 years to track its evolution and adaptation to changing needs.
- Compare WPCO with American or Japanese primary care models, which are privately funded and have a long history of Total Quality Management, to identify potential innovations and improvements in service delivery.

Key Recommendations

Based on the comprehensive analysis of WPCO's Information, Advice, and Assistance (IAA) service, here are key recommendations to enhance the effectiveness and efficiency of the Single Point of Access (SPA) model:

Resource Allocation and Staffing

- Advocate for Flexible Funding: Engage with the local authority to negotiate a more flexible budget structure that allows for adaptive resource allocation based on service demand fluctuations.
- Optimise Staffing at the Front Door: Increase staffing levels at the initial point of contact to reduce bottlenecks and improve first-call resolution rates. This may involve:
  - Implementing a tiered staffing model with different levels of expertise
  - Cross-training staff to handle a wider range of inquiries
  - Developing a pool of on-call specialists for complex cases
- Implement Workforce Initiatives: Introduce programs to support staff mental health, reduce burnout, and improve job satisfaction, which can lead to better service delivery and staff retention.

Technology Integration and Data Management

- Advocate for System Integration: Work with the local authority partner and the health board to integrate disparate data systems, allowing for seamless information sharing and reducing the need for staff to navigate multiple platforms.
- Implement a Unified Case Management System: Develop or acquire a comprehensive system that can track client interactions, service history, and outcomes across all touchpoints.
- Enhance Digital Access Points: Expand and improve online self-service options, including:
  - User-friendly web portals for information and self-referrals
  - Mobile applications for easy access to services and information
  - Chatbots for initial triage and basic information provision
- Leverage Data Analytics: Implement advanced analytics tools to:
  - Predict service demand and optimise resource allocation
  - Identify trends in service usage and outcomes
  - Inform evidence-based decision-making for service improvements

Service Delivery Optimisation

- Enhance Triage Processes: Develop and implement a more robust triage system that:
  - Accurately assesses client needs at the first point of contact
  - Prioritises cases based on urgency and complexity
  - Routes clients to the most appropriate services efficiently
- Expand Preventative Services: Increase focus on early intervention and preventative measures to reduce long-term demand on intensive services. This could include:
  - Proactive outreach programs for at-risk populations
  - Community education initiatives on health and
  - Partnerships with local organisations for early identification of needs
- Implement a Hybrid SPA Model: Combine elements of centralised, decentralised, and digital models to:
  - Maintain a central hub for complex cases and coordination
  - Establish local access points for community-specific services
  - Integrate digital platforms for routine inquiries and self-service

Collaboration and Partnerships

- Strengthen Inter-agency Collaboration: Develop formal partnerships and communication channels with:
  - Local healthcare providers
  - Social services departments
  - Community organisations and charities
- Implement Shared Care Protocols: Develop and implement protocols for shared care planning and service delivery across different agencies to ensure continuity of care.
- Engage in Knowledge Sharing: Participate in regional or national networks of SPA providers to share best practices, challenges, and innovations.

Quality Assurance and Continuous Improvement

- Establish a Robust Feedback System: Implement a comprehensive feedback mechanism that includes:
  - Regular client satisfaction surveys
  - Staff feedback sessions
  - Stakeholder consultations
- Develop Key Performance Indicators (KPIs): Create a set of KPIs that accurately reflect service quality, efficiency, and outcomes. These could include:

  - First-call resolution rates
  - Wait times for assessments and services
  - Preventative intervention success rates
  - Client satisfaction scores
- Implement Continuous Training Programmes: Develop ongoing training initiatives for staff, focusing on:
  - Latest best practices in IAA service delivery
  - Technical skills for using new systems and technologies

Accessibility and Inclusivity

- Enhance Language Support: Expand language support services to ensure equitable access for diverse communities, including:
  - Multi-lingual staff recruitment
- Improve Accessibility for Disabled Users: Ensure all access points, both physical and digital, are fully accessible to users with various disabilities.
- Develop Culturally Sensitive Services: Train staff in cultural competence and develop services that respect and accommodate diverse cultural needs.

Financial Sustainability

- Explore Alternative Funding Models: Investigate and propose alternative funding structures to Carmarthenshire County Council, such as:
  - Blended funding models incorporating grants and service contracts
  - Social impact bonds for preventative services
- Implement Cost-Benefit Analysis: Regularly conduct and report on cost-benefit analyses of services to demonstrate value and justify resource allocation.
- Develop Social Value Metrics: Create and track metrics that demonstrate the broader social and economic impact of the IAA service on the community.

Innovation and Adaptation

- Establish an Innovation Fund: Propose the creation of a dedicated fund for piloting innovative service delivery models and technologies.
- Implement Agile Service Development: Adopt agile methodologies for service development, allowing for rapid testing and iteration of new ideas.
- Engage in Action Research: Partner with academic institutions to conduct ongoing action research, continuously evaluating and improving service delivery models.

Community Engagement and Awareness

- Develop a Community Outreach Strategy: Create a comprehensive plan to increase awareness of IAA services, including:
  - Targeted marketing campaigns
  - Presence at community events
  - Partnerships with local media outlets
- Implement a Community Ambassador Program: Recruit and train community members to act as ambassadors for the IAA service, helping to spread awareness and gather community feedback.

Governance and Accountability

- Enhance Reporting Structures: Develop clear, regular reporting mechanisms to the local authority and other stakeholders, demonstrating service performance, challenges, and improvements.
- Establish an Advisory Board: Create a diverse advisory board including service users, community representatives, and experts to provide ongoing guidance and oversight.
- Implement Transparent Decision-Making Processes: Develop and communicate clear processes for how service decisions are made, ensuring accountability and trust.

By implementing these recommendations, WPCO can significantly enhance its IAA service, addressing current challenges while positioning itself for future growth and adaptation. These changes will require close collaboration with the local authority and other stakeholders, as well as a commitment to ongoing evaluation and improvement. The result will be a more efficient, effective, and responsive Single Point of Access that better serves the diverse needs of the community.

Final Words

This has been the final stage of an MSc program that has stretched the researcher and added to her passion to improve NHS primary care services. This report represents many hundreds of hours of applied work, and it has brought enormous pride whilst conducting the research and reflecting on it. The researcher hopes others will find his work useful and extend it with the same passion.

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Appendix A: Ethical Approval

Swansea University
Prifysgol Abertawe

Approval Date: 14/08/2024

Research Ethics Approval Number: 3 2024 9893 10040

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	• Enhancing Access: Evaluating the Information, Advice, and Assistance Service by Delta Wellbeing for Carmarthenshire County Council
Applicant name	MRS REBECCA DAVIES
Submitted by	MRS REBECCA DAVIES /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/11962

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Dyddiad Cymeradwyo: 14/08/2024

Rhif Cymeradwyo Moeseg Ymchwil:

Diolch am gwblhau cais moeseg ymchwil am gymeradwyaeth foesegol ac am gyflwyno'r ddogfennaeth ofynnol drwy'r platfform ar-lein.

Teitl y Prosiect	• Enhancing Access: Evaluating the Information, Advice, and Assistance Service by Delta Wellbeing for Carmarthenshire County Council
Enw'r Ymgeisydd	MRS REBECCA DAVIES
Cyflwynwyd gan	MRS REBECCA DAVIES /
Dolen i'r ffurflen gais lawn	https://swansea.forms.ethicalreviewmanager.com/Project/Index/11962

Page 1 of 2

Mae'r pwyllgor moeseg Humanities and Social Sciences wedi cymeradwyo'r cais moeseg ymchwil, yn amodol ar yr amodau a amlinellir isod:

Amodau cymeradwyo

1. Mae'r gymeradwyaeth yn seiliedig ar yr wybodaeth a roddir yn y cais, a gwneir y gwaith yn unol â hyn. Yr ymgeisydd sy'n gyfrifol am sicrhau bod yr holl reoliadau, polisïau a deddfau mewnol ac allanol perthnasol yn cael eu dilyn.

- Gall y prosiect hwn gael ei adolygu gan y pwyllgor o bryd i'w gilydd. Gellir atal neu ddirymu'r gymeradwyaeth ar unrhyw adeg os bydd yr amodau'n cael eu torri.
- Caiff unrhyw addasiadau sylweddol i'r cais a gymeradwywyd eu cyflwyno i'r pwyllgor moeseg cyn i'r fath newidiadau gael eu rhoi ar waith.

Amodau penodol ynghylch y cais hwn:

Barnwyd bod y cais yn risg Low i'r Brifysgol.

Dim amodau ychwanegol.

Datganiad o gydymffurfiaeth

Penodir y pwyllgor yn unol â'r trefniadau llywodraethu ar gyfer pwyllgorau moeseg ymchwil. Mae'n cydymffurfio â chanllawiau Ymchwil ac Arloesi yn y DU (UKRI) a'r concordat i gefnogi uniondeb ymchwil.

Cadeirydd Ymchwil a Moeseg, Humanities and Social Sciences

Prifysgol Abertawe.

Os oes gennych ymholiadau ynghylch yr hysbysiad hwn, yna mae croeso i chi gysylltu â gweinyddwr moeseg ymchwil eich cyfadran.

- Ar gyfer Gwyddoniaeth a Pheirianneg, e-bostiwch FSE-Ethics@abertawe.ac.uk

- Ar gyfer Meddygaeth, Iechyd a Gwyddor Bywyd, e-bostiwch FMHLS-Ethics@abertawe.ac.uk
- Ar gyfer y Dyniaethau a'r Gwyddorau Cymdeithasol, e-bostiwch FHSS-Ethics@abertawe.ac.uk

Appendix B: Research interview questions

What is your name and job title

Do you consent to taking part in this interview?

1. Please describe the main purpose of the IAA service.

2. In your opinion how accessible and usable is the IAA service to the public?

3. In what ways does the service effectively address the diverse needs of the community, including linguistic, cultural, and socio-economic considerations?

4. What are the key challenges faced by service providers in delivering timely and accurate information and advice?

5. How does the Information, Advice, and Assistance service align with the strategic objectives and priorities of both Delta Wellbeing and Carmarthenshire County Council?

6. What recommendations can be made for optimising the service delivery process and maximising its impact on community well-being?

Appendix C: Research questionnaire



I consent to complete this questionnaire (yes/no)

- ○ Yes
- ○ No - Thank you for your help. You may now close this window.

What is your professional role?

- ○ Senior practitioner
- ○ Nurse
- ○ Social worker
- ○ Occupational Therapist
- ○ Team Leader
- ○ IAA Adviser
- ○ Community Wellbeing Officer
- ○ Community Wellbeing Officer (Hospital Based)
- ○ Head of service
- ○ Director

In your opinion, what is the main reason individuals would contact Delta Wellbeing

- ◯ Requests for information for carers
- ◯ Request information on community support
- ◯ Social work assessments
- ◯ Referral for third sector organisations
- ◯ CONNECT Referral
- ◯ Occupation therapy referral
- ◯ Physio referral
- ◯ Safeguarding
- ◯ Other - please state

Please review each service and how often you would request the Delta Service

	Never Use	Rarely Use	Sometimes Use	Often Use	Always
Information for carers	○	○	○	○	○
Information on community services	○	○	○	○	○
Social work assessment	○	○	○	○	○
Referral for third sector organisations	○	○	○	○	○
CONNECT referral	○	○	○	○	○
Occupational therapy referral	○	○	○	○	○
Physio referral	○	○	○	○	○
Safeguarding	○	○	○	○	○

For the range of organisations you deal with - how effective is Delta at providing Information Advice and assistance

	Excellent	Good	Satisfactory	Unsatisfactory
For you	○	○	○	○
For your employer	○	○	○	○
For your service user	○	○	○	○

In your professional opinion, please rate the following statements from the perspective of your service user:

	Very poor	Poor	Neutral	Good	Very Good	Not Applicable
Time to get through to Delta when needed	○	○	○	○	○	○
Time for Delta to get back to me	○	○	○	○	○	○
Quality of information provided	○	○	○	○	○	○
Relevance of information provided	○	○	○	○	○	○
Completeness of service requests	○	○	○	○	○	○

How well does the service, provided by Delta Wellbeing, address the needs of a diverse community?

	Not at all	Parially	Mostly	Always
Diversity of language	○	○	○	○
Cultural diversity	○	○	○	○
Socio-Economic backgrounds	○	○	○	○
Equity of access to care	○	○	○	○
Religious diversity and appropriateness	○	○	○	○

How do staff members perceive their role in delivering the service, and what support or resources do they identify as necessary for improving service delivery?

What are the challenges faced by service providers in issuing timely and high quality advice?

	Not a significant challenge	moderate challenge	Really challenging	NOT APPLICABLE
Up-to-date information on local services	○	○	○	○
On-line materials	○	○	○	○
Relevant information for the specific service user and their unique conditions	○	○	○	○
Waiting for oversight from an expert (to aid the referral process)	○	○	○	○
General process delays	○	○	○	○

Maintaining the single point of access	○	○	○	○
Ensuring enough front line capacity to meet demand	○	○	○	○
Coping with multiple referrals for the same service user	○	○	○	○
Determining the priorities for the service user	○	○	○	○
Prioritising statutory services	○	○	○	○

In your opinion, what are the most effective methods for promoting awareness of the Delta service to your local community?

How does the information and service provided by Delta align with the strategic needs and priorities of your organisation?

What recommendations would you suggest for optimising the service delivery process?

What would you recommend to maximise the service impact on community wellbeing in the short term?

What would you recommend to maximise the service impact on community wellbeing in the long term?

Is there anything else you would like to share with us?

Appendix D: Questionnaire results

What is your professional role? 18

What is your professional role?	Average	Minimum	Maximum	Count
Senior practitioner	1.00	1.00	1.00	1
Nurse	-	-	-	0
Social worker	3.00	3.00	3.00	1
Occupational Therapist	-	-	-	0
Team Leader	12.00	12.00	12.00	3
IAA Adviser	7.00	7.00	7.00	3
Community Wellbeing Officer	8.00	8.00	8.00	2

In your opinion, what is the main reason individuals would contact Delta Wellbeing 18

Q3 - In your opinion, what is the main reason individuals would contact Delta Wellbeing - Selected Choice	Percentage	Count
Requests for information for carers	0%	0
Request information on community support	6%	1
Social work assessments	56%	10
Referral for third sector organisations	0%	0
CONNECT Referral	28%	5
Occupation therapy referral	0%	0
Physio referral	0%	0

Please review each service and how often you would request the Delta Service 15

Please review each service and how often you would request the Delta Servic... ↑	Never Use	Rarely Use	Sometimes Use	Often Use	Always
Information for carers	2	1	5	6	1
Information on community services	2	0	4	5	3
Social work assessment	3	2	1	4	5
Referral for third sector organisations	2	2	4	5	2
CONNECT referral	1	2	2	7	3
Occupational therapy referral	3	2	3	5	2
Physio referral	3	4	3	3	2

For the range of organisations you deal with - how effective is Delta at providing Information Advice and assistance 17

For the range of organisations you deal with - how effective is Delta at p... ↑	Excellent	Good	Satisfactory	Unsatisfactory
For you	14	3	0	0
For your employer	14	3	0	0
For your service user	12	4	0	0

In your professional opinion, please rate the following statements from the perspective of your service user: 16

In your professional opinion, please rate the following statements from the...	Very poor	Poor	Neutral	Good	Very Good
Time to get through to Delta when needed	0	1	3	7	5
Time for Delta to get back to me	0	0	3	9	4
Quality of information provided	0	0	0	3	13
Relevance of information provided	0	0	0	2	14
Completeness of service requests	0	0	0	1	14

How well does the service, provided by Delta Wellbeing, address the needs of a diverse community? 17

How well does the service, provided by Delta Wellbeing, address the needs o...	Not at all	Parially	Mostly	Always
Diversity of language	0	0	7	10
Cultural diversity	0	0	5	12
Socio-Economic backgrounds	0	0	5	12
Equity of access to care	0	0	5	12
Religious diversity and appropriateness	0	0	5	12

How do staff members perceive their role in delivering the service, and what support or resources do they identify as necessary for improving service delivery? 20

How do staff members perceive their role in delivering the service, and wha...

My role is to ensure that people are aware of what services are available to them and to assist them to access the service if required. I feel that to improve the service we need to reach more people, and to do this we need to recruit more staff. We also need to attend more networking forums to improve our knowledge on what is available in the community so that the information we are providing is relevant and up to date

The staff feel they provide a valuable service, however can get stressed with the volume of referrals hitting the system

It is a very important role, ensuring that people in the community are getting the information that they need in order to access the service that they need. More local information would be beneficial as we are not aware of everything that is available in every locality.

What are the challenges faced by service providers in issuing timely and high quality advice? 17

What are the challenges faced by service providers in issuing timely and hi...	Not a significant challenge	moderate challenge	Really challenging
Up-to-date information on local services	3	10	2
Prioritising statutory services	5	8	3
On-line materials	4	12	0
Relevant information for the specific service user and their unique conditi...	3	9	3
Waiting for oversight from an expert (to aid the referral process)	3	12	2
General process delays	3	8	5
Maintaining the single point of access	5	9	1

In your opinion, what are the most effective methods for promoting awareness of the Delta service to your local community? 20

In your opinion, what are the most effective methods for promoting awarenes...

I would have to say that attending community events, advertising in local newspapers (not everyone has internet),

advertising and information on website

Radio campaigns, news articles and social media

Social media and also posters/leaflets in as many places within the community where people of the community access.

How does the information and service provided by Delta align with the strategic needs and priorities of your organisation? 20

How does the information and service provided by Delta align with the strat...

The information and Service provided by Delta aims to keep people living at home independently for as long as possible, and aims to avoid using statutory resources where not needed - allowing statutory resources to be delivered to the people who are in need of the Support. It also helps third sectors to deliver their services and to grow, and it empowers people to make their own choices

Delta is the local authority's information, advice and assistance service it is an incredible support to the local authority because it promote independence, voice and control and ensures that those individuals who can support themselves receive sufficient support to do so.

Social care is at the centre of all that we do, we work on the on preventative and pro-active services, so this is perfectly aligned.

What recommendations would you suggest for optimising the service delivery process? 20

What recommendations would you suggest for optimising the service delivery...

I feel that it would be beneficial for staff to attend / complete relevant courses such as Customer Services, and for there to be better communication within the organisation, and for information to be shared at the same time to staff to avoid confusion

Delta are aware that at times there has been issues in people being able to get through. However, they have worked tirelessly to look at ways to improve this.

More resource at the front door to ensure all referrals are actioned in a timely manner

Increase frontline staff to prevent backlog

What would you recommend to maximise the service impact on community wellbeing in the short term? 20

What would you recommend to maximise the service impact on community wellbe...

More awareness on what we do (Advertising on radio, in newspapers), hold open days for the public, recruitment events

The service is excellent

Change of priority with regards to statutory referrals, IAA are benched marked on preventative outcomes. IAA are the front door to adult social care and deal with all requests including statutory.

It is important to provide up-to-date, quality information and in a timely manner which will increase community wellbeing, therefore increasing frontline staff will help to maximise the service impact

What would you recommend to maximise the service impact on community wellbeing in the long term? 20

What would you recommend to maximise the service impact on community wellbe...

More staff training, More awareness on what we do (Advertising on radio, in newspapers), hold open days for the public, recruitment events

Investment in preventative service to reduce or delay individual access in to statutory services, encouraging a TEC first approach

As above, and long-term this will promote a proactive approach to health and wellbeing with community support in place and reducing requirement for statutory intervention

Examining the barriers and enablers to deploying innovative healthcare technologies in Wales

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Abstract:

This report examines the barriers and enablers to deploying innovative health technologies within the Welsh healthcare system. Through a literature review, and a primary research questionnaire distributed to healthcare innovation leaders, the study identifies key factors influencing the adoption and deployment of technologies such as artificial intelligence, digital health tools, and medical devices. The findings reveal that while innovative technologies can significantly improve patient outcomes and operational efficiency, barriers such as financial constraints, resistance to change, and outdated digital infrastructure pose significant challenges. Conversely, strong leadership, a culture of innovation, and stakeholder collaboration are crucial enablers for successful deployment. The report offers strategic recommendations to overcome these barriers, including enhancing resource allocation, modernising digital infrastructure, and fostering a culture that encourages experimentation and risk-taking. These actions are essential for Welsh healthcare organisations to leverage the transformative potential of emerging technologies and deliver improved patient care, operational efficiency, and sustainable services.

Keywords: Technological Innovation, Health Technologies, Barriers and Enablers to Technology Deployment, Deployment challenges, Emerging Technology, Innovation Adoption, Culture, Collaboration, Resource Allocation, Health Efficiencies

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INTRODUCTION

BACKGROUND AND CONTEXT

The NHS and healthcare sector across the United Kingdom are facing unprecedented pressure and demand. Critical to this are the twin challenges of an ageing population and increasing rates of chronic illnesses, presenting a situation where this increased demand must be balanced against limited resources and cost-containment caused by austerity (Montgomery et al., 2017). Healthcare innovations are a vital tool in creating solutions to manage these demands, whilst also seeking to improve patient outcomes and enhance the efficiency of healthcare delivery. As outlined in 'A Healthier Wales' (Welsh Government, 2018), the Welsh Government plan for health and social care, and supporting innovation policies and strategies highlighted in Table 1. Technological innovations in particular have tremendous transformative potential in healthcare (Liu et al., 2022); diagnostic tools, medical devices, artificial intelligence, and digital health solutions offer huge opportunities to improve health, patient outcomes, and experiences. However, the journey from innovation to adoption and deployment continues to present significant challenges across the sector, with research showing the average lag time for technological innovations to be translated into routine practice is 17 years, and requires significant investment from health organisations (Sauchelli et al., 2023).

These challenges underscore the urgent need for innovative solutions that support and enable more effective and sustainable healthcare services. Although there is a need to embrace these emerging technologies, they will not deliver improvements in productivity on their own and may inadvertently create inefficiencies, staff frustration, and threaten the quality of care if careful implementation is not adhered to (Imision et al., 2016). Moreover, healthcare innovations are particularly complex, often blending product and process novelties and incorporating both embodied and disembodied components, with varying degrees of tangibility (Barnett et al., 2011). It is therefore crucial that the factors affecting the deployment of innovations are understood to enhance the chance of success, providing the rationale for further research in the context of the Welsh healthcare sector.

Consequently, this research report seeks to explore these specific barriers and enablers to deploying innovative technology in Wales. Through identifying and understanding these factors, this paper aims to provide insights that can inform the development of innovation strategies, guide healthcare organisations in deploying innovative technologies to leverage the transformational potential and contribute to the improvement of sustainable healthcare services in Wales.

Table 11. Innovation Strategies and Policies

Title	Year	Publisher	Purpose
A Healthier Wales: our Plan for Health and Social Care	2018	Welsh Government	Sets out a long-term future vision of a 'whole system approach to health and social care,' which is focussed on health and wellbeing, and on preventing illness.
Wales Innovates: creating a stronger, fairer, greener Wales – innovation delivery plan	2023	Welsh Government	Sets out an aspiration for Wales to be a leading, innovation-based nation, focusing on ensuring innovative new technologies are developed to help solve the biggest challenges facing communities.
Charter to develop healthcare innovation in Wales	2023	Welsh Government	Collaboration between AstraZeneca, the Welsh Government, Swansea University, and Life Sciences Hub Wales to develop new methods for diagnosing and treating illnesses, focusing on patient priorities. This partnership will align health and economic policies to prioritise innovative healthcare technologies and medicines.

RESEARCH STRUCTURE

The report will aim to answer the research question: 'What are the barriers and enablers to deploying innovative health technologies in Wales?', and will begin with an analysis of the current literature on innovative technologies in healthcare; examining the proposed benefits for organisations, and the key barriers and enablers to their deployment in healthcare systems, while further identifying and categorising the most significant factors of each. Subsequently, the chosen research methodology and design will be outlined before conducting a data analysis of the responses to the primary research questionnaire, distributed to innovation leads and other networks across the Welsh innovation and healthcare sectors. This analysis will compare the insights obtained from the research with the current literature findings,

providing key recommendations to healthcare organisations looking to effectively deploy technology innovations in healthcare.

RESEARCH OBJECTIVES

- Explore the current literature on deploying and adopting innovative health technologies within the healthcare sector.
- Gain an understanding of the impact and benefits that innovative technology deployment has for healthcare providers and patients.
- Identify the barriers and enablers faced by innovation practitioners in deploying innovative and emerging technology in Wales.
- Propose recommendations to healthcare providers in Wales that will assist with the effective deployment and adoption of technological innovations.

LITERATURE REVIEW

A literature review was conducted to guide and justify the research project, providing knowledge and context of the current research in the field which will function as a reference point for the results and analysis. Table 2 outlines the activity and search criteria process for the publications referenced in the review.

Table 2. Literature Review Activity

Activity	Process
Search Criteria	*Keyword searches*: Innovative technology, barriers and enablers to deploying innovative technology, digital health technology, digital innovations, technological innovations, healthcare innovation. *Additional terms*: barriers, enablers, benefits, individual factors, social factors, organisational factors, healthcare, adopting, implementing, deploying.
Repositories	PubMed Central, PubMed, JSTOR, Google Scholar, SpringerLink, and ScienceDirect. These databases offered the greatest access to publications, specifically healthcare-related journals, while also being accessible through Swansea University Velindre NHS Trust/Cardiff University Licenses.
Additional Criteria	Acceptance criteria for publications were established on the quality of the journal it was published in, the date it was published, relevance to the research question, and the relevance to the field of healthcare. Only publications since 2010 were selected for the review of barriers and enablers, with earlier publications being accepted for definitions when no other source was available.

Introduction

Technological innovations are becoming increasingly important in improving healthcare service delivery and outcomes as the sector faces unprecedented pressures on demand. Evidence suggests that innovations in healthcare have increased patient life expectancy and quality of life, rising 9.8% between 2000 and 2020 (Gomes-Osman et al., 2021), while also facilitating easier access to diagnostic-path options, treatment, and care for patients (Palm and Fischier, 2021; Polisena et al., 2009; Shigekawa et al., 2018). Moreover, healthcare innovations can reduce organisational costs and generate efficiency (Guarcello & De Vargas, 2020; Nascimento et al., 2023; Jiang et al., 2017), while process and service innovations can greatly impact operational performance (Moreira et al., 2017). Furthermore, innovations such as wearables, artificial intelligence decision-making, and remote telemedicine, improve the technical performance and satisfaction of healthcare employees, with further potential to reduce the costs of services and enhance the quality of care (Nascimento et al., 2023).

In reviewing the literature, no clear consensus on the definition of innovative technology within healthcare is evident, with much of the research focusing on innovation and technology as separate entities. Furthermore, various terminology exists within the literature concerning specific applications of technology, which broadly intertwine to fall under the term digital health technologies. Table 3 summarises these definitions. However, for this report, 'innovative technology' will be used to describe all new applications of digital health technologies, including the terms digital health, telemedicine, e-health, and emerging technology while utilising Wienroth & O'Neill's (2023) definition of research, development and the deployment of new devices, materials, equipment, but also of procedures and processes, including software, novel services and systems, and analysis approaches.

Table 3. Innovative Technology in Healthcare Definitions

Terminology	Definition	Author
e-Health	"eHealth is the application of information and communications technologies (ICT) across the whole range of functions that affect health."	(Silber, 2003)

Telemedicine	"The delivery of health care and sharing of medical knowledge over a distance using telecommunication system."	(Thrall & Boland, 1998)
Digital Health Technology	"a broad umbrella term encompassing eHealth as well as emerging areas, such as the use of advanced computing sciences in big data, genomics, and artificial intelligence"	(Ali et al., 2022)
Emerging Technology	"Emerging technologies as science-based innovation that have the potential to create a new industry or transform existing ones. They include discontinuous innovations derived from radical innovations, as well as more evolutionary technologies formed by the convergence of previously separate research streams"	(Day & Schoemaker, 2000)

Research in this area is vast on the proposed benefits that technological innovations can provide, as summarised in Table 4, however, there may be limited value to practical application within the healthcare sector, with the challenge of deploying and subsequently adopting such technology persisting due to its naturally complex environment (Wong et al., 2021). Consequently, this review will focus on exploring the factors that can facilitate or impede the deployment of innovative technologies, which are becoming increasingly essential to achieving improved outcomes for patients, solving live system pressures, and generating sustainability for health organisations; a view echoed in the Welsh government innovation strategy (Welsh Government, 2023a).

Table 4. Benefits of Innovative Technologies in Healthcare

Benefits	Literature
More informed and efficient decision-making	(Barbarito et al., 2015)
Increase patient outcomes, quality of life and life expectancy	(Polisena et al., 2009; Palm & Fischier, 2021; Buntin et al., 2011; Topol, 2019)
Reduce organisational costs and increase cost-effectiveness	(Guarcello & De Vargas, 2020; Martínez Álvarez et al. 2011; Nascimento et al., 2023; Jiang et al., 2017; Goldzweig et al., 2009)
Enhance the quality of care	(Nascimento et al., 2023; Faré et al., 2014)
Increased access to care	(Shigekawa et al., 2018; Palm & Fischier, 2021; Chapman & Arunatileka, 2010)
Increased operational performance	(Moreira et al., 2017)
Patient empowerment	(Babbage et al., 2020)

Barriers and Enablers to Deploying Innovative Technology

Innovative technology in healthcare holds significant potential to transform healthcare organisations, however, research indicates that alongside these opportunities, numerous challenges persist in the deployment process, hindering successful implementation. The literature review will examine the most common and significant factors identified as barriers or enablers, categorised under individual, social and organisational levels, Table 5 shows the definitions of the terms that will be used, while Table 6 presents a summary of the most common and significant factors identified in the review.

Table 5. Barriers, Enablers and Factor Levels Definitions

Term	Report Definition	Literature
Barrier	Factors that impede or hinder the successful implementation of a process, intervention, or technology.	(Leach & Veziari, 2022; Grol & Wensing, 2004)
Enabler	Factors that facilitate or support the implementation or success of an intervention, innovation, or technology.	(Leach & Veziari, 2022; Grol & Wensing, 2004)
Individual	Attitudes, motivations, and behaviours of a person which influence their ability or willingness to engage with technological innovations.	(Zhao & Kemp, 2013; Stone & Eddy, 1996)
Social	Dynamics of different groups of people within the organisation whose interactions, attitudes, culture, dynamics, and relationships affect the deployment of technological innovations.	(Schepers & Van Den Berg, 2006; Zhao & Kemp, 2013)
Organisational	An organisation's structural and cultural elements that influence the deployment of technological innovations.	(Zhao & Kemp, 2013; (Stone & Eddy, 1996)

Furthermore, these factors have been utilised to provide a rationale for the development of the questions presented for analysis in the primary research questionnaire.

Table 6. Barriers and Levels to Innovative Technology

Level	Barrier	Enabler
Individual	Increased workload and time for integration (Gagnon et al., 2012; Lluch, 2011; McGinn et al., 2011; Schreiweis et al.,2019; Mair et al., 2012) Lack of accessibility to the new technology (Gagnon et al., 2012) Lack of trust in the new technology (Lluch, 2011; Wong et al., 2021) Resistance to changes at work (Koivunen & Saranto, 2018; Greenhalgh et al., 2017; Johnsson, 2017; Young et al., 2011; Mair et al., 2012) Fear of being replaced by the new technology (Koivunen & Saranto, 2018) Perceived productivity loss (Kruse et al., 2016; McGinn et al., 2011)	Previous experience, skills, and familiarity with general technology (Gagnon et al., 2012; Koivunen & Saranto, 2018; McGinn et al., 2011; Schreiweis et al., 2019) Training and education on how to use the new technology (Koivunen & Saranto, 2018) Perceived benefits of using the new technology (Kruse et al., 2016) Perceived ease of use of the new technology (Gagnon et al., 2012) Motivation to uptake the new technology (Gagnon et al., 2012; McGinn et al., 2011)
Social	Perceived detriment to patient outcomes and the staff-patient interactions (Gagnon et al., 2012; Koivunen & Saranto, 2018; McGinn et al., 2011) Staff negative attitudes and resisting the new technology (Gagnon et al., 2012; Greenhalgh et al., 2017; (Barchielli et al., 2021) Social pressure/clinician perception of impersonal care (Sinclair et al., 2013)	Perceived benefits to patients and enrichment of the staff-patient interactions (Gagnon et al., 2012; Koivunen & Saranto, 2018; McGinn et al., 2011) Colleagues' positive attitudes accepting of the new technology (Gagnon et al., 2012; Greenhalgh et al., 2017 Collaboration and partnerships (Sunderland, 2018; Johnsson, 2017; Kosiol et al., 2024; Huynh, 2024) Patient and staff input in the innovation process (Livingstone et al., 2021; Geerligs et al., 2018)
Organisational	Governance and Data privacy (Quach et al., 2022; Kosiol et al., 2024) Regulation and compliance (Asthana et al., 2019) Financial constraints and focus on cost containment (MacNeil et al., 2019; Johnsson, 2017; Adams et al, 2006) Lack of training and support for integrating the new technology (Kruse et al., 2016; Schreiweis et al., 2019) Lack of management or leadership support (Barnett et al., 2011) Incompatibility of technology with work practices and systems (Walker et al., 2023; Gagnon et al., 2012; Kruse et al., 2016; Lluch, 2011; Schreiweis et al., 2019) Depersonalisation of health delivery and changing work culture from the introduction of the new technology (Lluch, 2011) Complex procurement processes (MacNeil et al., 2019)	Positive innovation culture (Andersson et al., 2023; Day-Duro et al., 2020; Kelly & Young, 2017; Kosiol et al., 2024) Koivunen & Saranto, 2018) Funding and financial incentives (Kosiol et al., 2024; Berghöfer et al., 2020) Support from management to uptake the new technology (Gagnon et al., 2012) Leadership guiding and supporting the introduction of new technology (Ingebrigtsen et al., 2014)

BARRIERS TO DEPLOYING INNOVATIVE TECHNOLOGY

INDIVIDUAL

Individual factors refer to the emotions and behaviours of a person which influence their ability or willingness to engage with technological innovations, and therefore act as a barrier or enabler to deployment. The most significant barriers relate to increased workload due to the time taken to integrate with the new technology (Schreiweis et al.,2019); requiring staff to relearn their work processes to become the new routine, in an

already high-demand environment, and therefore resulting in reduced productivity (Kruse et al., 2016). Moreover, research shows that fears exist among staff that the technology may replace them in their role (Koivunen & Saranto, 2018), and similarly, display a lack of trust in the technology (Lluch, 2011), suggesting causation and highlighting the importance of emotion as a factor in the acceptance of technology by the individual (Wong et al., 2021).

SOCIAL

Social factors refer to the dynamics of different groups of people within the organisation whose interactions, culture and relationships affect the deployment of technological innovations. Research by Gagnon et al. (2012) found that perceived detriment to patient outcomes and staff-patient interactions caused by technological- innovations presented a significant barrier to deployment within healthcare. Moreover, Sinclair et al. assert that clinicians' perception that technology amplifies the issue of impersonal care, and the resulting social pressure on other clinicians, plays a large part in the successful adoption of technology, findings that were echoed by Greenhalgh et al. (2017) who found acceptance by peers to be the most important factor. Consequently, staff's negative attitudes towards these innovations create resistance to the technology and impede its effectiveness when deployed (Barchielli et al., 2021)

ORGANISATIONAL

Organisational factors are an organisation's structural and cultural elements that influence the deployment of technological innovations. Barriers identified in the literature include financial constraints and focus on cost containment (MacNeil et al., 2019; Johnsson, 2017), complex bureaucratic processes relating to procurement (MacNeil et al., 2019), governance (Quach et al., 2022) and the regulations (Asthana et al., 2019) that must be adhered to within healthcare. Furthermore, a lack of training and assistance to integrate the technology (Kruse et al., 2016; Schreiweis et al., 2019) along with management and leadership support (Barnett et al., 2011) were further inhibitors identified at the organisational level. While these barriers present a significant challenge to technology adoption, perhaps the biggest issue within the healthcare sector is the incompatibility of technological innovations with the current digital infrastructure, creating interoperability issues due to the lack of standardisation and the prevalence of legacy systems (Walker et al., 2023).

ENABLERS TO DEPLOYING INNOVATIVE TECHNOLOGY

INDIVIDUAL

Similar to the barriers at the individual level, perception plays an important role in the acceptance of technology. Kruse et al. (2016) surmise that the perceived benefit of using the new technology enhances its chances of success, while Gagnon et al. (2012) found ease of use of the new technology was also an enabler; consequently, these perceptions then increase the motivation of individuals to uptake the new technology (McGinn et al., 2011). However, the most common factors evident within the literature refer to the previous experience, skills, and familiarity with general technology (Gagnon et al., 2012; Koivunen & Saranto, 2018), acting as a counter to the fears and emotions presented in the barriers.

SOCIAL

Many of the barriers at the social level are also identified as enablers in the literature when those perceptions are inversed to hold positive attitudes towards the technology (Gagnon et al., 2012). Research by Kosiol et al. (2024) additionally identifies the importance of collaboration and partnerships with industry, allowing healthcare organisation to leverage knowledge transfer and technology sharing. Similarly, staff and patient co-production in the innovation process is seen as equally important to ensure acceptance and effectiveness in deployment (Livingstone et al., 2021), suggesting a correlation with the attitudes held towards the innovation.

ORGANISATIONAL

Organisational enablers rely heavily on the support provided by the healthcare organisation and whether its culture facilitates innovation. Kosiol et al. (2024) suggest this support comes from funding allocation and financial incentives from leadership by allocating sufficient budgets to adopt innovations, while research by Ingebrigtsen et al. (2014) proposes it is the guidance and backing of leaders that presents a significant enabler. Arguably, it is this management support that helps foster a culture of innovation within an organisation and it is proposed that this interdependency is the critical factor at the organisational level in

enabling technological innovation. Leaders who champion innovation by encouraging new ideas and providing necessary support, create a positive innovation culture which enables healthcare organisations to effectively deploy innovations and enhance patient outcomes (Andersson et al., 2023; Day-Duro et al., 2020).

CONCLUSION

This review of the barriers and enablers to deploying innovative technology in healthcare identified the most significant factors consistently highlighted throughout the literature and categorised them at the individual, social and organisational levels, summarised in Table 5. These factors provide the rationale for the questions included in the primary research questionnaire presented for analysis in section 3 of this report and will be examined in the context of healthcare organisations across Wales.

MAIN ANALYSIS

This section of the report will first outline the chosen research methodology and design before presenting the key findings of the research; specifically focusing on the most important barriers and enablers to deployment identified by participants within the Welsh healthcare sector. The main analysis will utilise the findings from the literature review, which contributed context and insight into the significant factors faced by organisations seeking to implement innovative technologies, while also providing secondary data for comparison to the primary research conducted. Following the research questionnaire analysis, key recommendations will be presented in section 4 to assist healthcare organisations in Wales with deploying innovative technologies and realising their potential benefits.

RESEARCH METHODOLOGY AND DESIGN

The chosen research methodology will be presented, providing the rationale for its use in examining the research proposal by focusing on innovation practitioners and leaders within the Welsh healthcare landscape. These findings will be analysed in relation to those presented in the literature review, with a focus on determining whether the barriers, enablers and perceived benefits are unique to Wales or align with those faced across the United Kingdom and Europe.

RESEARCH QUESTIONNAIRE

A mixed methods approach has been utilised through a primary research questionnaire, consisting of quantitative and qualitative questions, allowing for a more comprehensive approach to answering the research question. Combining both methods provides the research with more detailed insights and allows for the generalisability of the results, supplying richer and more nuanced data for analysis that could not be gained from a single approach (Johnson et al., 2007). The choice of a research questionnaire was preferred due to the small sample of the participants targeted, specifically, innovation practitioners and managers responsible for deploying and adopting innovative health technologies in Wales. Purposive sampling ensures participants have a direct experience of the factors that impede or enable innovation in their organisation, thus ensuring the relevance to the study goals and the accuracy of the insights obtained (Palinkas et al., 2013). Table 7 summarises the questionnaire methodology, Appendix 1 shows the Ethics approval for research.

Table 7. Questionnaire Methods

Method	People who were innovation leaders or practioners within healthcare across Wales. Respondents were specifically selected based on their job role, engagement in innovation, and experience working within the field.
Participant selection	Questionnaire link was distributed to the researchers' own connections and through access to specific distribution lists and networks including the NHS Wales Innovation Leads Group (NWILG), Life Science Hub Wales and Health Technology Wales (HTW).
Questionnaire Distribution	Quantitative questions with qualitative open responses to add additional detail and context. Benefits, barriers, and enablers were chosen based on the significant factors identified in the literature and the researchers own experience as an innovation project manager, presented in a ranking format 1-10, with 1 being the most significant and 10 the least.
Types of Questions	Quantitative questions with qualitative open responses to add additional detail and context. Benefits, barriers, and enablers were chosen based on the significant factors identified in the literature and the researchers own experience as an innovation project manager, presented in a ranking format 1-10, with 1 being the most significant and 10 the least.

Questionnaire Design	The questionnaire consisted of 15 questions, three covering the participants professional background and 12 themed sections relevant to the research question: 1. Role type – clinical or non-clinical 2. Job title 3. Years of experience (<1/1-5/>5-10/>10-15/>15-20/>20) 4. Familiarity with the current innovative and emerging technologies available within healthcare 5. Ranked benefits of deploying innovation technologies (1-8) 6. Extent to which innovative technologies are currently being used in their organisation (5-point Likert scale) 7. Ranked barriers to deploying innovative technologies (1-10) 8. Open question for additional barriers participants have experienced in their organisation for further insight 9. Ranked enablers for deploying innovative technologies (1-10) 10. Open question for additional enablers participants have experienced in their organisation for further insight 11. Adequacy of current resources and support for deploying innovative technologies (5-point Likert scale) 12. Importance of patient input and education for deploying innovative technologies (5-point Likert scale)
	13. Importance of staff input and education for deploying innovative technologies (5-point Likert scale) 14. Open question for the most promising emerging technologies that could transform healthcare in Wales in the next 5-10 years 15. Open question for recommendations to healthcare organisations looking to adopt new technologies
Form of recording	Questionnaire responses were collected using Microsoft Forms, all responses are anonymised and secure, with only the researcher having access.

ANALYSIS OF DATA

The purpose of this section is to present a review of the findings from the research questionnaire, followed by an analysis of the results and a comparison against those identified in the literature review, highlighting the similarities and differences between the findings and those found in Wales.

RESEARCH QUESTIONNAIRE

The research questionnaire was developed using Microsoft Forms and received 23 responses. All respondents were required to be directly involved, or engaged with, innovation activities within their organisations in Wales.

JOB ROLES

A summary of participant's job roles is shown in Figure 1, with 96% identifying their role as non-clinical. Results show 62% of respondents have job roles primarily focussed on innovation activity, consisting of Head of Innovation, Innovation Project / Programme Manager, and Innovation Lead. 25% were Head of Service for their department, and therefore have responsibility for overseeing innovation activity, while the remaining 13% were engaged with innovation as part of their job role. The findings underscore the validity of the research study data through the appropriateness of respondent's job roles and expertise in answering the research question.

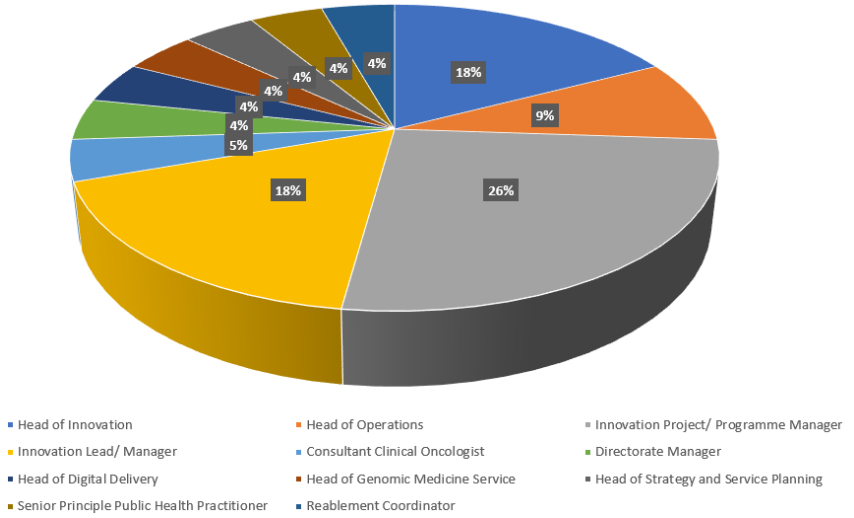


Figure 1. Participants Job Roles

YEARS OF EXPERIENCE IN THE HEALTHCARE SECTOR

Figure 2 shows the participant's years of experience in the healthcare sector. 9 respondents answered that they had over 20 years of experience, accounting for 40% of all responses, evidencing the breadth of expertise and knowledge of the participants. In total, 86% had over five years of experience, further highlighting the credibility of their insights, and aligning with the research objectives.

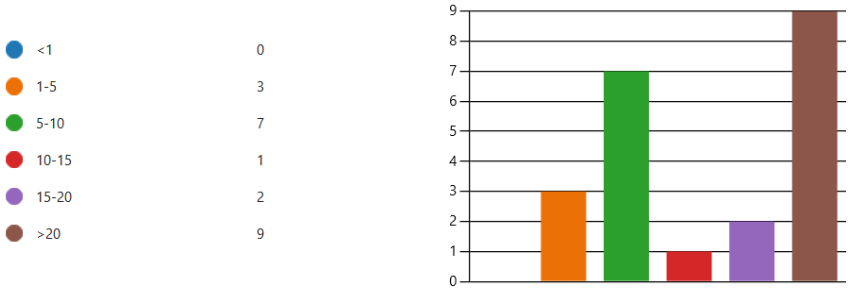


Figure 2. Years of Experience

FAMILIARITY OF INNOVATIVE OR EMERGING TECHNOLOGY

To gain an understanding of healthcare innovation practitioners' knowledge of the innovative and emerging technologies available, participants were required to answer their familiarity along a 5-point Likert scale. Results show the majority (47.8%) were moderately familiar, 21.7% were somewhat familiar, and 26.1% were very familiar, totalling 95.6% who had confidence in their knowledge of the potential solutions that were available to healthcare organisations. These results are significant in validating the data provided by participants, suggesting a contextual understanding, and increasing the likelihood of relevant and informed responses. Consequently, this knowledge will allow for increased generalisability of the results in different healthcare settings.

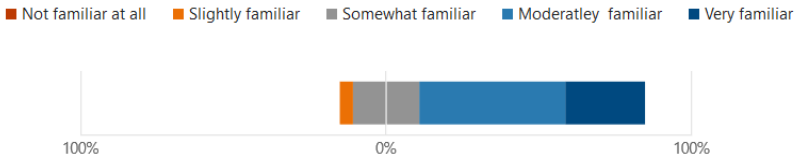


Figure 3. Familiarity with Innovative Technology

POTENTIAL BENEFITS OF DEPLOYING INNOVATIVE TECHNOLOGIES

Participants were asked to rank the potential benefits they see in deploying innovative technologies in healthcare; the choice of options was established using the evidence obtained through the literature review and the researcher's own experience working within healthcare innovation. A significant proportion of respondents (82.6%) identified improved patient outcomes as the most important benefit, followed by efficiencies in healthcare delivery and increased quality, aligning with the research findings in the literature review. However, results and the literature differ on the emphasis of cost saving as a potential benefit, with participants placing its importance 6th in the rankings. Conversely, cost savings and efficiencies were the most frequently referenced benefit, alongside improved outcomes in the literature review

Interestingly, these perceived benefits further align with the goal and objectives set out in Welsh Government Policy, specifically, 'A Healthier Wales' (Welsh Government, 2018) and 'Wales Innovates' (Welsh Government, 2023a) suggesting a cohesive approach with government aims and innovation practitioners in healthcare.

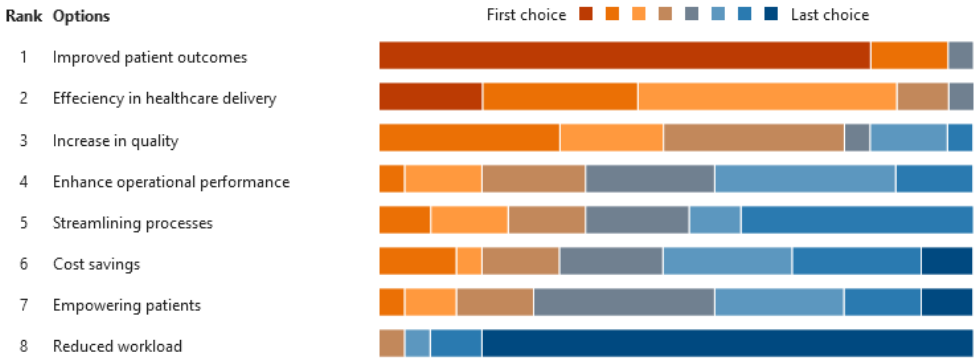


Figure 4. Potential Benefits of Deploying Innovative Technology

CURRENT UTILISATION OF INNOVATIVE TECHNOLOGIES

Participants responses to the extent to which innovative technologies are being utilised in their organisations varied considerably from rarely used (39%), somewhat used (26%) to moderately used (30%), with only a single respondent (4%) stating that they were widely used. The discrepancy in responses to this question may stem from the lack of a unified definition of innovative technology as identified in the literature review. For instance, while not new technologies, electronic record and communication systems are increasingly becoming commonplace in healthcare and therefore may still be regarded as innovative within certain organisations.

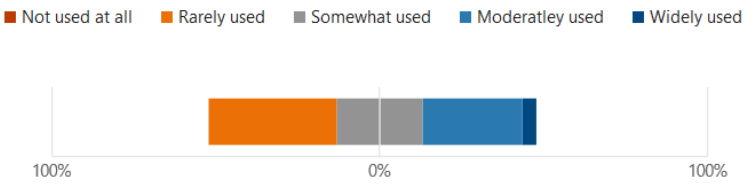


Figure 5. Current Utilisation of Innovative Technologies

Recent research on the adoption rates of digital health technologies in the UK healthcare sector supports this observation (Figure 6). While 87% of organisations report using electronic record systems and 47% utilising telemedicine, the adoption rates for emerging technologies remain relatively low in comparison, with artificial intelligence at 5%, virtual reality at 7%, and robotics at 8% (Deloitte, 2020).

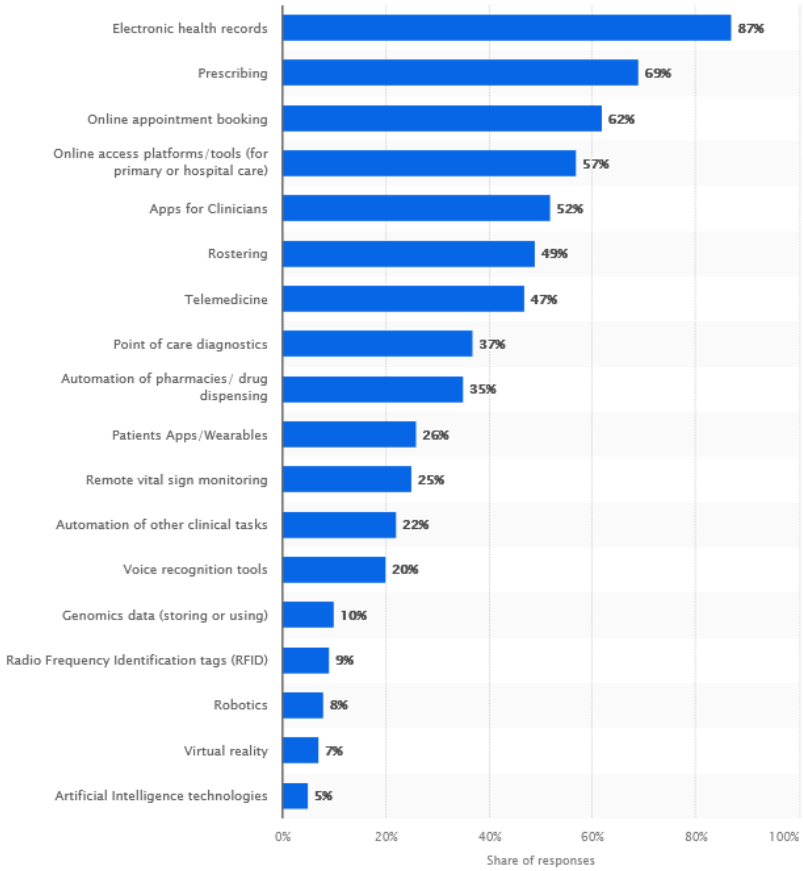


Figure 6. Adoption Rates of Digital Health Technologies in the UK

Note. Adoption rates of digital health technologies in the UK. From "Which of the following digital technologies do you use to support care delivery?", by Deloitte, 2020, Statista. https://www.statista.com/statistics/1255634/adoption-rates-of-health-digital-technologies-in-the-uk

TOP BARRIERS TO DEPLOYING INNOVATIVE TECHNOLOGY

Participants were asked to rank in ascending order, the top barriers to deploying innovative technology based on their experience. The barriers available for ranking were selected from a combination of those evident within the literature review and the researcher's own experience working as an innovation project manager in NHS Wales. 10 respondents (43%) selected costs and budget constraints as the top barrier, while also being ranked second (13%) and third (17%) choice by other respondents, resulting in a total of 17 (73%) out of the 23 participants ranking costs within the top 3 barriers to deploying technology. Resistance to change was identified as the second most significant barrier with 30% selecting it as their first choice, 26% second, and 4% third, totalling 14 respondents (60%) identifying resistance within their top three significant barriers. The third ranked top barrier was digital infrastructure and interoperability, with six respondents (26%) placing it at number 3, with 8% ranking it first and 4% as second, resulting in a total of 38%. It is also worth noting that lack of management support, although ranked at number 4, received 13% of votes as the first choice and 17% as second, with only a single respondent placing each as third and fourth choice.

The results predominately align with the findings in the literature review, suggesting the barriers are not unique to Wales but rather, they are challenges faced across the healthcare sector in the United Kingdom, specifically budget constraints, lack of support from leadership, resistance to change and interoperability issues caused by legacy systems. Interestingly, a significant factor at the individual level identified in the

literature, increased workload, ranked relatively low among the participants, with 67% ranking the barrier between 8-10 on the scale.

The disparity between the literature and the questionnaire results may be attributed to the seniority and job roles of the respondents, focussing more on the organisational level barriers such as resistance, cost-containment, and bureaucratic processes in governance and procurement. As leaders and managers, they are likely to prioritise these issues over the emotions and perceptions of the staff whose workflow may be disrupted by deploying technological innovations.

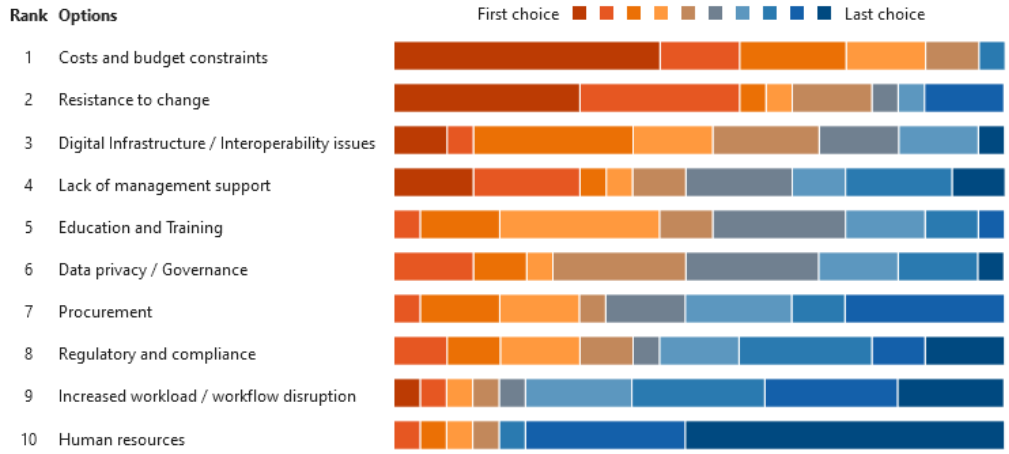


Figure 7. Top Barriers to Deploying Innovative Technology

ADDITIONAL BARRIERS AND CONTEXT

Participants were offered the opportunity to add context and raise additional barriers experienced within their organisation in an open text format; 14 respondents chose to provide this information, as shown in Table 8.

Table 8. Additional Barriers and Context to Deploying Innovative Technology

ID	Participant Response
1	Resistance to change beyond BAU Funding Perceived Time pull
2	Risk appetite to try, fail fast and learn Cash saving is king particularly in the current climate. Innovation often requires more than a single financial cycle Too much addition and alternative rather than true alternatives and so we end up doing more on patients.
3	small innovation culture of organisation
4	Significant delays in navigating the hierarchical governance structure. Financial pressures and instability. Short term funding opportunities which feed into workforce instability. The importance of Patient experience not adequately considered and valued
5	There is no budget for innovation whether incentivised or top sliced for nationally adopted solutions. Nor does procurement build in a duty or requirement to consider innovative solutions.
6	courage, people are nervous about embracing tech and AI
7	reluctancy to embrace emerging technology, no risk appetite. Difficulty in navigating the organisational governance procedures and structures can cause big delays to project timelines or stop the project altogether.
8	Capacity to take on innovation projects - both in terms of digital and operational/clinical resources - Workforce digital literacy
9	Fear of change; capacity for change (current, operational pressures are overwhelming); perceived hesitancy of the organisation; track record of the organisation in positive delivery of such things (lack of trust)
10	capacity
11	a supportive, coherent strategy that is based on pro-value decision making (Value-Based health and care); lack of joined up strategic leadership.
12	Risk aversion and unwillingness to experiment
13	Constant changes within upper management. This means that each new manager has a different perspective on what is important and will work better within the organisation.
14	A lot of the barriers I've experienced or heard from other organisations is budgets. A lot of these organisations are not experienced in writing budget/grant applications and therefore require further support to write a successful budget/grant application.

Figure 8 shows the percentile distribution of the results after categorisation into relevant themes for analysis. Many of the participants chose to expand upon the predetermined barriers selected for ranking, with 19% mentioning budget and financial challenges as a significant barrier, 12% referring to resistance or fear of change, and 4% stated procurement not considering innovative solutions as a further inhibitor. A notable addition was the issue of innovations requiring more than a single financial cycle, providing additional complexity to budgeting at a time when healthcare is so focused on cost containment.

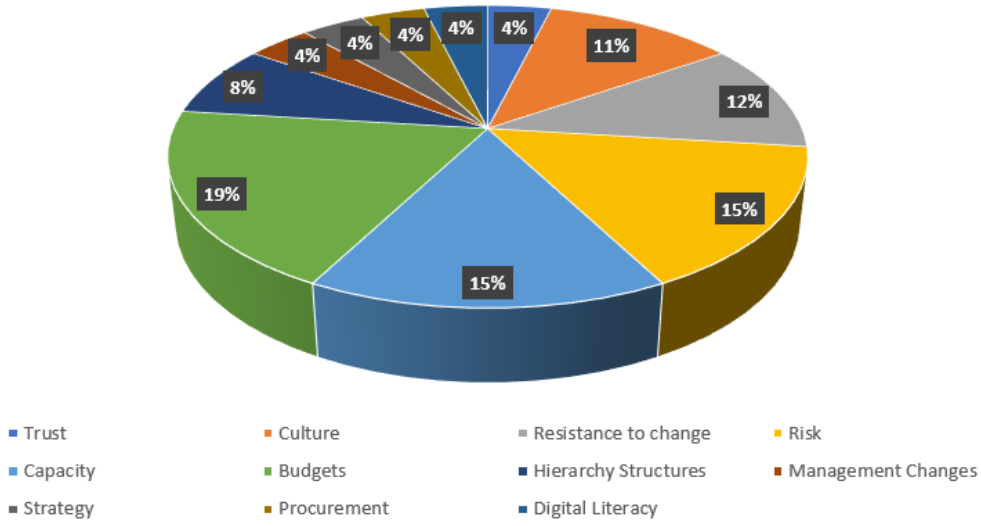


Figure 8. Additional Barriers to Deploying Innovative Technology

Aside from these factors, additional barriers received from participants focus on the lack of courage and risk appetite (15%) within their organisations, with management often unwilling to experiment with innovative technologies, facing perceived hesitancy from the organisation due to a lack of precedent in successful innovations, which may in turn lead to a lack of trust (4%). Equally significant to participants was the capacity to engage in innovation with 15% of responses mentioning it as a factor, a barrier which suggests a correlation with the limited resources provided by organisations due to budget constraints. Hierarchical structures which are often synonymous with healthcare organisations, were also seen as a key barrier, with 8% of participants stating that difficulty in navigating these procedures leads to delays in project timelines or stopping the project completely. Finally, the lack of an innovation culture was identified amongst 11% of responses, and it is proposed that this factor is inherently linked to many of the others; without a culture that encourages risk-taking, supported by leadership with budgets, strategy, and capacity, then it is unsurprising that healthcare organisations continue to face difficulty in deploying innovative technologies.

TOP ENABLERS TO DEPLOYING INNOVATIVE TECHNOLOGY

The results show the top-ranked enabler identified by participants was a positive innovative culture within the organisation, with 39% ranking it as first choice, and 17% as second and third respectively, totalling 73% of respondents selecting culture within their top three enablers. Leadership support also scored highly, with 22% choosing it as the most significant enabler, followed by 30% as second, and 4% as third, resulting in a total of 56% ranking within the top three. Funding and financial incentives ranked closely in third place, with 48% of participants identifying it as one of their top three significant factors for enabling the deployment of innovative technology; 22% ranked it as second, while 13% ranked it as first and third choice, respectively. Figure 9 illustrates the proximity of the results for the top three selections, implying significant agreement from respondents, and further evidencing the importance of these enablers.

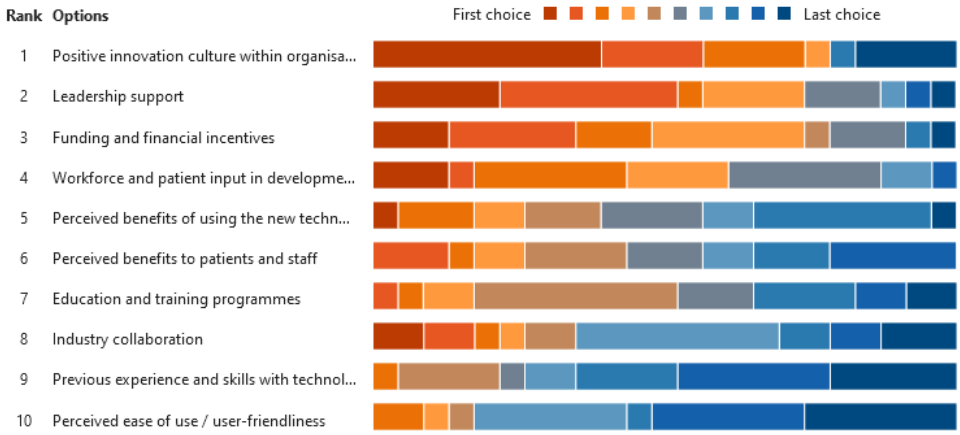


Figure 9. Ranked Enablers to Deploying Innovative Technology

The findings are consistent with those found in the literature, which identified positive culture as being the most common significant enabler at the organisational level as evidenced in Table 4. Furthermore, these results may support the earlier assumption that positive leadership and adequate funding are necessary to foster a positive innovation culture, given the high level of importance identified by participants. Moreover, co-production with the workforce and patients scored highly in fourth place, highlighting its potential at the social level to enhance the effectiveness of the deployed technology when these groups participate in the innovation process. Consequently, it is proposed that this collaboration generates positive attitudes towards the technology required for acceptance amongst those groups (Livingstone et al., 2021; Geerligs et al., 2018).

Participants ranked individual-level enablers higher than barriers at the same level, with perceived benefits of using the technology ranked 5th, and perceived benefits to patients and staff ranked 6th. This suggests further alignment with the literature findings, indicating that positive perceptions are a key enabler for the successful uptake of innovative technology in the organisation.

ADDITIONAL ENABLERS AND CONTEXT

The results of participants' responses to additional enablers are shown in Table 9, a total of 12 respondents chose to provide this information. Figure 9 shows the percentile distribution of the categorised responses.

Table 9. Additional Enablers to Deploying Innovative Technology

ID	Participant Response
1	Management system approach, SBRI approach
2	Peer challenge and consensus
3	evidence of proven effectiveness / ROI in value
4	The most important enabler is to have a proactive clinician / team who will allocate time to develop and educate others about the project. Also the collection of clear benefits and outcomes
5	Clinical and corporate champions in key positions of influence (equally can be a blocker).
6	Welsh Gov policy
7	Having a champion or advocate for the innovation, particularly a clinician or clinical team with influence and drive to implement.
8	Prior positive experiences
9	successful examples of previous innovation deployments
10	Desire? Interest? WG/UK Gov Policy?
11	Government mandate
12	A lot of the time, people will not want to contribute to new innovative technologies due to the duration of each visit and in addition the stigmatism with the older generation of not wanting to participate in any usage of technology.

The results evidence the importance participants place on having someone to champion innovation within the organisation, with 29% stating it was a further enabler for successfully deploying innovative technology. Additionally, participants noted these advocates should preferably be clinicians or from the corporate division to drive the innovation forward most effectively. This suggests that the emphasis is due to the influence these individuals hold within a healthcare organisation, assisting in navigating the hierarchical structures, processes, and low risk tolerances previously identified as barriers by participants, as well as engaging and educating stakeholders about the project, and thereby overcoming resistance to change (Santos et al., 2022).

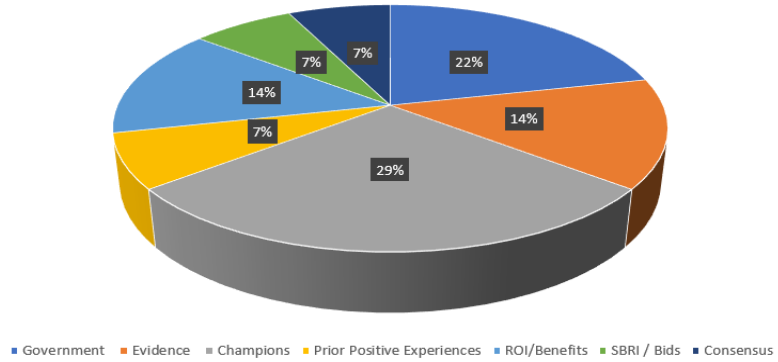


Figure 9. Categorised Additional Enablers to Deploying Innovative Technology

Additionally, Welsh Government policy and mandates were also frequently mentioned in the responses, with 22% identifying this as a key enabler. Government policy sets the agenda for public healthcare, in 'A Healthier Wales,' (Welsh Government, 2018), the Welsh government set out a mandate for the long-term vision to transform healthcare, with a focus on well-being and ensuring services are sustainable through encouraging innovation. 'Wales Innovates' (Welsh Government, 2023a) seeks to transform Wales into a coherent innovation ecosystem, where the health and social care sector collaborates with industry, academia and the third sector to deliver greater value for the population by increasing innovation activity, funding awards and investment, with an emphasis on increasing adoption and scale of innovations. These policies are necessary to obtain the support and financing required from healthcare organisations to allocate sufficient resources and foster a culture of innovation, which participants previously identified as a significant enabler in the rankings. Finally, 14% of responses reference evidence of proven effectiveness, while a further 14% mention return on investment (ROI) and clear benefits of these technologies as an enabler, proposedly due to the risk averseness and hesitancy of leadership identified previously.

ADEQUACY OF CURRENT RESOURCES AND SUPPORT

Participants' responses to the adequacy of current resources and support available within their organisation, shown in Figure 10, highlight a predominantly even distribution between *not adequate* and *moderately adequate*, across the 5-point Likert scale. 30.4% of respondents stated the resources and support were *not adequate,* 34.8% were *slightly adequate*, and 30.4% answered *moderately adequate*. A single respondent stated that the resources and support provided by their organisation were *very adequate*, accounting for 4.3%.

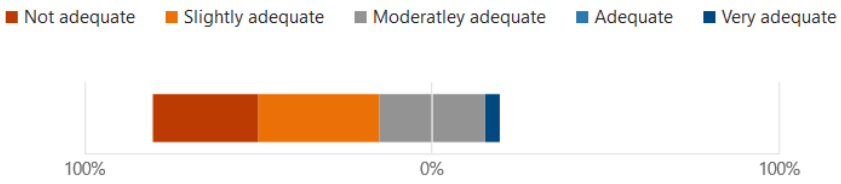


Figure 10. Adequacy of current resources and support

The disparity between the choices may be explained by the different organisation sizes of participants, and therefore, the ability to provide more support for innovation activities. However, despite this apparent disparity in results, a consensus is still evident; participants across Wales do not view the current distribution of resources and support received by their organisation as sufficient to effectively deploy innovative technologies. These results, as highlighted in the literature, present a significant barrier to deployment. Healthcare organisation's emphasis on cost-containment and limited resources (MacNeil et al., 2019;

Johnsson, 2017; Adams et al, 2006), along with a lack of managerial support (Gagnon et al., 2012; Barnett et al., 2011), is a huge detriment to both adoption and deployment, effectively stifling the ability to exploit innovative technology and realise the benefits that come with it.

PATIENT INPUT AND EDUCATION

Figure 11 shows that participants placed great emphasis on the involvement of patients in the process of deploying digital health technologies, either through direct input or education, with 73.9% stating *very important* along the Likert scale, 21.7% answering *important*, and 4.3% believing it was *moderately important*.

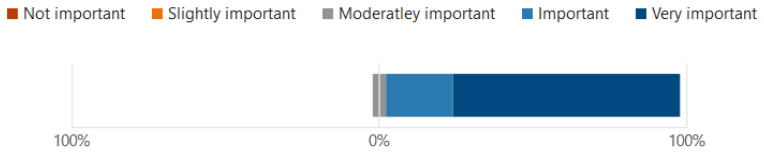


Figure 11. Patient Input and Education

These results are supported by the literature findings of the social level factors, with Livingstone et al. (2021) and Geerligs et al. (2018) emphasising the importance of both patient and staff co-production in the successful deployment of technological innovations, while Koivunen and Saranto (2018) similarly highlight education on how to use the technology as a significant enabler. However, the researcher notes that combining input and education into a single category may introduce limitations to the analysis, as these factors are not inherently linked and could result in skewed responses from participants.

STAFF INPUT AND EDUCATION

Similarly, results shown in Figure 12 also indicate that participants placed significant importance on the input and education of staff in the deployment of innovative technologies, mirroring the responses to the same question concerning patients. Specifically, 77.3% indicated it was *very important*, 18.2% as *important*, and 4.5% as *moderately important*. A small differentiation is evident, with 3.4% of participants signalling a slightly higher emphasis on workforce involvement as very important in deploying innovative technologies, however, results support the view that both patient and staff involvement, through co-production and education, is a key enabler for healthcare organisations seeking to deploy such technologies effectively.

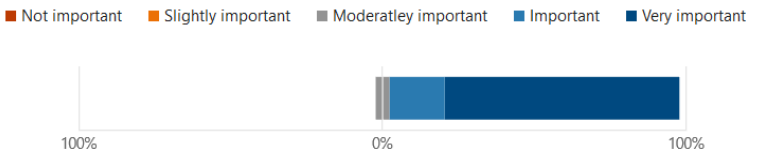


Figure 12. Staff Input and Education

EMERGING Technologies

Participants were asked to provide answers stating what they believe to be the most promising emerging technologies that could help transform healthcare in Wales over the next 5-10 years. The results are presented in Table 10, with Figure 13 displaying the percentile distribution of these results following categorisation.

Table 10. Emerging Technologies to Transform Healthcare in Wales

ID	Participant Response
1	AI
2	Genomics, Robotic Processing Automation, Generative AI and Point of care testing
3	Pathology and genomics
4	AI / 3D Printing / wearables
5	AI
6	Its already here - the issue is exploiting the technology of the past 5-10. Looking ahead ambient technology within the home and person linked to bespoke lifelong gene-led individual treatment plans.
7	artificial intelligence

ID	Participant Response
8	artificial intelligence and genomics
9	AI (including machine learning, automation etc.)
10	AI
11	n/a
12	AI & robotics
13	Automation of routine tasks
14	Virtual reality. Artificial intelligence.
15	AI
16	AI
17	AI; screening; genomics; EHR software; predictive analytics; digital therapeutics; MH Technologies.
18	Gene Therapies & Artificial Intelligence
19	Anything that can easily improve health literacy and personal ownership of health and well-being. In addition, anything that replaces mundane work that truly releases professional time that can allow more human interaction
20	Moving to digital in general and away from paper.
21	AI
22	An integrated health and social care system where data can be shared immediately.
23	Virtual Reality where it will support staff in real life scenarios on how to treat a patient on a situation they've never experienced or dealt with or Virtual wards to support the general public so that they do not need to wait hours on end to be seen, which reduces hours and elevate the pressure from the Staff

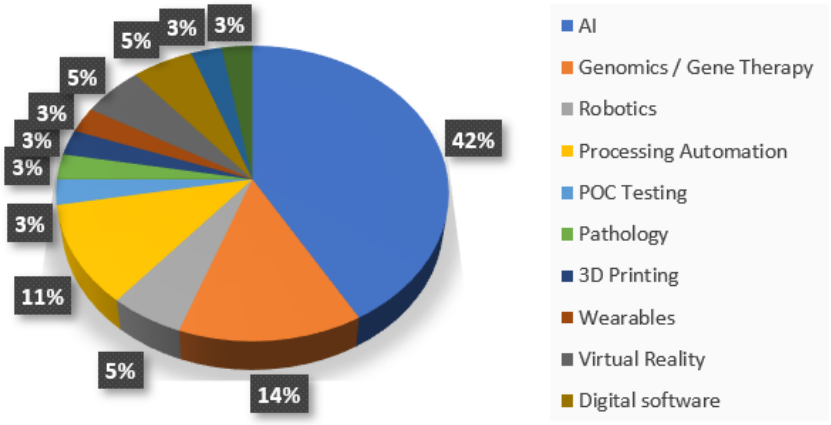


Figure 13. Categorised Emerging Technology Responses

The results in Figure 13 show a considerable number of respondents answered AI to this question, mentioned in 42% of responses, followed by Genomics and Gene Therapy with 14%, and Process Automation with 11%. These three emerging technologies accounted for 67% of all responses to this question, suggesting a broad consensus amongst innovation practitioners in Wales. These results are not surprising, given the transformational impact AI, and similarly, process automation can have in healthcare, with research showing that the successful alliance between the two can significantly improve hospital productivity (Junaid et al., 2022: Lee et al., 2013), patient safety (Alotaibi & Federico, 2017) and quality medical treatment (Jamal et al., 2009).

Additionally, Gene therapy presents significant benefits to healthcare organisations through its ability to treat previously untreatable conditions, thereby reducing the ongoing care costs related to the management of rare or chronic diseases (Ossandon et al., 2024). However, as noted by one participant, this technology is already available and deployed within some organisations, the challenge facing healthcare organisations in Wales may be exploiting the technology from the previous 5-10 years.

RECOMMENDATIONS FOR HEALTHCARE ORGANISATIONS

The closing section of the research questionnaire asked participants to provide recommendations to healthcare organisations seeking to adopt and deploy innovative health technologies, with responses shown in Table 11.

Table 11. Recommendations to Healthcare Organisations

ID	Recommendations
1	Find a champion at exec level/Director, Division and Team Ensure the governance and project support is agreed/in place Learn from others / best practice/Partners/Industry
2	Provide a culture to enable experimentation; mechanisms for positive constraint to better ensure benefit realisation.
3	First, you need to start looking
4	create a strong culture of innovation that encourages risk taking. Find support from top management / executives to champion innovation programmes and projects.
5	Create an Innovation network to share, learn and develop together. Shared experience, contacts, wins and fails creates a positive culture to promote and develop
6	There is an over emphasis on clinical intervention and innovation when the additional capacity and opportunity time (as well as financial gains) from process and service based innovation would lead to far greater impacts at scale. The emphasis is clinically rather than population / place and needs/harm led.
7	be brave and innovative, look for solutions that allow practitioners to spend more time with people and less time on a computer / doing paperwork
8	create a strong innovation culture within the organisation that enables risk-taking and experimentation with innovation. Learn from those in the sector that have implemented similar technology. Learn/collaborate with industry.
9	Fund teams, not projects. Need to permanently establish teams to deliver a digitalisation/transformation agenda, rather than current model of short-term, project (time-limited) funding.
10	Strategy, plan, process, governance, evidence, pilot, adopt/adapt, scale, and spread
11	Invest in the space/time/capacity for your staff to be truly involved and lead such things. They will surprise you; patients, staff and your organisation will reap the benefits of such an approach
12	invest in capacity and build teams capable of delivering transformation in innovative technology, not just projects
13	Embrace Risk
14	Collaborate with suppliers, Universities & Companies
15	Training Education Consistency & joined up systems
16	Enabling staff through culture and giving time to adapt is most important to addressing resistance. Staff are too busy to be able to change without risking patient care - this must be addressed first.
17	choose wisely; accelerate adoption; prioritise innovation pipelines and discard quickly those unlikely to succeed.
18	Use more effectively to understand pressure points within the system
19	Support experimentation. Enable fail fast and praise failures and learning. Also praise adoption so as to break they whole cult of personality around being first.
20	Explore opportunities and collaborate with stakeholders (especially patients) on the potential outcomes and development.
21	Culture first and foremost with leadership
22	To make sure that the technology fits what you want it to do, not try to make it work as best as possible. You cant put a square peg into a round hole.
23	I would ensure that you have support on budget/grant applications as well as a list of available funding streams you can apply for in order to start to implement the project/study and also start to think about patient/site recruitment and barriers you may come across with people reluctantly using technology.

Analysis of the results evidences common themes in the responses, specifically, an innovative culture embracing risk, leadership and resource support, collaboration, capacity, training and education, and technology fit. In total, 33 distinct recommendations were provided. Figure 14 shows the categorisation of these recommendations into themes to produce quantitative data, established through the frequency of factors mentioned, to assist with the analysis. These themes follow the trend of the previous responses obtained in the questionnaire while also supporting the findings from the literature review which proposed enabling and inhibiting factors exist at the individual, social, and organisational levels.

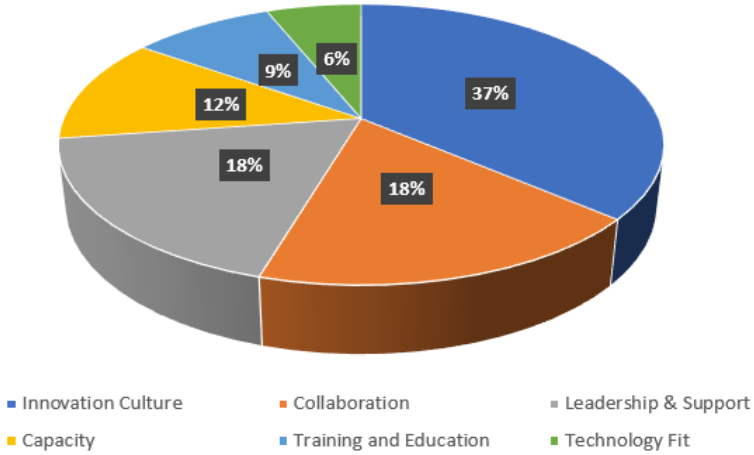


Figure 14. Themed Recommendations for Deploying Innovation Technology in Healthcare

Responses referencing the creation of an innovation culture that embraces experimentation and risk, was the most frequently identified theme, constituting 37% of all recommendations. Leadership and support, along with collaboration, formed the second largest cluster with 18% respectively, followed by building capacity with 12%. Analysis of these themes further corroborates the findings of earlier results, which identified a positive innovation culture as the most significant enabler, followed by leadership support, funding, and collaboration. Significantly, trends in the results suggest a broad consensus among innovation practitioners across Wales with the ranking of barriers and enablers, supplemented by additional context and factors, correlating with their proposed recommendations to healthcare organisations.

Moreover, the summative message from the participant's recommendations suggests a multifaceted approach is required for the successful adoption of innovative technology in healthcare; acknowledging factors at the individual, social and organisational levels that can inhibit or enable deployment. Strong leadership and championing of innovation are crucial, supported by an organisational culture that encourages experimentation and focuses on collaboration with stakeholders and partners to leverage their capabilities, which are all critical factors to success. Furthermore, respondents commented on the importance of building capacity and long-term strategic vision beyond individual projects, shifting away from the overemphasis on clinical innovation to impactful process innovation, and critically, embracing risk and learning from both successes and failures. Engaging with peers across Wales through the development of an innovation network was also identified as key to driving sustainable healthcare innovation; resources can be pooled, and practitioners can learn, develop, and share experiences and contacts to assist in creating a positive culture of innovation to promote successful examples of innovative technologies.

In conclusion, participant recommendations placed particular emphasis on the organisational level enablers, with culture, leadership and support, and capacity, being the most frequently suggested factors, constituting 67% of all recommendations provided. However, social factors including collaboration and co-production were also seen as significant by participants, emphasising the importance of stakeholder input in the deployment of health technology innovation. Although factors at the individual level were mentioned by participants, who emphasised the importance of training and education to reduce resistance to change and increase technology acceptance, the analysis suggests that organisational enablers and barriers are the most important to consider for healthcare providers in Wales if they are to fully exploit the benefits of technological innovations and create sustainable services.

CONCLUSION

Innovation is becoming increasingly important as healthcare providers seek to balance the unprecedented pressure on services against limited resources and cost containment. Innovative health technologies have huge transformational potential for organisations, with research suggesting they are a solution to the current crisis facing the NHS (Liu et al., 2022). Therefore, this research report set out to identify the most significant enablers and barriers to provide healthcare organisations in Wales with a set of recommendations on how to effectively deploy innovative technologies and unleash the benefits they can offer. A combination of a research questionnaire and a literature review have provided both primary and secondary data for analysis in this report, with results showing a broad consensus of the barriers and enablers faced across Europe are also found in Wales. Moreover, the research suggests that these barriers and enablers exist on the

individual, social, and organisational levels. The analysis further highlights a particular emphasis from participants on the organisations structural and cultural elements as being the most significant for facilitating the deployment of innovative technology in Wales.

KEY FINDINGS

- Barriers and enablers exist on three levels: individual, social, and organisational.
- 82.6% of research participants identified improved patient outcomes as the most important benefit of innovative technology, a view supported by the literature.
- Most significant barriers identified were cost and budget constraints, resistance to change, digital infrastructure and lack of management support. Additional significant barriers provided by participants referred to risk averseness, capacity and navigating hierarchical structures.
- Participants top enablers were a positive innovation culture, strong leadership support, funding and financial incentives, and collaborative input from stakeholders. Additional significant enablers mentioned utilising innovation champions to drive the project, government policy support, evidence of the technologies effectiveness, and similarly, return on investment and benefits the technology can provide.
- Adequacy of resources and support are not currently sufficient in Wales.
- Stakeholder input and education is viewed as a key factor in the successful deployment of innovative technologies.
- Consensus amongst participants that AI is the most promising emerging technology to transform healthcare in the next 5-10 years, with research showing only a 5% adoption rate across the UK currently, followed by Genomics and process automation.
- Participants' recommendations to healthcare organisations placed significant emphasis on the organisational level factors, constituting 67% of all recommendations provided, evidencing the importance to Welsh healthcare providers in addressing these barriers if effective deployment is to be achieved.

RECOMMENDATIONS

Based on the key findings of the research paper, the following set of recommendations are proposed to assist Healthcare organisations in Wales in overcoming barriers and enabling the successful deployment of innovative technology, thereby exploiting the potential benefits in patient outcomes and efficiencies they can provide, and lead to a more sustainable health service.

INCREASE FINANCIAL AND RESOURCE SUPPORT

Focus on cost containment and lack of financial support was referenced frequently by both participants and the literature as being one of the most significant barriers to deploying innovative technology. Technology innovations require significant financial investment, often across more than one financial cycle, and may not yield immediate results, however, without this support and commitment from organisations, the transformational impact cannot be fully realised and the organisation will remain in the status-quo.

Therefore, leaders must allocate sufficient organisational resources to innovation projects to ensure effective deployment and adoption, providing not just the finances but also ensuring capacity of the workforce to engage in the process. To mitigate the issue of tight budgets and capacity, the organisation should seek diversified streams of funding through the use of government and industry grants, provide grant application support, and partner with third-sector to leverage their resources and expertise, thereby alleviating the cost burden and allowing for a shift in focus to innovation activities.

ENHANCE DIGITAL INFRASTRUCTURE

Archaic digital infrastructure and the resulting interoperability issues with new technology identified in the research is another significant challenge facing the deployment of innovative technologies. Organisations should seek to invest in and upgrade outdated systems that hamper the integration of innovative technology, with the aim to increase standardisation across the organisation and enable effective communication.

Through the enhancement and modernisation of digital infrastructure, new innovative technologies can be integrated seamlessly, reducing technological barriers and aid in achieving interoperability across systems.

Organisations should further focus on ensuring the updated digital systems are adaptive and agile, and that they can accommodate emerging advanced technologies such as AI and Genomics to mitigate future issues and ensure sustainability. Finally, cybersecurity should also be a priority, with a focus on strengthening existing frameworks to protect sensitive data and ensuring compliance with data protection regulations, especially with those technologies that rely on large data sets.

FOSTER LEADERSHIP AND MANAGEMENT SUPPORT

The research highlighted that a lack of leadership and management support represents a major challenge in deploying technology, at both the individual and organisational levels, whether through resource support or advocacy and guidance for innovation projects. Therefore, healthcare organisations in Wales must ensure strong leadership and management backing is in place to mitigate barriers like resistance to change, capacity issues, and hierarchical structures.

Leaders should demonstrate commitment to innovation through clear vision, strategies, and resource allocation. To achieve this, it is recommended that organisational leaders are trained and educated in innovation through relevant courses and programs that focus on fostering an innovation mindset and culture. Additionally, managers and leaders need to be made accountable for the level of innovation adoption within their departments, which can be achieved through performance indicators assessing the facilitation and support of innovation projects.

Moreover, the organisation must create open communication channels between management and the workforce to explain the strategic goals and outcomes of technological innovations, this explanation will ensure that all levels of the organisation understand the proposed benefits, and the strategic reasoning behind the deployment of innovative technology, further reducing resistance to change.

CREATE A POSITIVE CULTURE OF INNOVATION

Results of the analysis indicate that a positive culture of innovation is perhaps the biggest single factor affecting the deployment of innovative technologies. Frequently identified in the literature, and supported by a consensus amongst participants as the most significant enabler, a positive innovation culture is inherently linked to leadership support and resources, capacity, experimentation, and strategy. Without a positive culture that fosters innovation, organisations are unlikely to provide the necessary enablers to effectively deploy innovative technology. Therefore it is crucial that healthcare organisations take steps to implement an innovative culture.

It is proposed that this is achieved through promoting risk taking and experimentation in the organisation, shifting the current mindset away from risk aversion to tolerance. Policies, strategies, and budgets should be developed that encourage pilot and prototyping projects, creating a safe space to engage in innovation and experiment with new ideas, while recognising that failure is part of the innovation process. Moreover, this will allow project teams to learn from those failures, providing valuable experience and knowledge to the organisation, and conversely, the successes will enable example case studies to be highlighted that demonstrate proven evidence and return on investment, gaining further support for future innovation deployments.

Innovation champions should also be implemented within the organisation, ideally from the clinical team or corporate division, as these individuals have the power to actively influence colleagues and navigate the complex bureaucratic processes. Champions must actively promote and embody a culture of innovation, seeking to communicate the importance of innovation in healthcare, and importantly, educate the workforce on the potential benefits to patient outcomes. Moreover, champions ought to act as role models and project sponsors who support innovation initiatives, liaising between the various stakeholder groups at all levels to drive momentum for the project and recognise staff engaged in this activity.

Finally, organisations in Wales must invest in continuous education and training in innovation to ensure staff are well-versed in what innovation accomplishes, and why it is crucial for healthcare providers to engage in activity that will provide transformational change. Training should be provided within the organisation, as well as externally through programs and courses, to empower staff with confidence in adopting the new tools and work practices that result from deploying technological innovations. Through adopting this culture, stakeholders will be encouraged to provide ideas, report barriers and offer insights into innovation activities, creating a bottom-up approach and shifting away the traditionally strict hierarchy common across the healthcare sector.

INCREASE COLLABORATION WITH STAKEHOLDERS

Identified as both an enabler in literature and research, collaboration and co-production with stakeholders should be a key area of focus for healthcare organisations in Wales, particularly in addressing social level factors. Organisations must ensure that stakeholders, including staff and patients are engaged in the process, gaining their input in the development and deployment of technological innovations. This engagement will reduce resistance to change and negative perceptions towards the technology, ensure the relevancy of the proposed innovation to the problem, and create acceptance and trust amongst stakeholders.

Industry engagement should also be a priority, aligning with the strategic goals and objectives referenced in 'A Healthier Wales' and 'Wales Innovates' (Welsh Government, 2018, 2023a), to leverage their resources and capabilities, lowering the risk to healthcare organisations and help mitigate the issues of limited internal budgets and capacity. Additionally, **collaborations should be** fostered through the creation of regional and national innovation networks, where healthcare providers are joined by academia, and industry members, allowing innovation leaders from across Wales to pool resources, share best practice, and co-produce solutions to common challenges faced across the sector.

PRIORITISE ORGANISATIONAL LEVEL REFORMS

While this research has established barriers and enablers exist at the individual, social, and organisational levels, it is recommended that healthcare organisations in Wales prioritise organisational factors. Analysis of the research results showed that 67% of participant recommendations focused on factors at the organisational level, whilst also featuring consistently as the highest ranked barriers and enablers by participants. The prior recommendations predominately focus on these organisational factors; however, organisations must also seek to restructure the hierarchical and bureaucratic processes that are synonymous with the healthcare sector, to create a more agile framework that ensures innovations can move forward efficiently.

Organisational structural barriers should be reduced through the flattening of hierarchies and work silos, creating flexibility, and minimising the challenges faced by innovation practitioners in navigating the governance frameworks when seeking to deploy at pace. Moreover, the often complex and slow procurement process, along with strict regulatory requirements makes it difficult to pass through the necessary stages of approval, resulting in significant delays to adoption.

Consequently, it is recommended that healthcare providers in Wales establish an innovation specific procurement pathway, co-produced with innovation leaders and procurement managers to create a streamlined system that facilitates procuring technologies at pace by reducing approval timelines. Similarly, the regulatory compliance framework must also be simplified to speed up the governance approval process. To achieve this, organisations should implement a dedicated governance lead experienced in emerging technology, ideally as part of regional and national innovation networks, allowing healthcare providers to benefit from previously submitted regulatory documentation if the technology has been adopted previously across Wales.

The reforms recommended will ensure healthcare organisations in Wales are adequately equipped to adopt and deploy emerging technology which is becoming increasingly prevalent as a proposed solution to many problems the healthcare sector is facing. The research highlighted the consensus across Wales that AI will transform healthcare delivery in the next 5-10 years, however many organisations are simply not prepared structurally or culturally to harness the benefits it can offer, as evidenced by a 5% adoption rate across the UK (Deloitte, 2020). Through implementing these recommendations which address the most significant barriers and enablers identified throughout this research project, healthcare organisations will be better positioned to exploit the power of emerging technology and assist in creating a more sustainable health service that provides improved outcomes for patients in Wales.

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APPENDIX E: RESEARCH ETHICS APPROVAL

Swansea University
Prifysgol Abertawe

Approval Date: 24/09/2024

Research Ethics Approval Number: 1 2024 11077 10415

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	What are the barriers and enablers to deploying innovative or emerging technologies in healthcare in Wales?
Applicant name	MR ROSS MCLEISH
Submitted by	MR ROSS MCLEISH /

Full application form link https://swansea.forms.ethicalreviewmanager.com/Project/Index/13189

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

ABOUT THE AUTHOR

Ross McLeish. Ross McLeish is an Innovation Project Manager at Velindre University Trust, located in Southeast Wales. He is an accredited PRINCE 2 Practioner with 10 years' experience working in the NHS and has led on several transformational change projects involving innovative technology, with a particular interest in artificial intelligence. Prior to working in innovation, Ross was an experienced clinical trial coordinator, facilitating the set-up and maintenance of UK wide trials within the Research and Development division. His personal motivation for undertaking this research study was to help healthcare organisations identify and reduce the barriers to technology adoption, aiming to facilitate large scale transformations and ultimately provide better outcomes for patients and staff across the country.

Value-Based Healthcare and Diabetes Risk in Chronic Kidney Disease, Sri Lanka.

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Abstract:

Value in Healthcare system is measured by focusing on person-related health outcomes and clinical-related health outcomes, while achieving the minimal cost measures. Considering the Sri Lankan public healthcare system and public health threats, chronic kidney disease has become a major threat. Due to the emerging demand for CKD management, the authorities must provide many healthcare facilities targeting CKD patients. In general healthcare system, Diabetes has become a major cause for CKD patients. Long-term sufferings from diabetes management can directly affect the CKD status increments and increase risk of getting CKD. Therefore, the author has navigated this study to answer the main research question is “What are the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in SL?”. To achieve the above aim and study objectives, the author has developed a set of hypotheses with four dependent variables of personal, technical. allocative, and societal, are positively related to value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases. Therefore, this study is strong proof that the Valu-based healthcare system is an effective disease management system that also can be used for early diagnosis of some medical conditions including diabetes and CKD. Therefore, the author strongly recommends the Sri Lankan healthcare authorities to focus on integrating technological innovations, advances while enhancing resources allocations and raising public awareness to prevent CKD and its complications among diabetic patients in Sri Lanka.

Keywords: CKD-Chronic Kidney Disease, CKDM - Chronic Kidney Disease Management, CKDU - Chronic Kidney Disease of Unknown Etiology, VBHC – Value-Based Health Care, SL – Sri Lanka, PVP - Personal Value Perspective, AVP -Allocative value Perspective SVP - Societal Value Perspective, IVBHP - Implementation of Value-Based Healthcare Principles, KMO - Kaiser-Meyer-Olkin, CKD - Chronic Kidney Disease, MLT - Medical Lab Technicians

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Introduction

Study Background

The global records contrast that approximately 422 million people are affected with diabetes and the majority are reported in lower and middle-income countries. Diabetic Nephropathy can be described as a common complication of Type one and two diabetes. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2019) has reported that high glucose levels in the blood can harm and damage the blood vessels in human kidneys.

The SL clinical evidence indicates that the number of CKD patients with known causes, including hypertension, diabetes, and glomerular nephritis, has increased over time (Senanayake, 2018). The establishment of the Presidential Taskforce for CKD in 2014 was intended to supervise the endeavors of diverse sectors, agencies, and ministries regarding the prevention and treatment of CKD. These highlights that authorities, and expertise should understand and create a forum and establish effective and cost-effective measures to manage and act with particular focus on early detection, prevention treatments, care, and social interventions.

Research Question and Aim

The main research question is “What are the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in SL?”. Therefore, the objective of this study is to study the Effects of VBHC Principles in adopting risk investigation of diabetes patients on CKD in SL.

Significance of the Study

VBHC method is identified as an effective patient management method in modern society that delivers better outcomes at a low cost. Reaves (2022), incorporating VBHC principles into this diabetes management helps to assess quality via performance metrics, comparing actual to projected costs, and conducting comprehensive risk assessments. Findings will help to upgrade the current healthcare management practices to VBHC principles constructively.

Limitations of the Study

The mode of data gathering may be affected by the professional conditions, which could have impacted the study's outcomes and the results quality.

Project Requirements

Problem Statement, Research Question and Aim

CKD risk identification is essential for individuals since early detection helps to prevent or manage the potential consequences at the earliest possible. This reduces patient outcomes, reduce complications, and public health research strategies can upgrade their next steps to explore more effective and efficient patient management strategies. Further, investigating CKD risk is essential to gain benefits such as high prevalence of CKD in diabetes patients, improved patient management, reduced complications, advanced research outcomes, seeking solutions and informing public health strategists, economic gaps, and creating personalized medicine plans. Therefore, the main research question is “What are the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in SL?” depending on the findings, the author will state the Effects of VBHC Principles in managing risk investigation for diabetes patients on CKD in SL.

Overview of Diabetes Patients on Chronic Kidney Diseases

The National Institute of Health (2014) stated that Kidneys are a main function of maintaining health by detoxifying the body and maintaining fluid levels that are generated as metabolism by-products. Busink, et. al. (2019), highlighted that kidneys produce hormones to regulate blood pressure and vital physiological process. In general, the gradual kidney functioning loss can be rectified as CKD. Webster, Nagler, Morton, and Masson (2017) have described that the international guidelines have defined CKD as the malfunction of kidney functioning which can be visible via glomerular filtration rate (GFR). Markers of kidney damage or the increment above the standard rate of GFR is 60 ml/ min per 1.73m2, or both issues reporting for a consecutive 3 months can be classified as CKD. Due to the severity of CKD patients and the frequency of

reporting CKD patients were identified as people with significant social status, family ties, lower income, and high healthcare dependency. CKD of unknown etiology is a related disease of CKD, and no known cause can be identified. Neither in SL is beset by this medical enigma. Considering the key global CKDU reporting frequency, developing and low-income countries such as El Salvador, Nicaragua, Egypt, India, and many other countries are dealing with CKDU situations. Hart and Pollack (2023) stated that CKD treatment methods are expensive, and Medicare needs excess spending of USD130 billion on kidney disease while end-stage kidney disease. When diagnosing a CKD patient, the stages of the disease range from stage one to severe stage five. In stage five, the patient requires either a kidney transplant or dialysis.

Overview of Value-Based Healthcare Practices

VBHC can be described as a sustainable, equitable, and patient management method that applies minimum resource input to achieve better outcomes and deliver better patient care. Nilsson, et al. (2017), also defined the VBHC approach in three segments and they are creating greater value for patients; inputting patients for full care cycles under the healthcare organization; and measuring the clinical outcomes and costs with Key Performance Indicators (KPI). Hurst, et al (2019) stated that in the UK and other countries, the demand for VBHC is getting higher to address unwarranted variations and their causes. Busink, et al (2019) have implied four bases of the VBHC services system and they are (1) outcomes measurement of the patient and associated medical costs, (2) expressing the listed outcomes with the cost for benchmarking, (3) arranging coordinated care according to patient's medical condition, and (4) developing a pay-back system and selectively reward high-performing care providers. The basis of Value-Based healthcare is the combination of Patient Related outcomes and Clinical-Related outcomes. Since this study carried targeting the healthcare professionals, this study focuses on Clinical-Related outcomes.

Global Value-Based Healthcare Practices and Application for CKD Management

The value of this healthcare system is dependent on patient's health outcomes for the cost of achieving the expected developments (Porter, 2006). The main aim of VBHC system transformation is to ensure the healthcare system to develop or create more value for the patients; since, the value is created only when a person's health outcomes are improved and detailed outcomes of VBHC that targets on cost minimization are insufficient (Teisberg, et al., 2020). As a result of research by McKinsey and Company found that VBHC enables nephrologists to succeed in Centers for Medicare and Medicaid Services (CMS) and Medicare Advantage value-based programs. The findings contrasted that hospitalization accounts for 40 percent of total costs incurred by all payers for patients with end-stage kidney disease (ESKD), while dialysis accounts for 30 percent of expenditures, among the CKD patients, hospitalization constitutes 30 percent of insurers' costs. In the United States, some Medicare Advantage plans incorporate VBJC principles for CKD management for preventive care and coordination with the use of the integrated care model of Kidney Care Choices (KCC). In the UK, National Healthcare Services (NHS) implemented VBHC as an integrated care model for CKDM and incentivizes primary care practices to manage chronic diseases; the renal registry provides data for improving patient outcomes.

In Sweden, the Regional Health System uses VBHC for CKDM to focus on patient-centered care and outcomes measurement. Quality registries are used to track patient-centered outcomes to enhance quality. In the Netherlands, Integrated Care Programs for CKD and chronic disease management help to coordinate, patient involvement, and outcome measurement. Bundled payments are used by healthcare providers to align incentives with patient outcomes. In Australia, the Chronic Disease Management Plans always provide coordinated care and preventive measures for CKD patients; the Primary Health Network (PHNs) uses VBHC, and they hold them responsible for patient management. In Germany, the Disease Management programs (DMPs) applied standardized care protocols and outcomes measurement methods for CKD patients. They use integrated care contracts to promote and coordinate primary and specialist care for CKDM. Similarly, the Singapore Health Promotion Board uses VBHC to detect and prevent CKD early via public health initiatives. After recognition, the patients were directed to be consistent and under a proper CKDM plan. These global VBHC practices for CKDM help in the early detection of patients, and develop patient-centered care, coordination of care plans, and performance measurement. More adherence to methodical manners will increase the success rate of each country's overall healthcare system and policies.

Main Analysis

Study Methodology

Research Design

The aim of this research is to identify the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in SL. Therefore, the objective of this study is to study the Effects of VBHC Principles in adopting risk investigation of diabetes patients on CKD in SL. The author has conducted this research to meet the final academic requirements and at the academic level, the author has followed Saunder's research onion model to reflect the methodological aspects of the study. The research will be explanatory, descriptive, and primary research.

- Research Philosophy: Positivism Philosophy
- Research Approach: Deductive Approach
- Research Strategy: Survey Strategy
- Research Choice: Quantitative Study and Mono Method
- Time Horizon: Cross-Sectional Study
- Research Methods: IBM SPSS Data Analysis Version 27

Research Framework and Hypothesis

The below four hypotheses have been developed by the author to test under this study.

- H1: There is a significant effect of Personal value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka.
- H2: There is a significant effect of technical value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka.
- H3: There is a significant effect of Allocative value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka.
- H4: There is a significant effect of Societal value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka.

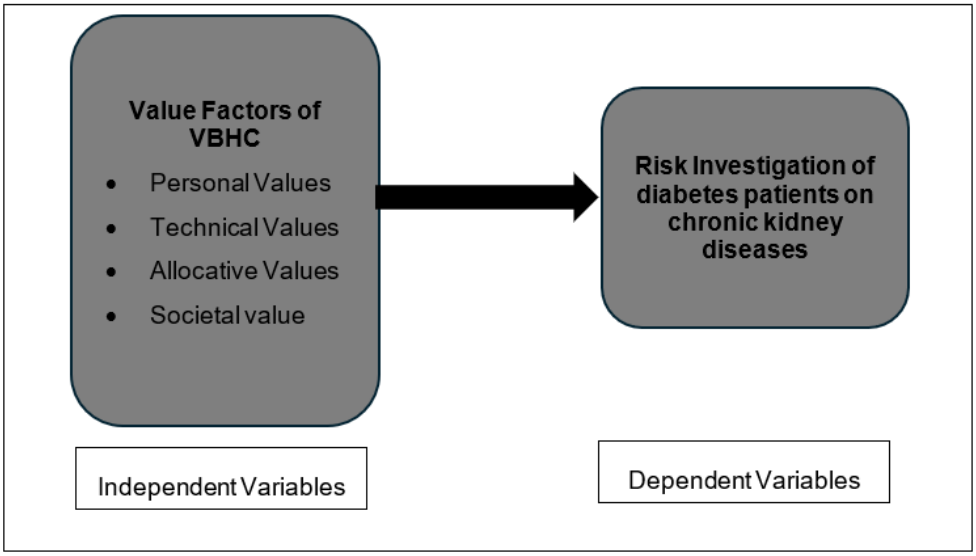


Figure No. 3.1.2: Research Framework.

Research Population and Sample

Banerhee, et al (2007) have defined research population as group of people who are differently identified by geographic location, sex, and age with specific definitions of features and variables such as ethnicity, religion, and occupation groups. Under this study, the author has specified the research sample as one specific group of professionals since they directly deal with the patient screening and management of CKD and the sample size has taken 100 of professionals.

Research Analysis and Evaluation

The author has conducted this research as a quantitative study that implies a survey strategy by using a closed-ended questionnaire. The researcher has developed the survey questionnaire by using close-ended questions and the author has used multiple choice questions for demographic questions and background analysis questions. The dependent and independent analysis questions were developed by using rating methods and the rating method is the Likert-Scale rating method. Maxwell (2004) has described the sampling strategy of a study can be people, events, and specific situations which are selected to get critical data that connects to one specific status that is unable to be acquired from general ways. When the author conducted this research, the author used the non-probability sampling method since it is recognized as a fewer-error sampling method. Under the non-probability sampling method, the author has used a simple random sampling method and current Sri Lankan CKD and Diabetes management is conducted as Integrated care delivery with the amalgamation between healthcare providers such as endocrinologists, nephrologists, Medical Lab Technicians (MLTs), and other medical professionals to ensure that technical expertise is effectively applied to provide comprehensive and continuous care. However, this study is conducted by targeting the healthcare professionals who manage diabetes and CKD as their primary job the author has taken, one specific group since they directly deal with the patient screening of CKD and the sample size has taken as 100 professionals. This study has been conducted based on professionals at the National Nephrology Hospital located in Polonnaruwa Sri Lanka. This hospital was opened in 2021 and was recognized as the largest nephrology hospital in Asia.

Data Analysis

Data analysis is a systematic approach for examining and interpreting data to extract meaningful insights, inform decision-making, and solve complex problems. In an era where data-driven decision-making has become paramount important, the ability to analyze and interpret data effectively is crucial. The primary objective of data analysis is to transform raw data into actionable information. This process involves various stages, including data collection, data cleaning, data exploration, and statistical analysis. By leveraging statistical tools and techniques, analysts can identify trends, patterns, and relationships within the data, which can provide a deeper understanding of underlying phenomena.

Missing Value Analysis

Testing of missing values is the first step in the data set preparation. Table illustrates the case processing statistics for visualizing the missing value.

Table 3.1. Missing Value Analysis.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Mean_PVP	100	100.0%	0	0.0%	100	100.0%
Mean_AVP	100	100.0%	0	0.0%	100	100.0%
Mean_TVP	100	100.0%	0	0.0%	100	100.0%
Mean_SVP	100	100.0%	0	0.0%	100	100.0%
Mean_IVBHP	100	100.0%	0	0.0%	100	100.0%

Table 3.1 depicts the case processing summary which narrates the zero missing values of this data set. Hence, this data set is transferred as it is for the next outlier analysis.

Outliers

There are two types of abnormal observations called outliers that can be identified in a data set. Extreme outliers should be removed from the data set and mild outliers should be kept as it is because there is a negligible impact for further analysis (Mowbray, et al., 2019). Figure 3.2 embellishes the outlier of each variable of this research study.

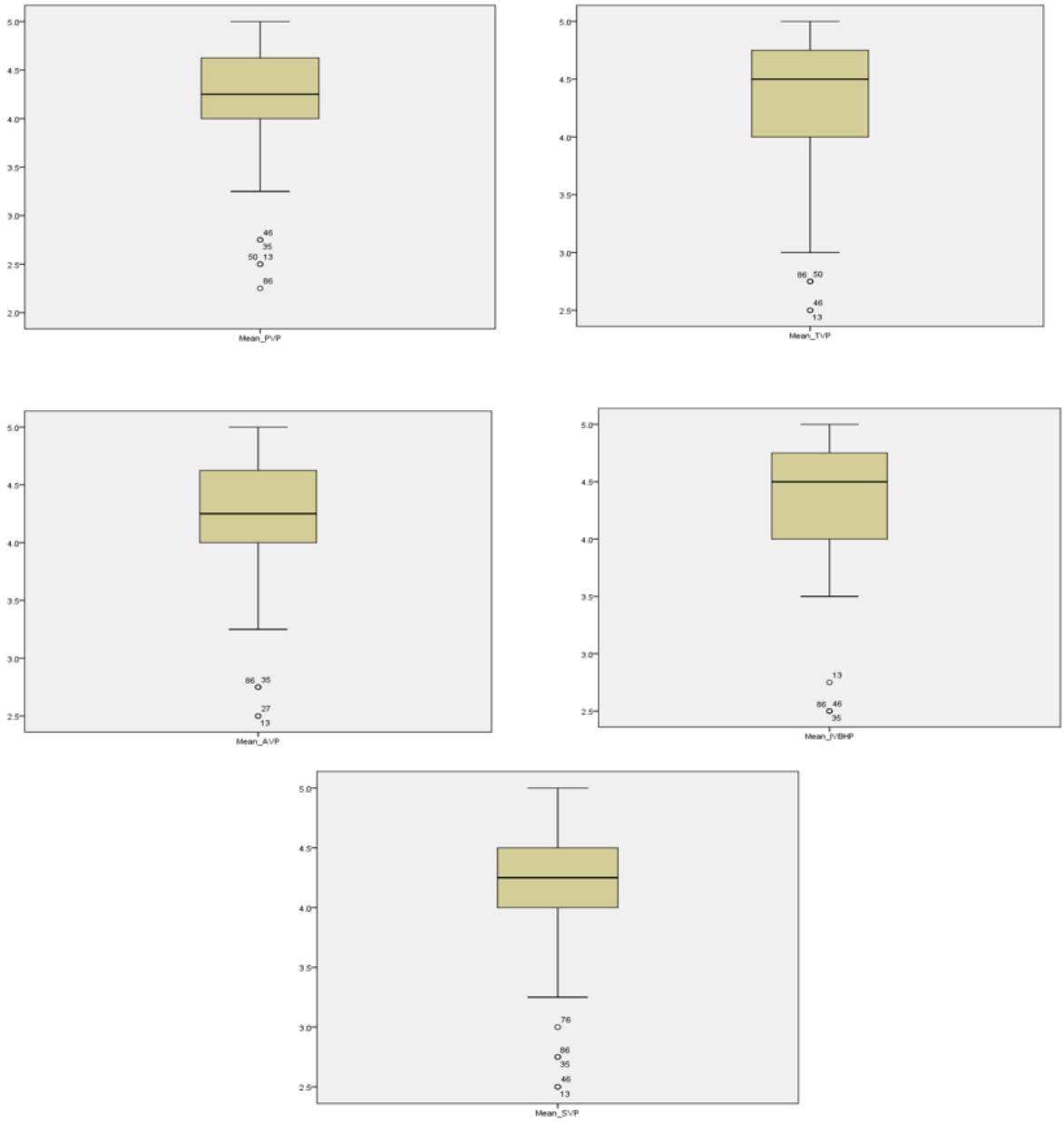


Figure 3.2 : Outliers.

Box plots were used to check the outliers of each variable and open dots indicate the mild outliers and an asterisk mark indicates the extreme outliers. As per Figure 3.2, all the visualized outliers indicate mild outliers considered negligible impact for further analyses. Hence, this data set proceeded as it is for further analysis.

Multivariate Assumption Analysis

Normality Test

The normal distribution of a data set is checked with the normality test (Tsagris & Pandis, 2021). Statistically and graphically, a normality test can be executed. In this research study, it was used skewness and kurtosis values under statistical methods. Cain, et al. (2017) mentioned that the -2.00 to +2.00 skewness value range and the -7.00 to +7.00 kurtosis value range can be used as acceptable values for normality assumption fulfilment in a data set. Nevertheless, the general argument is the skewness value range of -0.5 to +0.5 is considered an asymmetrical distribution of a data set. Table 3.2 embellishes the skewness and kurtosis value of this data set.

Table 3.2: Skewness and Kurtosis Values.

Statistics

		Mean_PVP	Mean_AVP	Mean_TVP	Mean_SVP	Mean_IVBHP
N	Valid	100	100	100	100	100
	Missing	0	0	0	0	0
Skewness		-1.579	-1.389	-1.430	-1.591	-1.551
Std. Error of Skewness		.241	.241	.241	.241	.241
Kurtosis		3.609	3.019	2.579	2.794	3.903
Std. Error of Kurtosis		.478	.478	.478	.478	.478

As per Table 3.2, all the skewness values and kurtosis values are ranged under acceptable value ranges according to the Cain, et al. (2017) study. Based on that, this data set is considered a normally distributed data set.

Moreover, histograms were used to visualize the normal distribution of the data set of this study. Figure 3.10 embellishes the histograms for each variable.

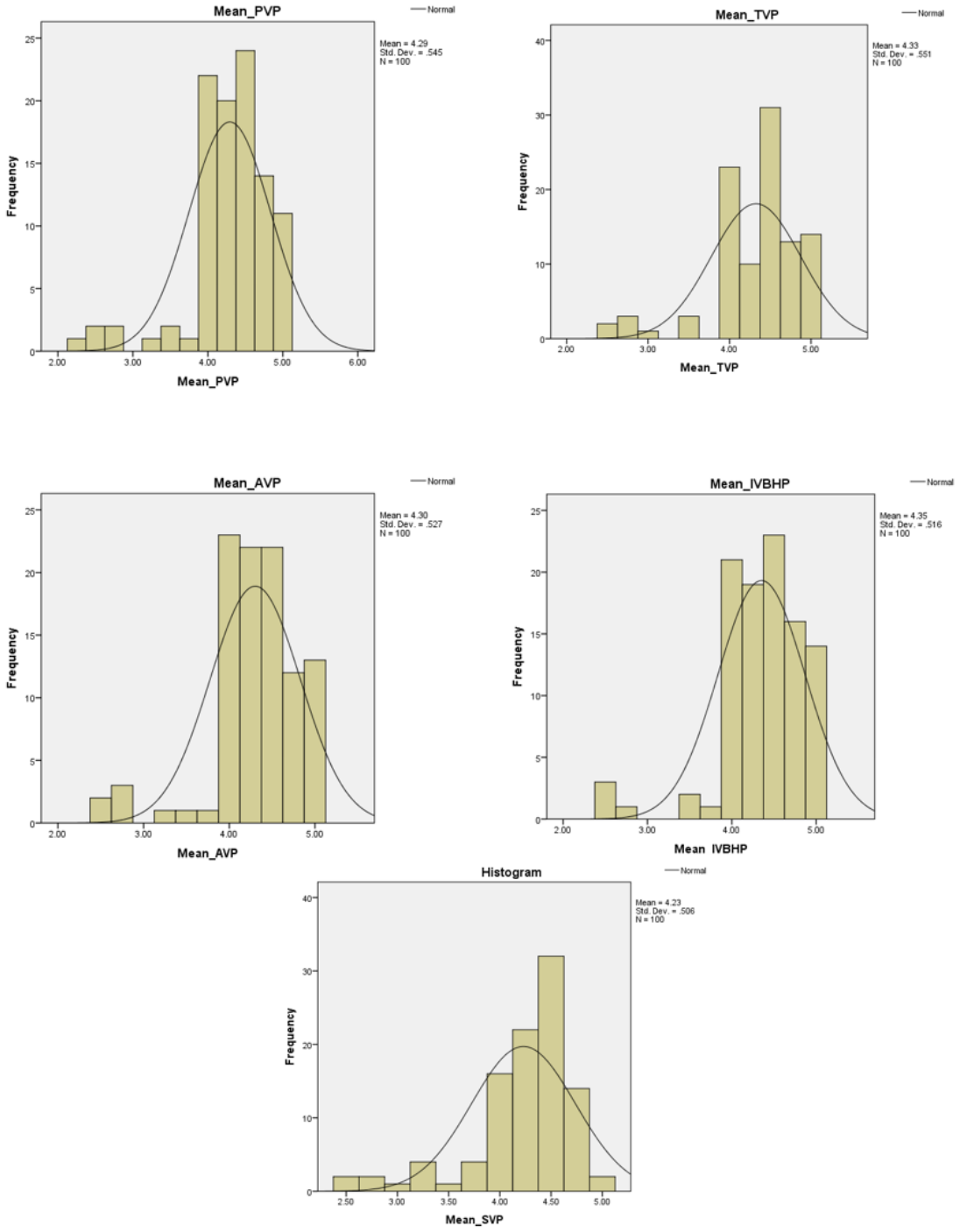


Figure 3.4: Histograms.

Linearity Testing

The linearity test is another multivariate assumption test which tests the relationship between the independent variable and dependent variable. Linearity lines using scatter plots are the method to check the linearity of a data set. The data set should be in a linear line to ensure linearity.

Figure 3.11 illustrates the linearity testing results of each independent variable and the dependent variable. As per the below figure, all the data sets were in a linear line by fulfilling the linear assumption of this data set.

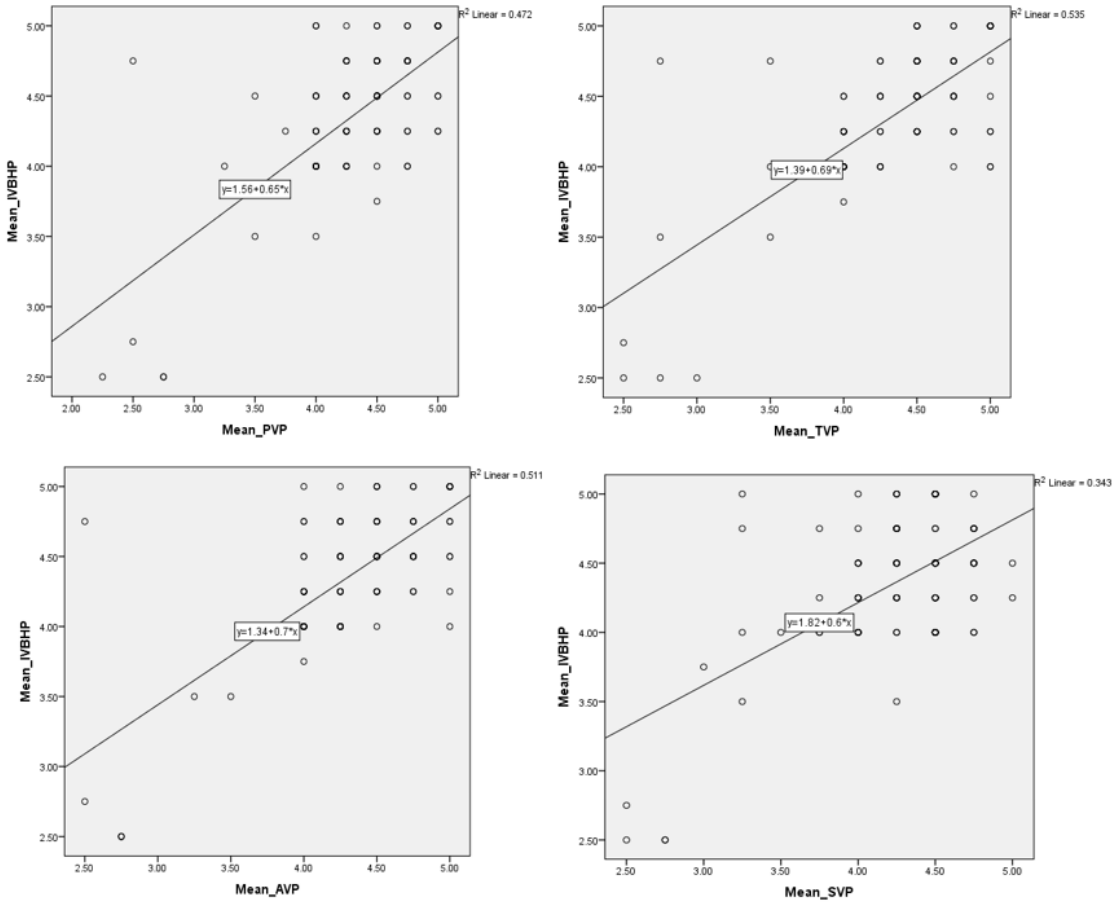


Figure 3. 5: Linearity Test Results.

Sample Adequacy

Appropriateness of each instrument for further analysis is tested using a sample adequacy test. Generally, the Kaiser-Meyer-Olkin (KMO) test is used to analyze the sample adequacy of the instruments. Numerous scholars mentioned that the acceptable minimum value of KMO is 0.6 to consider the adequacy of the instruments (Hair, et al., 2014). Table 3.3 embellishes the KMO values of each variable of this study.

Table 3.3: KMO Test Results.

Variable	KMO Value	Instruments Numbers
PVP	0.762	04
TVP	0.788	04
AVP	0.785	04
SVP	0.744	04
IVBHP	0.774	04

As per Table 3.3, PVP, TVP, AVP, SVP and IVBHP KMO values are 0.762, 0.788, 0.785, 0.744 and 0.774 respectively by surpassing the minimum acceptable value. Hence, it ensures the adequacy of the instruments.

Reliability and Validity Test

Reliability Test

The reliability test represents the dependability, stability and consistency of the instruments (DeVellis, 2016). Cronbach Alpha value is the decision-making criterion and Cronbach Alpha value should be higher than 0.7 to ensure the reliability of the instruments. Table 3.4 embellishes the Cronbach Alpha value of each instrument in variable wise of this study.

Table 3.4: Reliability Test Results.

Variable	Cronbach Alpha Value	Instruments Numbers
PVP	0.782	04
TVP	0.811	04
AVP	0.791	04
SVP	0.772	04
IVBHP	0.794	04

Table 3.4embellishes the PVP, TVP, AVP, SVP and IVBHP as 0.782, 0.811, 0.791, 0.772 and 0.794 respectively by exceeding the minimum acceptable Cronbach alpha value. Hence, it certifies the reliability of this study.

Validity Test

The appropriateness of the data set checks with the validity test tests. It can be identified numerous validity tests including, content validity, discriminant validity, convergent validity, etc. However, the researcher has opted for content validity to certify the validity of this study.

The instruments have been created based on the previously peer-reviewed quality literature. These instruments are published and already tested the validity and reliability and further, it ensured the validity and reliability. By considering this, it can be ensured the validity of this data set.

Descriptive Statistics

Descriptive statistics represents the characteristics of a data set. This study has used mean, mode and median values under the measure of dispersion and standard deviation, variance, and range under the measure of central tendency. Further, these characteristics have been measured as viable wise. Table 3.5 embellishes the descriptive statistics test results.

Table 3.5: Descriptive Statistics Test Results.

Statistics

		Mean_PVP	Mean_AVP	Mean_TVP	Mean_SVP	Mean_IVBHP
N	Valid	100	100	100	100	100
	Missing	0	0	0	0	0
Mean		4.2925	4.3025	4.3250	4.2300	4.3525
Median		4.2500	4.2500	4.5000	4.2500	4.5000
Mode		4.50	4.00	4.50	4.50	4.50
Std. Deviation		.54478	.52740	.55106	.50587	.51627
Variance		.297	.278	.304	.256	.267
Range		2.75	2.50	2.50	2.50	2.50

As per Table 3.5, the mean values of PVP, TVP, AVP, SVP and IVBHP are 4.2925, 4.3250, 4.3025, 4.2300 and 4.3525 respectively. It can be observed that respondents' answers skewed towards the positive answers which were agreed and strongly agreed. Standard deviation values are 0.54478, 0.55106, 0.52740, 0.50587 and 0.51627 for PVP, TVP, AVP, SVP and IVBHP respectively by indicating miner deviation on average value.

Demographic data analysis

According to the Sri Lankan Healthcare infrastructure contained within it a sample structure that primary healthcare institutions that the well-wishers are expecting from the future healthcare. To meet the expected study outcomes, the author has collected the demographic and background information that supports the sample participants to be eligible for being a sample participant. Demographic information reveals the background of the respondents. Gender, age, education level and years of experience were tested under the demographic of the respondents.

Gender

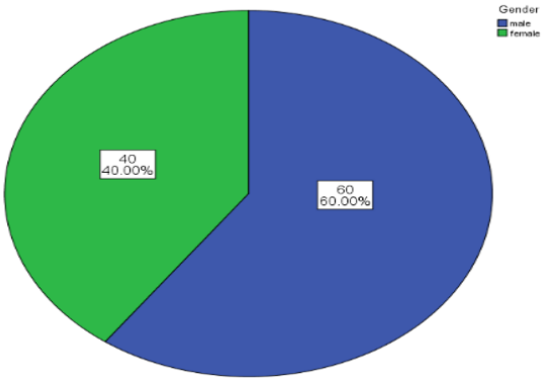


Figure 3.6: Gender.

Gender is the first demographic factor which was tested for this study. Among the 100 respondents, 60% were male whereas 40% were female. Hence, a large proportion of respondents were male participants in this research. Figure 3.12 described as follows.

Age

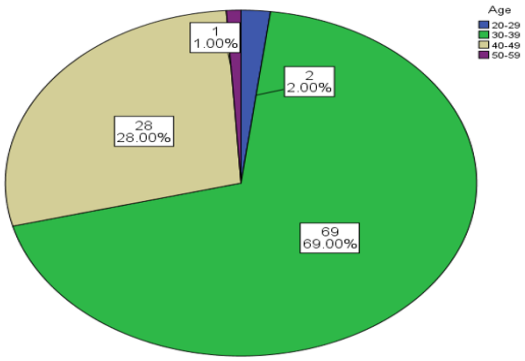


Figure 3.7: Age.

Age factor has been tested under four categories which are 20-29 years old, 30-39 years old, 40-49 years old, and 50-59 years old. The highest proportion is illustrated by the 30-39 age group as 69% and the lowest portion is depicted by the 50-59 age group as 1%. The other two age groups illustrated 28% and 2% for the 40-49 and 20-29 age groups respectively. Figure 3.13 described as follows.

Education

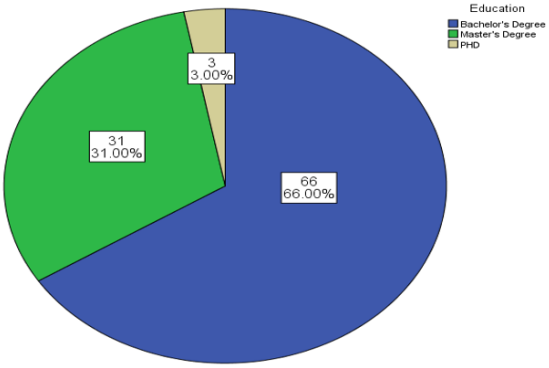


Figure. 3.8: Education.

The education level of the respondents was tested under four categories which are Diploma, Bachelor's degree, Master's degree and PhD. The highest value was 66% for Bachelor's degree holders whereas the

lowest value was 0% for diploma holders. However, Master's and PhD respondents were 31% and 3% respectively. Figure 3.14 described as follows.

Experience

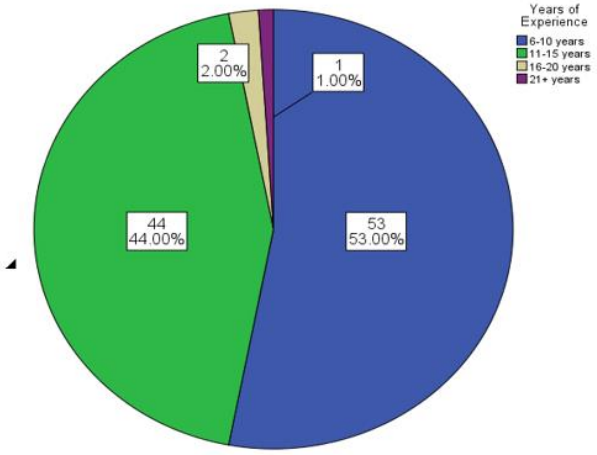


Figure 3.9: Experience.

Years of experience have tested under four groups which were 6-10 years, 11-15 years, 16-20 years, and 21+ years. The 6-10 years' experience group had the highest proportion of respondents' category indicating 53% and the least proportion of respondents' category was 21+ years at 1%. The 11-15 group and 16-20 years group narrated the 44% and 2% respectively. Figure 3.15 described as follows.

Background Analysis of the research topic area

Approximate Number of Chronic Kidney Disease patients reports per month

Under the background information concerning the research topic area, initially, it was asked the number of CKD reports being checked per month. Answers were categorized into four groups which were 21-40, 41-60, 61-80 and 81-100 patients' reports. The highest value indicates the 21-40 reports per month as 66% and the least value indicates for 81-100 reports per month as 1%. The other two groups which were 41-60, and 61-80 indicate 28% and 5% respectively. Figure 3.16 described as follows.

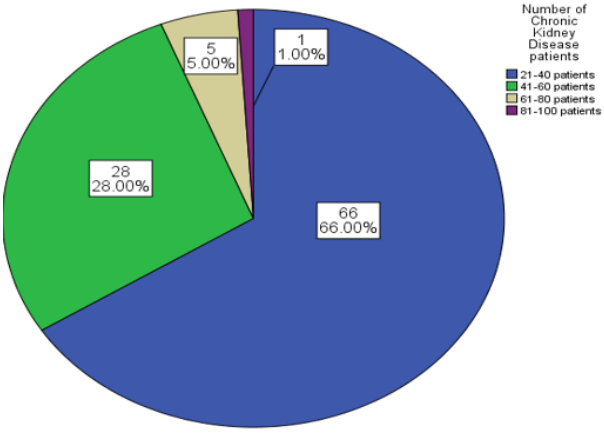


Figure 3.10: Number of CKD Reports.

Familiarity with the value-based healthcare practices

The next background question was about familiarity with value-based healthcare practices. Four categories were allocated to answers for the respondents. 63% was the highest value and it indicates the category of "familiar". The lowest percentage was 0% which indicated for "Not Familiar" category. "Somewhat familiar" and "Very familiar" indicated 32% and 5% respectively. Figure 3.17 described as follows.

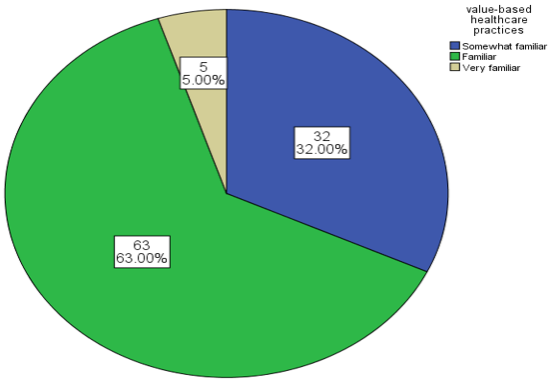


Figure 3.11: Familiarity with the VBHP.

Awareness of CKD in Diabetic Patients

Four categories were taken into consideration to check the awareness of CKD in diabetic patients which were Not aware, somewhat aware, aware and very aware. 56% was the highest proportionate and it was indicated under the category of “aware”. The not-aware category which is the least respondents 0% was not indicated in Figure 3.10 since all the respondents were aware of the CKF in diabetic patients. Figure 3.18 described as follows.

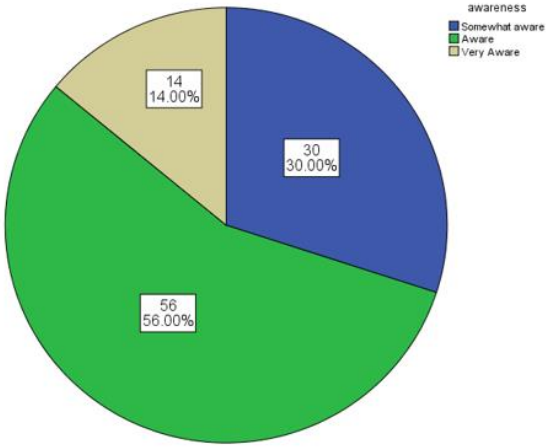


Figure 3.12: Awareness of CKD.

Sri Lankan context regarding CKD in Diabetic Patients as a common side effect

Most of the respondents in Sri Lanka were aware that, CKD in diabetic patients have common side effects. Proportionately, it was 97%. Figure 3.19 described as follows.

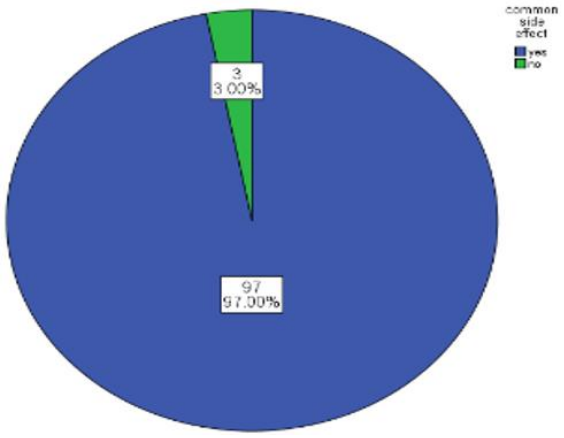


Figure 3.13: Sri Lankan context for CKD.

Correlation Analysis

Correlation analysis emphasizes the relationship between independent variables and dependent variables of the research study. This research has tested the correlation of PVP, TVP, AVP, and SVP with the IVBHP. Generally, positive relationships fluctuate the value of 0 to +1.00 and Negative relationships fluctuate between -1.00 to 0. Fundamentally, Pearson Correlation Coefficient value and sig value are considered to determine the relationships between variables. The sig value should be < 0.05 to conclude the significance of the data set. Table 3.6 embellishes the Pearson Correlation analysis test results of this study.

Table 3.6: Pearson Correlation Coefficient Values.

Variable	Pearson Correlation Coefficient	Sig Value
PVP and IVBHP	0.687	0.000
TVP and IVBHP	0.732	0.000
AVP and IVBHP	0.715	0.000
SVP and IVBHP	0.617	0.000

As per Table 3.6, all the Pearson correlation coefficient values are positive values exceeding 0.6. That indicates the positive strong relationship between each variable set. Further, all the sig values are 0.000 which is < 0.05 and it ensures the significance of the data set. Hence, it certifies the strong positive correlation between the study's independent variables and the dependent variable.

Regression Analysis

Regression analysis is crucial to identify the impact of the independent variables on the dependent variable. Further, hypotheses testing results are dependent on the regression analysis test results. Additionally, this study has opted for multiple regression analysis as per the developed conceptual framework for this study. Three tables are fundamentally considered to make the decisions as below in Table 3.7.

Table 3.7: Regression Analysis Test Results.

Model Summary		
R-value	R square Value	
0.792	0.627	
ANOVA Table		
F value	Sig Value	
39.976	0.000	
Coefficient Table		
Variables	Unstandardized Coefficient B value	P- Value
Constant (IVBHP)	0.643	0.034
PVP	0.207	0.034
TVP	0.230	0.048
AVP	0.257	0.017
SVP	0.171	0.036

The first evaluation of regression analysis test results is the model summary. R-value and R square value are the primary evaluated figures in the model summary. R-value implies the multiple correlation coefficient and its R = 0.792 which shows a strong correlation between the independent variables (PVP, TVP, AVP, SVP) and the dependent variable (IVBHP). The R^2 value of 0.627 indicates that 62.7% of the variance in IVBHP may be defined by using the mixed effect of PVP, TVP, AVP and SVP.

ANOVA table is used to determine the efficiency of the model. Mainly, the F value and sig values are considered in the NOVA table. F value should be > 1 and the sig value should be < 0.05. As per Table 3.7, the F value is 39.976 and the sig value is 0.000 which indicates the efficiency of the model and certifies the significance of the model.

The coefficient table provides the most crucial figures for the decision-making of the research hypotheses. P value is the main decision criterion, and the p value should be less than 0.05. As per the figures in Table 3.7, all the p values indicate the below value for the accepted minimum p value, and it ensures that all the hypotheses are accepted.

Owing to the acceptance of all hypotheses, the regression model can be written as below using Unstandardized Coefficient B values.

$IVBHP = \beta 0 + PVP\beta 1 + TVP\beta 2 + AVP\beta 3 + SVP\beta 4 + \varepsilon$

IVBHP = 0.643+ 0.207 (PVP) + 0.230(TVP) + 0.257 (AVP) + 0.171(SVP) + ε

Hence, hypothesis results can be embellished as follows in Table 3.8.

Table 3.8: Hypotheses Testing Results.

Hypotheses	Test Results
H1: There is a significant effect of Personal value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka	Accept
H2: There is a significant effect of technical value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka	Accept
H3: There is a significant effect of Allocative value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka	Accept
H4: There is a significant effect of Societal value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka	Accept

Hence, by considering the study findings, it can be summed up that personal value perspectives, technical value perspectives, allocative value perspectives and societal value perspectives significantly and positively affect value-based healthcare principles in adopting risk investigation of diabetes patients on chronic kidney diseases in Sri Lanka.

Discussion Using Primary data and Secondary data findings

Discussion of Personal Value Perspectives on value-based Healthcare principles in Adopting Risk Investigation of diabetes patients on chronic Kidney diseases

According to Poter and Lee (2013), patients value personalized health outcomes which address their unique situation, such as lifestyle, current health and long-term goals is a key requirement in their lives. By adapting to VBHC, risk investigation for CKD focuses on achieving meaningful outcomes for each patient, such as delaying dialysis treatments or avoiding hospitalization for complications. Further, Strachan, Murray and Arora (2009) have stated that diabetic patients at risk for CKD value early detection helps to reduce and alleviate the fear and anxiety getting lifetime health conditions. Knowing that CKD can be identified at the early stage, provides a sense of security and reduces the stress about future health conditions. The concept of bundle payments is introduced Value-Based Healthcare systems, where the single payment is made for an entire care stage, incentivizing providers to focus on the entire continuum of care rather than individual services. In CKD management, some countries have introduced bundled payment structures that can be used for comprehensive care, diagnostics, treatment management, and patient follow-up plans, rather than fragmenting the healthcare services into different units, departments, and different geographical locations. Improved quality of life is another gain of patient-prioritized health interventions that help to increase overall quality of life (Patrick and Erickson, 1993) and this study shows the focus on improving quality of life by targeting the personal value perspective. For instance, managing the symptoms, and identifying risks associated with diabetes and CKD. Additionally, Rudd (2015) has stated that empowerment through knowledge and health literacy is the main gain related to VBHC since this adds value and knowledge to healthcare literacy and improves patient empowerment.

As per the above literature, the author has created four points of personal values perspectives on value-based healthcare principles in adopting risk investigation of diabetes patients on CKD management. The evaluation contrasts with the R-value from the Pearson correlation coefficient result, there is a positive relationship between PVP and IVBHP. Further, as per the regression analysis results, PVP positively impacts to increase in the implementation of value-based healthcare principles, and it elaborates a positive linear relationship. Hence, by considering primary data findings, it can be concluded that personal value perspectives positively impact on implementation of value-based healthcare principles in adopting risk investigation of diabetes patients with chronic kidney diseases in Sri Lanka.

Discussion of technical Value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases

Developing and making predictive models is a significant value addition for early CKD management. For example, Machine Learning and Artificial Intelligence are the key tools in VBHC. By applying these tools,

healthcare professionals can track the risk for CKD progression earlier and optimize clinical decision-making based on real-time and accurate data (Beam and Kohane, 2018). This emphasizes that the risk prediction data will help to create predictive models which directly relevant to adopting risk investigation for CKD in diabetic patients. Vassy, Shrader, Jonsson, Florez, and Meigs (2011) have implied that the technical approach to VBHC involves utilizing and analyzing patient data and analytics to provide risk-based statistics of developing CKD. The key benefit of this is allowing personalized interventions that target high-risk patients more effectively while improving outcomes and reducing unnecessary testing and treatments for lower-risk individuals.

Clinical Pathway optimization ability is another way of uplifting VBHC by standardizing the optimal care delivery for chronic conditions of diabetes and CKD (Rotter, et al., 2010). Developing a system with an evidence-based protocol for risk investigation will reduce the variability in care management and ensure the patient receives more effective and efficient medical care. According to Levet, et al. (2003), the usage of biomarkers and diagnostic tools is essential for early diabetic management. Biomarkers and diagnostics tools usage can be used for CKD early detection specifically for diabetic management. This supports the technical perspective of VBHC (Levet, et al., 2003).

R value for the Pearson correlation coefficient was 0.732 and it indicates the strong positive relationship between TVP and IVBHP. Regression analysis results further certified the collective effect of TVP, and other variables positively correlate with IVBHP (R=0.792). Further, it illustrates the positive impact of technical perspective values on the implementation of value-based healthcare principles, and it elaborates a positive linear relationship. Hence, by considering primary data findings, it can be concluded that technical value perspectives positively impact on implementation of value-based healthcare principles in adopting risk investigation of diabetes patients with chronic kidney diseases in Sri Lanka.

Discussion of Allocative value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases

According to the Pearson correlation coefficient result, the R-value was 0.715 and it indicates the strong positive relationship between AVP and IVBHP. Regression analysis results further certified the collective effect of AVP, and other variables positively correlated with IVBHP (R=0.792). Further, it illustrates the positive impact of Allocative perspective values on the implementation of value-based healthcare principles, and it elaborates a positive linear relationship. Hence, by considering primary data findings, it can be concluded that allocative value perspectives positively impact on implementation of value-based healthcare principles in adopting risk investigation of diabetes patients with chronic kidney diseases in Sri Lanka. Kaplan and Poter (2011) have highlighted that outcome-based monitoring benefits help both patients and healthcare professionals to add valuable measures to healthcare outcomes. Adapting to CKD risk investigations in diabetic patients can be guided by the principles of healthcare services delivery while increasing visibility and positive outcomes. Further, Koller (2018) has implied the equitable access principle is crucial specifically in a limited-resources set-up setting same as in Sri Lanka. Healthcare professionals and patients alike value a system that ensures equal accessibility to preventive measures, irrespective of socio-economic status.

When making decisions collaboratively between healthcare providers and patients, the numerical and statistical data is significant. This increases the effectiveness of the patient management plan (Elwyn, Frosch, and Rollnick, 2009). This increases the VBHC principles more towards patient-related outcomes increment. According to White and Joffe (2016), adopting to future risk of getting CKD due to diabetes can be stated as the principle of prevention. A holistic approach to care management that addresses multiple risk factors at once is highly valued as this contributes to preventing disease management unless than focusing on treating complications after the patients are diagnosed with a diabetes diagnosis.

Discussion of Societal value perspectives on value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases

Increasing the public health impact and disease prevention is another addition to society's values of the healthcare system (Tonelli and Riella, 2014). This navigates to early risk investigation of CKD in diabetic patients and aligns with public health priorities of preventing complications and reducing healthcare costs by addressing issues before they become critical. Further, Brown and Bussell (2011) implied society values a healthcare system that contributes to the overall public health parameters. Implementing a risk identification method for CKD in diabetic patients is essential for reducing the prevalence of end-stage renal

disease and related complications, which have significant implications and threats to public health. As per the above literature, the author has created four points of societal values perspectives on value-based healthcare principles in adopting risk investigation of diabetes patients on CKD management. According to the collected and measured data, the R-value from the Pearson correlation coefficient result indicated a positive relationship between SVP and IVBHP. Further, as per the regression analysis results, SVP positively impacts to increase in the implementation of value-based healthcare principles, and it elaborates a positive linear relationship. Hence, by considering primary data findings, it can be concluded that societal value perspectives positively impact on implementation of value-based healthcare principles in adopting risk investigation of diabetes patients with chronic kidney diseases in Sri Lanka.

CONCLUSION

This study has been conducted by the author to answer the question “What are the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in Sri Lanka?”. According to the hypothesis the four dependent variables of personal, technical, allocative, and societal, are positively related to value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases. Therefore, this study is strong proof that the Valu-based healthcare system is an effective disease management system and can be used for early diagnosis of some medical conditions including diabetes and CKD.

When government offer cost-effective and evidence-based healthcare screening services, can further prevent expensive treatments, such as kidney transplants, by focusing on early prevention and intervention strategies. When patients value interventions that decrease their financial, physical, and emotional imbalances while ensuring that they are actively engaged in the decision-making process.

Considering this study, the author had to manage many limitations of this study to maintain the accuracy levels of the study. Initially, the research sample was selected by targeting the healthcare professionals who manage diabetes and CKD as their primary job. with their busy time schedule and the different levels of responsibility holding and management contribution, the author managed limitations.

As a national healthcare system leverage, the VBHC principles can be used to prioritize early detection, patient-centered management strategies in diabetes, and deliver equitable care that can enhance the quality of life for patients.

By implementing this VBHC system for implementing following recommendations, the aim of this research to identify the effects of VBHC Principles in Adopting risk investigation of Diabetes patients on CKD in SL will be achieved. However, by advancing and critically analyzing these key areas in-depth, the author believes that practitioners and researchers can gain more insight into this area.

KEY RECOMMENDATIONS

The essence of VBHC focuses on delivering a high level of patient care efficiently and cost-effectively. Proper management and application of VBHC will lead to better outcomes, improved patient care, reduced healthcare costs, and high patient satisfaction.Healthcare authorities can implement the following recommendations to uplift the current CKD management system and long-term diabetic patient management. The following recommendations are formed under the dependent variables of personal, technical. Allocative, and societal values that come under value-based health care principles in adopting risk investigation of diabetes patients on chronic kidney diseases. In CKD management, this involves the utilization of patient-reported outcomes measures (PROMs) and Patient-Reported Experience Measures (PREMs) to track the health status of patients, patient’s quality of life, and satisfaction of CKD patients over time. Based on this, the author has made these recommendations.

Personal Values can be uplifted by focusing on individual patient experiences and outcomes. This can be done by implementing patient-centered care that can be used for risk investigation that should focus on individual patient needs, early detection of CKD, and tailored health management for diabetes patients. Further, creating a patient-centered education system and youth empowerment can make diabetes patients aware of getting CKD in the future adopt preventive measures and adhere to treatment regimens that increase personal responsibility and responsibility to engage in required medical care. Also, from the healthcare professional’s side, acquiring more knowledge about the current healthcare systems and practices across the world adds value to their personal career growth. Therefore, the authorities can create

a certified VBHC program for the professionals to upgrade their careers while managing CKD and Diabetic patients.

Technical Values can be used to improve the quality of the services delivered and the effectiveness of care. The outcomes can be measured by using albuminuria, serum creatinine, and eGFR levels allowing us to accurately read the health levels and the CKD risks in diabetes patients, which leads to more effective interventions. Integrated care delivery can make greater amalgamation between healthcare providers such as endocrinologists, nephrologists, MLTs, and other medical professionals to ensure that technical expertise is effectively applied to provide comprehensive and continuous care. Regular training, monitoring, and conducting some audits for standardization can contribute to increase the healthcare services delivery efficiency. To increase the knowledge levels and skill levels of the professionals, the authority can offer more technical support in terms of connections, funds, technical facilities, and guidance to explore more aspects of VBHC, CKD, and Diabetic Management.

Allocative values can be enhanced by using effective and efficient resources to increase patient benefits. When a patient is suffering from CKD, the demand for medical supplies is increasing high. Early detection and prevention of CKD via proactive diabetes management will help to reduce the long-term financial burden on the healthcare system and personal funds. Utilizing technical and technological resources will help to increase the efficiency in patient monitoring and adjust the treatment strategies based on real-time data supporting resources-efficiency, outcomes-driven patient care. Another way of increasing the allocative value of the VBHC system is by introducing cost-efficient screening methods, and creating partnerships with research bodies and the private sector to fund affordable screening methods for CKD prevention seems effective. Regular cost-benefit analysis conducting can uplift the accuracy and validity of scientific screening. Additionally, the authorities can prioritize preventive care methods over expensive treatments by executing early prevention strategies such as regular screening and patient education to minimize the need for kidney transplantation. This can be managed by allocating more resources to preventive healthcare that affects long-term healthcare costs related to CKD and kidney transplants.

Societal values can be increased by enhancing health outcomes among the community as a whole and increasing community health parameters. This can be improved by prevention and public health impact. Early CKD detection and prevention strategies can reduce the societal burden for chronic diseases which can lead to costly treatments such as dialysis for kidney transplants. Further, increasing healthcare accessibility and equity by implementing VBHC principles ensures that all diabetes patients, regardless of socioeconomic status, have access to risk investigations and preventive measures for CKD, by fostering equitable outcomes in healthcare. With the help of district-level public healthcare professionals, the authorities can expand the scientific screening programs for preventing CKD in diabetic patients. Promoting these programs as national pilot projects and amalgamating with other healthcare screening activities such as Dengue, Malaria, and Elephantiasis demonstrate the long-term health benefits through continuous research and outcomes tracking. Moreover, Public Awareness campaigns are recommended for this community since the awareness levels of the people remain low and the focus of these campaigns should be highlighting the risk of CKD and the potential risk of getting CKD due to diabetic mismanagement. Implementing Value-Based Healthcare Principles, and executing strategies based on VBHC principles will help to engage the communities via workshops, social media, and collaborations with local healthcare providers.

Implementing the above risk tracing, and community development efforts that also align with VBHC principles. Structured planning and execution can reduce the risk and increase the prevalence of CKD patient reporting, CKD patient management, and diabetes patient management. However, from the author's viewpoint, the VBHC system implementation in Sri Lanka will help the current Sri Lankan medical system to upgrade for a more sustainable and impactful healthcare system that can manage CKD and diabetes patients. Further, the author suggests that future researchers conduct studies by applying VBHC management principles for other medical system threats in Sri Lanka Moreover, shifting the current healthcare management system into VBHC principles can be challenging as a nation. Therefore, the author invites the research professionals to conduct further studies to suggest a standardized methodology for systematic transition. As a result of this study, shows that adopting a VBHC approach in CKD risk investigation can lead to creating improved outcomes for diabetic patients, reduce healthcare costs, and promote equity in care. However, it is essential that the healthcare authorities focus on integrating

technological innovations, and advances while enhancing resource allocations and raising public awareness to prevent CKD and its complications among diabetic patients in Sri Lanka.

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Appendix A: Research Questionnaire

THE EFFECTS OF VALUE-BASED HEALTH CARE PRINCIPLES IN ADOPTING RISK INVESTIGATION OF DIABETES PATIENTS ON CHRONIC KIDNEY DISEASES IN SRI LANKA

Research Questionnaire

This research is conducted by Mr. Saman Kumara (Student ID: ……) and I am currently reading my Masters of Science in Management at Swansea University, United Kingdom. The study has been conducted to complete the research methods module under the Advanced Health and Care Management Program at Swansea University, UK. This research is conducted under the close supervision of Professor Hamish Laing, and this target the health management professionals in Sri Lanka in order to identify the Effects of VBHC Principles in adopting risk investigation of diabetes patients on chronic kidney disease based in Sri Lanka. Herewith I request you to answer and rate the below questions, by referring to your experience with chronic kidney disease management in Sri Lanka. To answer these questions, the participants can contribute voluntarily, and the author hereby declares that these data will not be enclosed for any external party. Your participation is highly appreciated.

1. Demographic Variables

Please select the suitable category from below.

1. Gender

Male	
Female	
Preferred Not to Say	

2. Age Group

20-29	
30-39	
40-49	
50-59	
60+	

3. Highest Educational Qualification

Diploma	
Bachelor's Degree	
Master's Degree	
PhD	
Other	

2. Background Information

Please rate the below selections according to your best knowledge.

4. Years of Experience in the Medical Field

0-5 years	
6-10 years	
11-15 years	
16-20 years	
21+ years	

5. Approximate Number of Chronic Kidney Disease patients reports per month.

0-20 patients	
21-40 patients	
41-60 patients	
61-80 patients	
81-100 patients	
More than 100 patients	

6. How familiar are you with value-based healthcare practices?

Not familiar	
Somewhat familiar	

Familiar	
Very familiar	

7. Awareness of CKD in Diabetic Patients.

Not aware	
Somewhat aware	
Aware	
Very aware	

8. In Sri Lanka, do you consider CKD in Diabetic Patients to be a common side effect?

Yes	
No	

3. Independent Variables

scenario: Value-based healthcare is an emerging healthcare standard that is used for patient management across the world. The following statements are being constructed depending on the personal, technical, allocative, and societal values of chronic kidney damage in Diabetes patients.

Please rate the below statements by referring to your prior experience regarding chronic kidney damage in Diabetes patients in Sri Lanka.

Scale	**1**	**2**	**3**	**4**	**5**
Description	Highly Dissatisfied	Dissatisfied	Either Satisfied or Not Satisfied	Satisfied	Highly Satisfied

No.	**Statements**	**Rating Scale**				
		1	**2**	**3**	**4**	**5**
Personal value Perspective						

P_1	To Decide on having "scientific screening for prevent or minimize chronic kidney damage with Diabetes" research has given important details regarding the Proper screening practices.					
P_2	Early Detection of Diabetic Nephropathy with scientific screening method, ensures the long-term survival of individual patients.					
P_3	In terms of job satisfaction, you are highly satisfied with your role and the responsibilities held towards investigating the risk of CKD in diabetic patients?					
P_4	In terms of your Professional Growth, adopting value-based healthcare principles contributes to your professional growth and development to some extent.					
Technical Value Perspective						
T_1	According to the given clinical guidelines, How well do the current clinical guidelines support the technical aspects of CKD risk investigation in diabetic patients?					
T_2	From your perspective, the current process holds effective diagnostic tools and technologies available for the early detection of CKD in diabetic patients.					
T_3	You receive adequate training in utilizing advanced diagnostic techniques for CKD risk investigation in diabetic patients.					
T_4	The authorities support with guidance and resources technological advancements (e.g., electronic health records, telemedicine) integrated into the management and monitoring of CKD in diabetic patients.					
Allocative value Perspective						

A_1	In terms of resource allocation, do authorities act effectively to the current allocation of resources in supporting the risk investigation of CKD in diabetic patients?					
A_2	Having "scientific screening for prevent or minimize chronic kidney damage with Diabetes" allocated funds according to the given numbers were affordable?					
A_3	In terms of Equity in Care, to what extent do you believe that value-based healthcare principles ensure equitable care for all diabetic patients at risk of CKD?					
A_4	Having "scientific screening for preventing or minimizing chronic kidney damage with Diabetes" prevents or minimizes kidney transplant expenditures.					
Societal Value Perspective						
S_1	In terms of public health impact, you believe the impact of value-based healthcare principles is on the overall public health outcomes related to CKD in diabetic patients.					
S_2	As per your knowledge, the "scientific screening for preventing or minimizing chronic kidney damage with Diabetes" is highly effective in preventing CKD with Diabetes compared with previous random screening methods.					
S_3	As per your knowledge, having "scientific screening for preventing or minimizing chronic kidney damage with Diabetes" helps the diabetes community to manage their kidney health cost-effectively.					

S_4	Raising community awareness about the risks of CKD in diabetic patients through value-based health care initiatives?					

4. Dependent Variables

Please rate your answers by referring to your opinion on the implementation of Value-based healthcare principles for the risk investigation process of CKD in diabetic patients.

Scale	**1**	**2**	**3**	**4**	**5**
Description	Highly Dissatisfied	Dissatisfied	Either Satisfied or Not Satisfied	Satisfied	Highly Satisfied

No.	**Statements**	**Rating Scale**				
		1	**2**	**3**	**4**	**5**
D_1	You believe that the implementation of Value-based healthcare principles has been improving the risk investigation process of CKD in diabetic patients.					
D_2	By adapting to Value-based healthcare principles, the patient-related outcomes (ex: early detection, effective management, reduced CKD progression) improved by the adoption of Value-based healthcare principles for CKD risk tracing in diabetic patients.					
D_3	The overall quality of care provided to diabetic patients at risk of CKD after implementing value-based healthcare principles is an effective method.					
D_4	The adoption of value-based healthcare principles impacted the timeliness of CKD diagnosis in diabetic patients.					

THANK YOU FOR THE ACTIVE PARTICIPATION

Appendix B: KMO

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.762
Bartlett's Test of Sphericity	Approx. Chi-Square	104.345
	df	6
	Sig.	.000

PVP

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.788
Bartlett's Test of Sphericity	Approx. Chi-Square	128.813
	df	6
	Sig.	.000

TVP

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.785
Bartlett's Test of Sphericity	Approx. Chi-Square	110.936
	df	6
	Sig.	.000

AVP

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.744
Bartlett's Test of Sphericity	Approx. Chi-Square	103.802
	df	6
	Sig.	.000

SVP

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.774
Bartlett's Test of Sphericity	Approx. Chi-Square	121.008
	df	6
	Sig.	.000

IVBHP

Appendix C: Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.782	4

PVP

Reliability Statistics

Cronbach's Alpha	N of Items
.811	4

TVP

Reliability Statistics

Cronbach's Alpha	N of Items
.791	4

AVP

Reliability Statistics

Cronbach's Alpha	N of Items
.772	4

SVP

Reliability Statistics

Cronbach's Alpha	N of Items
.794	4

IVBHP

Appendix D: Correlation

Correlations

		Mean_PVP	Mean_TVP	Mean_AVP	Mean_SVP	Mean_IVBHP
Mean_PVP	Pearson Correlation	1	.774**	.671**	.574**	.687**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	100	100	100	100	100
Mean_TVP	Pearson Correlation	.774**	1	.794**	.609**	.732**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	100	100	100	100	100
Mean_AVP	Pearson Correlation	.671**	.794**	1	.623**	.715**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	100	100	100	100	100
Mean_SVP	Pearson Correlation	.574**	.609**	.623**	1	.617**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	100	100	100	100	100
Mean_IVBHP	Pearson Correlation	.687**	.732**	.715**	.617**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix E: Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.792[a]	.627	.612	.32174

a. Predictors: (Constant), Mean_SVP, Mean_PVP, Mean_AVP, Mean_TVP

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.553	4	4.138	39.976	.000[b]
	Residual	9.834	95	.104		
	Total	26.387	99			

a. Dependent Variable: Mean_IVBHP

b. Predictors: (Constant), Mean_SVP, Mean_PVP, Mean_AVP, Mean_TVP

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.643	.299		2.149	.034
	Mean_PVP	.207	.096	.219	2.155	.034
	Mean_AVP	.257	.106	.262	2.423	.017
	Mean_TVP	.230	.115	.246	2.000	.048
	Mean_SVP	.171	.080	.178	2.131	.036

a. Dependent Variable: Mean_IVBHP

HOW can patient pathways be redesigned to enhance efficiency and optimise resources: A case study from west Wales.

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Abstract:

One of the most under-researched areas of health and care provision is the redesign of existing patient pathways within the complex environment of community-based care. This research, drawing from a structured literature review, explores the challenges and opportunities for enhanced service delivery and efficiencies using a community team-based case study from West Wales. The report draws from a historical review of secondary data collected from the case study and covering a period of one calendar year (April 2023 to April 2024). The study found that substantial efficiencies and cost avoidances could, and were generated, which allows existing staff resources to be free of waste and allow professionals to focus on greater patient-focused value adding. The study concludes that it is possible to use service redesign processes to generate new resource efficiencies and allow empowered staff to learn how to change processes and services that enhance community resource team performance and patient responsiveness. These gains generate a smoother process which permits the swift and even flow of patients from all areas of the local community and secondary care to keep patients safe and to provide optimised services locally.

Keywords: Community-Based Care, Service Re-design, Efficiency, Patient Pathways, Resource Optimisation.

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Introduction

Background and Context

The movement of patients through different stages of care in hospitals, known as patient flow, is critical for maintaining efficiency and quality of healthcare delivery. Effective patient flow management ensures that resources, decisions, and processes within the hospital work in unison to deliver timely care while reducing strain on staff and hospital systems. (Richards, 2021).

This project addresses a pressing issue in healthcare systems: ensuring that patients are discharged home safely and promptly while minimising the delays that burden hospital resources and patient care. Effective patient flow management and coordination is essential in hospital settings as it significantly impacts the quality of care, staff workload, and patient outcomes for patients, resulting in more efficiency in the system. The "Discharge to Recover then Assess" (D2RA) model in Wales, part of the "Once for Wales" strategy, was introduced in 2018, based on the English model but with added recovery principles, (Parliament, W. 2022). It focuses on facilitating discharges with ongoing recovery and assessments taking place in a community setting, rather than hospitals. This approach prioritises the "Home First" ethos, which is aligned with the broader goal of transforming health and social care services into more integrated, community-centred models. (Senedd Wales, 2022) However, there remains a significant gap in understanding the true costs associated with these processes. By developing a cost model framework that evaluates the current inefficiencies and explores potential interventions, this project seeks to provide evidence-based recommendations that can optimise patient outcomes, streamline discharge processes, and enhance resource allocation within the Welsh healthcare system.

The Importance of the Service for more efficient and effective Decision-Making.

The "Discharge to Recover then Assess" (D2RA) model plays a crucial role in facilitating more efficient and effective decision-making within the healthcare system. By focusing on discharging patients to a more appropriate, community-based setting as soon as they are medically fit, the D2RA model alleviates pressure on hospital resources, such as acute care beds, and enables healthcare providers to make faster, more informed decisions. This shift from hospital-based to community-based care allows for timely assessments and interventions that are better suited to patients' recovery needs in a familiar environment, reducing the risk of hospital-acquired conditions like infections or deconditioning. (Welsh Government, 2021b) Furthermore, the integration of health and social care services under the D2RA model ensures that decision-making is collaborative and person-centred, with healthcare professionals, social services, and third-sector organisations working closely together to support each patient's unique and bespoke needs. By streamlining the discharge process and improving the coordination between stakeholders, the model not only has potential to enhance patient outcomes but also enables more strategic use of resources, reduces readmissions, and improves overall patient flow. As a result, healthcare systems become more responsive and adaptive, fostering a more sustainable approach to long-term patient care and system management. Through the shared aim of transforming health and social care services, the 'Delivering Home First' initiative is part of the broader 'A Healthier Wales' strategy with a focus on being more integrated, community-focused, and patient-centred.

There are a number of research papers that identify ineffectiveness such as The Bevan Commission's, "What a Waste!" report which highlights issues related to patient discharge and flow including poor coordination of care leading to adverse events that prolong hospital stays and delays in transfers of care were identified as an urgent area of concern, where hospitals are used due to a lack of more appropriate alternatives outside of hospitals. (Howson, 2023)

The Vital Role of Community Services in Supporting Discharge Pathways in Wales.

Community services play a crucial role in the success of the discharge pathways in Wales by providing essential support and resources that enable patients to transition smoothly from hospital to home or other care settings. Organisations should focus on prevention and early intervention, which are vital for supporting independence at home, before the patient reaches crisis point. By maximising community assets and third sector services, organisations should be focused on helping reduce the demand on primary and secondary care facilities and thinking about community response services that can provide a wrap around, bespoke, unique and flexible response to delivering care and support, which goes hand in hand with technology enabled care, telehealth and access to information, advice and assistance, whilst working in close

partnership with intermediate care multi-disciplinary teams (ICMDT). The table below identifies the governance issued in recent years:

Table 1. Key Documents shaping modern primary care processes in Wales.

Title	Year	Publisher	Main Recommendations
A Healthier Wales: Our Plan for Health and Social Care	(2018, updated 2021)	Welsh Government	Long-term vision for a "whole system approach to health and social care" in Wales.
Prudent Healthcare: Securing Health and Well-being for Future Generations	(2016)	Welsh Government & NHS Wales	Prudent healthcare' to ensure the Welsh NHS adds value, improves outcomes, and provides sustainable services.
Digital and Data Strategy for Health and Social Care in Wales	(2023)	Welsh Government	This strategy outlines the Welsh Government's approach to using digital technology and data in health and social care services.
The National Health Service Joint Commissioning Committee (Wales) Directions	(2024)	Welsh Government	This document provides direction for joint commissioning of primary care services in Wales.
NHS Wales Performance Framework 2023 to 2024	(2023-2024)	NHS Wales	This framework sets out performance expectations for NHS organisations in Wales.
Health and Care Quality Standards	(2023)	NHS Wales	These standards establish a common framework for NHS and partner bodies in the delivery of healthcare services in Wales.
Strategic Workforce Plan for Primary Care (SWPPC)	(2024)	HEIW	This plan sets out a long-term vision for a whole system approach to health and social care, focusing on workforce development in primary care.
Welsh Value in Health Centre Strategy to 2024	(2024)	NHS Wales	This document outlines the strategy for implementing value-based healthcare across the Welsh healthcare system.

Source: The Researcher (2024).

A critical analysis of key documents shaping modern primary care processes in Wales reveals several prominent themes, including the emphasis on integrated, person-cantered care as outlined in "A Healthier Wales" (2018). This vision advocates for the integration of health and social care services tailored to individual needs, reflecting a global shift toward holistic care models. Additionally, the "Digital and Data Strategy for Health and Social Care" highlights the importance of leveraging technology to optimise care delivery and enhance data sharing, which is essential for effective population health management. The focus on value-based healthcare, as highlighted in the Welsh Value in Health Centre's strategy, aims to improve patient outcomes while optimising resource allocation. This approach, while gaining traction globally, requires robust data systems and cultural shifts for successful implementation. Furthermore, the emphasis on preventive care and early intervention aligns with international public health priorities, although reallocating resources toward prevention can be challenging in resource-constrained environments.

Despite the ambitious strategies presented in these documents, several potential challenges may hinder their successful implementation. Integrating health and social care, while beneficial, has proven complex in many healthcare systems. Resource constraints pose a significant barrier, as many initiatives demand substantial investment in technology, workforce development, and new care models, which may be difficult to secure in the current economic climate. Additionally, the rapid digitalisation of healthcare could exacerbate health inequalities if equitable access is not prioritised. Change management will be essential for shifting to value-based care and integrated models, requiring significant cultural and organisational adjustments. Moreover, enhanced data sharing must be balanced with robust privacy protections, and measuring the impact of these reforms on long-term population health outcomes will present its own set of challenges. Overall, while Wales is pursuing a comprehensive approach to primary care reform aligned with international best practices, sustained commitment and adaptability will be crucial to overcoming these obstacles.

The Integrated Home First Pathway: A Multidisciplinary Approach to Discharge and Community Care.

The integrated “Home First” pathway is a comprehensive service designed to implement the discharge to assess approach, facilitating patient discharge from hospitals with continued care and assessment in community settings. It operates as a multidisciplinary service involving health professionals, local authorities, and third sector organisations. The ICMDT successfully aligns the 4 pillars of intermediate care into a single point of access which pools intelligence and resources of health, social care and third sector agencies together. The ‘Home First’ principle is strongly embedded, triggering away from statutory services, and proportionally supporting individuals to receive a period of recovery and assessment at home or as close to home as possible. (Public Health Wales, 2024).

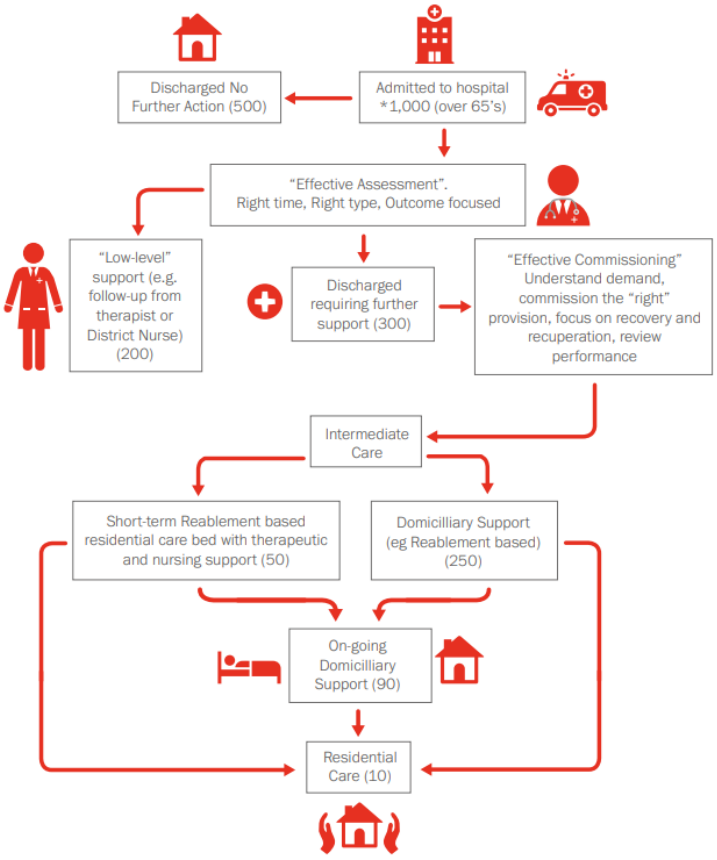


Figure 1. Discharge to Recover and Assess Model. (Source: Welsh Government, 2021).

The D2RA model by Professor John Bolton provides a framework for improving the efficiency of hospital discharges and ensuring that patients receive the necessary care in the right setting, thereby enhancing patient outcomes and optimising the use of healthcare resources. (Bolton, 2020)

Home First services provide various support options, including home-based rehabilitation, therapy-only support, medication management, nursing and social work assistance, and wellbeing services through third sector partnerships. For patients with complex needs, assessments are conducted in acute or community-based hospitals to determine long-term requirements. The service emphasises a "home first ethos," focusing on patient-centred care by collaborating with partners, patients, and families. Assessments for reablement are strength-based, aiming for recovery and rehabilitation outside hospital environments. For complex cases, the goal is to minimise hospital assessments and facilitate care home transfers for optimisation and assessment. To enhance service accessibility, Home First includes a hospital-based team of therapists, social workers, and community discharge liaison nurses (DLNs) who work in close collaboration with patient flow officers (PFO) and team of community response officers. They advocate for D2RA, conduct patient assessments, expedite referrals, provide information, advice and assistance both from the community and on the hospital wards. The team also participates in clinically optimised meetings,

attend board rounds and patient escalation meetings. Additionally, patient flow officers, also known as wellbeing officers, serve as trusted assessors to facilitate patient transfers to designated facilities for D2RA pathways.

For the 'Home First (HF) model to function optimally, several key resources and conditions must be in place. These resources and key requirements are poorly explored in the existing literature and no general and universal checklist for success exists. In this manner each provider must determine their own and optimised process to achieve the goals of the Home First service. Adequate staffing is fundamental, requiring a sufficient number of trained health and social care professionals. These skills are in scarce supply and there are known shortfalls in the quantity of competent staff across Wales including nurses, therapists, and social workers. To provide a seamless and highly efficient process that delivers the necessary care and support during the transition from hospital to home or community settings a team-based model must be enacted (NHS Wales, 2021) however policies provide little support in terms of such team structures and how a multi-disciplinary approach can be enacted for better patient outcomes and experiences.

Research Question, Aims and Objectives

Research Question

By developing a cost model framework that evaluates the current inefficiencies and explores potential interventions, this project seeks to provide evidence-based recommendations that can optimise patient outcomes, streamline discharge processes, and enhance resource allocation within the healthcare system, particularly in a complex, diverse and rural locality in West Wales.

Aim

To critically evaluate the effectiveness of existing patient pathways to include a new model of community-based care that addresses identified challenges and enhances service delivery in West Wales.

Objectives

- To conduct a comprehensive analysis of secondary data collected over a 12-month period to identify gaps and inefficiencies in current patient pathways.
- To evaluate key performance indicators and conduct a root cause analysis to determine the effectiveness of the new service model compared to traditional approaches.
- To gain insights into existing challenges and best practices in service delivery.

Personal Motivation of the Researcher

The researcher has been working as a Service Delivery Manager for almost five years, leading and developing frontline twenty-four-hour services, designed to shape the future of health and social care across West Wales. The researcher's role has been to lead and strategically develop a community crisis responder service, which provides a timely, professional response to support people in crisis. The mobile service aims to respond to non-medical emergency calls, avoiding inappropriate hospital admission or use of emergency services and is the only one of its kind registered with the Care Inspectorate Wales (CIW) to provide emergency or planned care and support following hospital discharge, offering clients and their families complete peace of mind knowing that help is always available avoiding statutory social care or multiple referrals and waiting lists.

The researcher emphasises the crucial role of independent and third-sector organisations in delivering innovative solutions to meet increasing demands in health and social care. By integrating services, early intervention becomes possible, enabling timely support. The researcher is personally motivated to drive significant changes for future innovation and transformation in these systems.

Recognising the huge potential of technology, the researcher aims to help individuals maintain a healthy, independent life at home. Through this project, they seek to develop expertise in implementing new technologies that support independent living. Additionally, the researcher is committed to understanding individual needs to create pathways that promote meaningful, independent lives at home, aligning with the project's goals and broader objectives to improve health and social care services in Wales.

Conclusions and The Structure of the Thesis

This chapter has provided a comprehensive overview of the modern context of primary care and its challenges, particularly focusing on patient flow management and the Discharge to Recover then Assess (D2RA) model in Wales. It has outlined the importance of efficient decision-making in healthcare systems, the vital role of community services in supporting discharge pathways, and the integrated Home First approach. The chapter has also presented the research question, aims, and objectives of this study, which seeks to develop a cost model framework to evaluate current inefficiencies and explore potential interventions in the Welsh healthcare system. Additionally, it has offered insight into the researcher's personal motivation and background in community response services. The next chapter will be built upon this foundation by presenting a thorough review of the main published literature in this subject area. This literature review will explore academic studies, policy documents, and research reports related to patient flow, discharge processes, community-based care models, and the integration of health and social care services. By examining the existing body of knowledge, the next chapter will provide a theoretical framework for the study and identify gaps in current research that this project aims to address.

Literature Review

Introduction and Purpose

As healthcare systems face increasing pressure to deliver high-quality, efficient care, examining service management principles and their application to primary care is critical. (Lee, 2023) Research suggests that there is a need to increase investment for performance management practices in primary health care (PHC) yet Pope et al. (2022) identified several barriers to effective management of primary healthcare services, such as managers lacking formal training and dedicating considerable time to non-managerial tasks. To enhance health system readiness and performance, it is crucial to strengthen management capacity and reinforce effective practices at the PHC level, which is essential for achieving global sustainable development goals and universal health coverage.

According to the 2022 report by the Health Foundation on priorities for reforming NHS management and leadership:

> *"Finding a way to juggle an impossibly long and complex list of tasks, all of which are billed as urgent priorities, is still a constant challenge for a large proportion of NHS managers, especially for those working in front-line clinical settings,"*
>
> *(Jones et al., 2022)*

Nancholas (2023) reported that healthcare providers continue to face financial challenges due to reduced patient capacity, rising costs of medical supplies, staffing shortages, and inflation. Recruiting and retaining staff has become critical, as healthcare vacancies reach unprecedented levels, prompting organisations to enhance hiring processes and technology. Investment in digital health technologies, such as telehealth, telecare and virtual wards, remains essential for improving efficiency and accessibility, though more work is needed. Additionally, efforts to address health equity are a priority, as providers aim to tackle persistent disparities in health outcomes, all of which contribute to inefficiencies and confusion for professionals.

Services and service Management

To understand the concept of services and service management, it is important that we recognise the evolving nature of services as dynamic processes that generate value (Slack et al, 2016). Services, by definition, are intangible, relying heavily on the application of knowledge and skills to fulfil customer needs (Vargo & Lusch, 2004).

According to Figueroa et al. (2019) Health systems are complex and dynamic, evolving across diverse contexts and service levels. The specific competencies required by health managers and leaders to address current and future challenges remain poorly defined. Existing research has been limited to individual countries and has not synthesized various international and multi-level perspectives.

Understanding services and service management is crucial for delivering effective healthcare. Services in healthcare are dynamic processes that generate value through the application of knowledge and skills to meet patient needs. This concept, originally proposed by Vargo and Lusch (2004), is particularly relevant in primary care settings where the focus is on providing comprehensive, patient-centred care.

The complexity of health systems, as noted by Figueroa extends to primary care services where these systems are constantly evolving across various contexts and service levels, presenting unique challenges for health managers and leaders. In primary care, this complexity is evident in the need to balance preventive care, chronic disease management, and acute care services while adapting to changing patient demographics and healthcare policies. The competencies required by primary care managers to address these challenges are still being defined, as existing research has largely focused on individual countries without synthesizing international perspectives. (AbdulRaheem, 2023)

To effectively manage these complex primary care services, information systems (IS) play a crucial role. As defined by Bourgeois (2019), information systems in healthcare settings comprise hardware, software, infrastructure, and trained personnel working together to facilitate planning, control, coordination, and decision-making. In primary care, these systems are essential for managing patient records, coordinating care across different providers, and supporting evidence-based decision-making. They collect, process, store, and disseminate information, enabling primary care teams to deliver more efficient and effective care. The integration of robust information systems in primary care settings is increasingly important for improving patient outcomes, enhancing care coordination, and supporting population health management initiatives.

High Performance Service Design

High performance service design in healthcare encompasses safety and quality as foundational elements while also addressing multiple dimensions such as clinical outcomes, cost efficiency, access, patient experience, and population health. It adopts a systems approach that considers the interactions between people, processes, technology, and the environment, integrating human factors to optimise wellbeing and performance. A culture of continuous improvement, effective leadership, and engaged staff are crucial, alongside the development of high-performing teams characterised by collaboration and trust. Additionally, leveraging data for improvement and integrating technology thoughtfully enhances care delivery and patient involvement, ultimately aiming to create healthcare systems that consistently provide safe, high-quality, efficient, and patient-centred care.

Service Design for Health and Care

Service design is a crucial approach for transforming and improving health and care systems. It places people at the heart of the design process, prioritising the needs, experiences, and challenges of patients, caregivers, and healthcare professionals. By taking a holistic view of the entire health and care ecosystem, service design helps identify pain points and generate innovative solutions across care pathways and services. This person-centered methodology enables healthcare organisations to enhance patient experiences, address health inequalities, reduce demand on services, improve workforce satisfaction, and achieve better financial sustainability. Through techniques such as journey mapping, prototyping, and co-design with stakeholders, service design creates more accessible, efficient, and patient-centered health and care services that truly work for people.

A high performing ‘Home First’/patient discharge system is characterised by several key elements. First, it requires effective management of primary care that is sensitive to a wide range of patient needs, emphasizing a home-first ethos and integrating multidisciplinary services, including health, local authorities, and third sector support. Second, the integration of skills is essential to form cohesive processes of care, offering a variety of supports such as rehabilitation, medication management, and nursing care while fostering collaboration among teams, patients, and families. Finally, meaningful measures of performance must be tracked to trigger improvements, utilising metrics like waiting list reductions and clinical capacity increases from initiatives such as the Bevan Commission’s Planned Care Innovation Programme (Bevan Commission, 2024). However, inhibitors optimised primary care services must be avoided, particularly delayed handovers between teams and professionals. The Home First service addresses this by minimising delays in assessments and transfers through a dedicated hospital-based team that advocates D2RA and expedite referrals, alongside DLN’s who ensure timely transfers to appropriate care settings.

Whilst Slacks research on "Operations Management" does not specifically target healthcare, its principles can be effectively applied to enhance patient flow and discharge processes in hospitals (N.Slack. 2014). Its process design and improvement can help streamline admission and triage procedures, reduce bottlenecks in diagnostic testing and treatment, and improve interdepartmental coordination. Additionally, the concepts of capacity management are crucial for optimising hospital bed utilisation and staffing levels, allowing for better balance of patient load and reduced wait times. Also, supply chain management principles can ensure

the availability of medications and supplies while facilitating smoother transitions with external care providers. Furthermore, quality management strategies can minimise errors that delay discharges and enhance patient satisfaction with the discharge process. Finally, project management techniques can assist hospitals in planning and executing initiatives aimed at improving patient flow and coordinating complex discharges for patients with multiple needs. Overall, the operational insights from Slack's work provide a valuable framework for hospitals seeking to improve efficiency in patient care.

The diagram below shows an example of the patient flow process and its relevant queueing theory aspects:

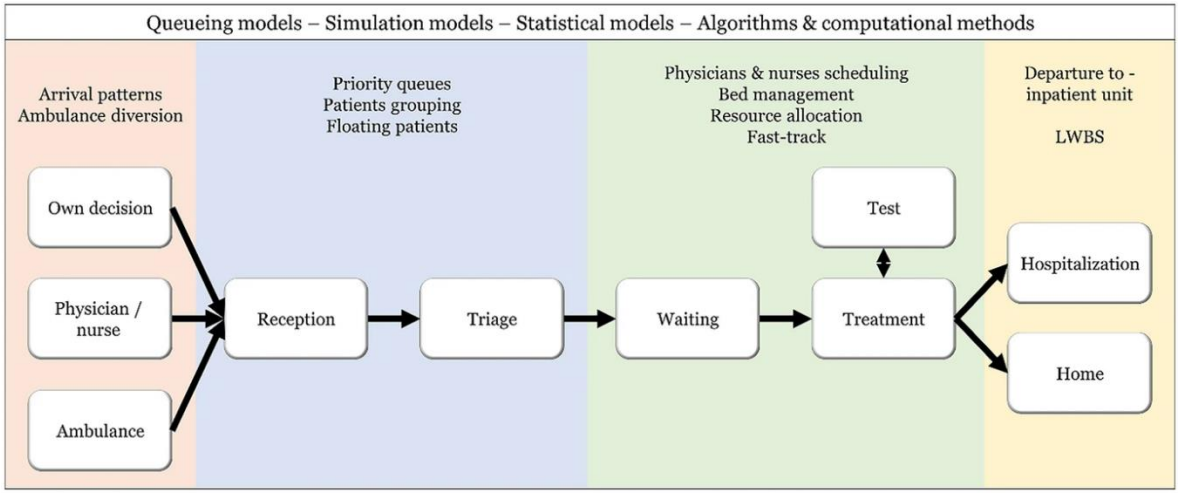


Figure 2. Patient flow process. (Source: Elalouf & Wachtel, 2021).

According to the research (Rich & Piercy, 2015) we can determine that lean operations can support the strategic direction of implementing the model tested in this thesis by addressing the inefficiencies and supporting patient outcomes. The table below identifies the key principles in this research and how this can be applied to patient flow and discharge pathways:

Table. 2 Key principles of lean operations and application to patient flow and discharge.

Lean Principle/Concept	How can this principle/concept be applied to patient flow and discharge?
Broader Sustainability Benefits	Aligns with the goal of improving patient care and community integration, enhancing workforce treatment and engagement.
Waste Reduction	Streamlines processes to reduce unnecessary steps, optimising resource utilisation for quicker and more efficient discharges.
Value Stream Mapping	Analyses and improves the entire discharge process, identifying non-value-adding steps that delay patient return home.
Continuous Improvement	Facilitates ongoing evaluation and refinement of the home first discharge model based on feedback and outcomes.
Pull System	Establishes discharge processes driven by patient readiness and home care availability, preventing premature discharges.
Standardisation	Develops consistent, evidence-based protocols for assessing patient readiness for discharge and preparing home environments.
Respect for People	Ensures discharge decisions consider patient preferences and needs, aligning with a patient-centred approach.
Cross-Functional Collaboration	Improves communication and coordination among hospital staff, community care providers, and stakeholders involved in discharge.

Table. 2 Key principles of lean operations and application to patient flow and discharge.

Lean Principle/Concept	How can this principle/concept be applied to patient flow and discharge?
Performance Measurement	Develops key performance indicators to track and drive improvements in the home first discharge model.

Source: The Researcher (2024).

The Conceptual Framework

To summarise the challenges of the knowledge gap, the researcher created a conceptual framework which is presented below:

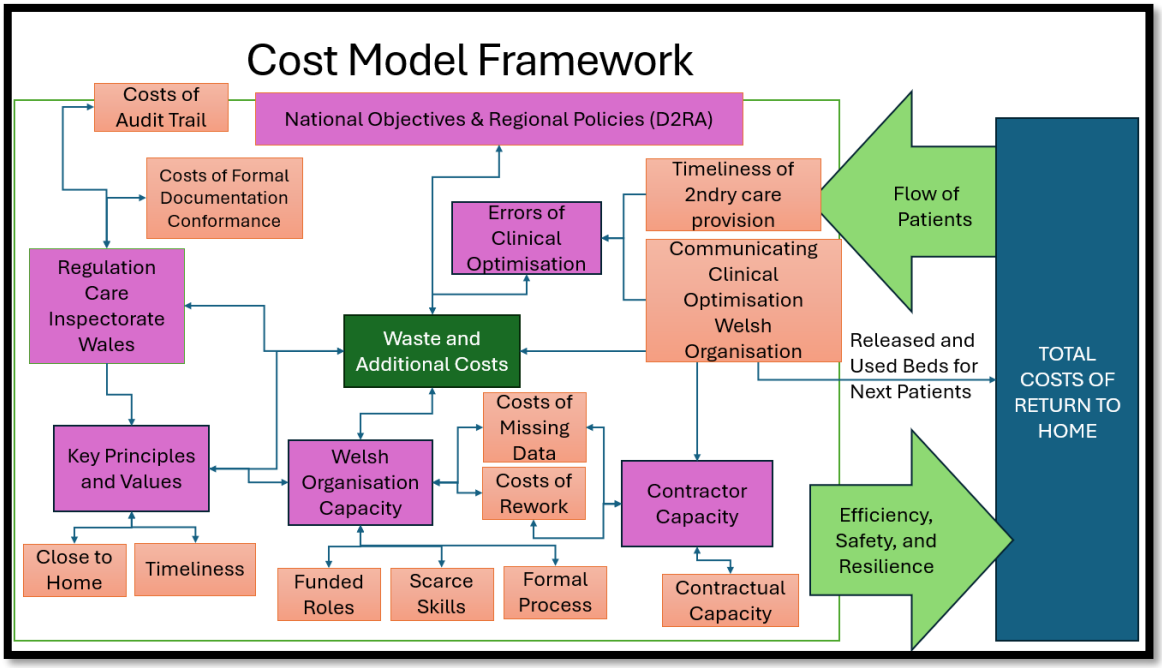


Figure 3: Researchers conceptual framework. Source: (The Researcher, 2024).

The framework outlines a comprehensive approach to managing healthcare costs and processes. At the top of the framework, we see "National Objectives & Regional Policies (D2RA)" which consists of the overarching guidelines influencing all other elements. This is connected to various cost factors, including the costs of audit trails and formal documentation conformance, which likely relate to regulatory compliance.

The framework highlights "Errors of Clinical Optimisation" as a significant factor, linking it to the timeliness of secondary care provision and communication. These errors contribute to waste and additional costs, which are central to the model.

Regulation is overseen by the Care Inspectorate Wales, which ensures adherence to policies, regulations and standards. These principles include proximity to home and timeliness, both of which impact provider capacity. Provider capacity is further influenced by funded roles, scarce skills, and formal processes.

The model also considers the costs of missing data and rework, which affect provider and contractor capacity. These factors, along with contractual capacity, play a role in the flow of patients and the efficiency of bed usage.

Ultimately, all these elements feed into the "Flow of Patients" and "Efficiency, Safety, and Resilience," which are represented by large green arrows pointing towards the final outcome. The total costs of returning patients' home. This suggests that the framework aims to optimise the entire process of patient care, from admission to discharge, with a focus on cost-effectiveness and quality of care.

Hospitals face significant challenges in managing patient discharge, leading to extended stays even when patients are medically optimised. Limited ward capacity creates bottlenecks, as beds are not readily available for new patients. Addressing this, tech-enabled virtual wards offer a promising solution by

enhancing capacity management and reducing unnecessary admissions, allowing patients to recover at home with remote monitoring with a wrap around, holistic approach to delivering social care. Additionally, backlogs in social work referrals and provision gaps in care support services further delay discharges. Finally, effective handover processes are crucial to ensure continuity of care, yet communication and coordination issues often lead to delays. These interconnected challenges highlight the need for innovative solutions to improve patient flow and resource allocation in healthcare systems.

The challenges identified are:

Limited Ward Capacity

Hospitals often face constraints in ward capacity, which can delay the admission and discharge process.

This limitation affects patient flow, as beds are not readily available for new patients once others are ready to be discharged which then creates bottle necks or 'blockages' across the hospital. (Anesi & Kerlin, 2021) According to the research of (Saco, 2024) there are two ways to impact the capacity issues, stopping admissions and speeding up discharges. Simple? Not quite, but Saco suggests that Tech-enabled virtual wards are emerging as a promising solution to address patient flow management challenges in healthcare systems. By leveraging technology, these virtual wards enhance capacity management and reduce the need for in-person healthcare professional involvement in non-critical cases. This approach not only helps prevent unnecessary hospital admissions but also improves community care, allowing patients to recover at home when possible. With the introduction of a twenty-four-hour community response service, who can be dispatched to patients in their own homes based on concerns raised through the monitoring of technology and telehealth.

The data demonstrates significant time and cost savings, with reduced bed days and fewer GP appointments. Ultimately, this strategy aims to ensure that hospital resources are allocated more efficiently, reserving beds for patients who truly require in-hospital care while providing effective remote monitoring and support for others.

Backlog of Referrals

Social work assessments and requests for formal support can accumulate, creating a backlog that slows down the discharge process.

This delay is often due to the limited capacity of social care services to handle the volume of cases efficiently. (Cavallaro et al., 2023) Even through this project focuses primarily on social care gaps in existing processes, it is important to note that social care delays only make up a percentage of the overall delay reasons for patients remaining in hospital. The data presented further on will show the impact that the proposal model is making on patient flow. According to the research of Deighton (2022), "The social care crisis is also a key part of the problem. In October, just 39.9% patients were discharged when they were ready to be, with an average of' 13,613 beds a day occupied by those who are medically fit for discharge but are unable to be cared for at home. This leaves poorly patients waiting for a bed."

Provision Gaps

There is frequently a shortage of available care support services, which hinders the transition from hospital to home care. Patients may wait for appropriate care packages to be arranged, contributing to extended hospital stays.

The challenge of balancing bed allocation with limited social care just further complicates a spiraling situation, as patients who could be monitored at home often occupy beds needed for critical patients yet discharging them requires ensuring adequate home monitoring.

Handover Complexities

The process of handing over care to formal providers can be fraught with challenges, including communication issues, lack of coordination, and the need to ensure all necessary services are in place. These complexities can lead to delays in discharging patients.

According to the research (Raeisi et al., 2019) Patient safety is a critical global concern in health systems, with effective service identification being the first step toward improving quality. Ensuring patient safety enhances treatment outcomes, yet it remains a significant challenge for healthcare providers. A key preventable cause of patient harm is the failure of effective handover, which is crucial for maintaining

continuity of care. Safe handover involves transferring professional responsibility and accountability, requiring the accurate transmission of patient information and care responsibilities between shifts or personnel. This process ensures high-quality communication and secure transitions, vital for patient care continuity.

Addressing these issues requires improved coordination, resource management, and streamlined processes to enhance patient flow and reduce hospital stays.

Summary and Conclusions

This section has presented the main published works and gap in this subject area of and has provided a conceptual model which summarises the key elements of a high performing primary care process and service that fits modern conditions and offers value for money.

Research Design

Introduction

The Welsh healthcare system faces significant challenges in optimising patient pathways, particularly in managing the transition between hospital and community care. This research aims to critically evaluate existing patient pathways and propose a new model of community-based care in West Wales, focusing on enhancing service delivery and patient outcomes. The study examines the innovative model of service delivery to address gaps in health and social care delivery, comparing it to traditional methods.

By analysing secondary data, assessing key performance indicators, and gathering stakeholder feedback, this research seeks to identify inefficiencies, evaluate the effectiveness of the new service model, and provide evidence-based recommendations for improving patient pathways. The findings of this study have the potential to inform policy decisions, optimise resource allocation, and ultimately enhance the quality of care provided to patients in West Wales.

Epistemology and Approach

To assist the reader, the study is designed by adopting the following research traditions which effectively organises the key components of the research approach, providing a clear overview of how each element contributes to conducting this research:

Table. 3 Research traditions and key components that contribute to this research.

Research Component	Details?	Why?
Research Tradition	Qualitative Inductive Research - Context-specific and rich in actual practice insights - Allows for deep exploration of local healthcare systems and patient populations.	To capture the complexities of the home first model, which may vary significantly across different contexts and practices.
Methods	Inductive - Enables bottom-up analysis and theory development, allowing patterns to emerge from data rather than testing pre-existing hypotheses.	To foster a deeper understanding of how the home first model operates in practice, rather than imposing preconceived notions or frameworks.
Strategy	Longitudinal Case Study - Tracks the evolution of the home first model over time - Assesses immediate and long-term impacts on patients and hospital operations - Provides contextual depth.	To observe changes and outcomes over time, which is critical for understanding the dynamics of implementing a new discharge process.
Actual Methods	- Literature Review and Conceptual Framework: Establishes theoretical foundation and identifies key concepts. - Secondary Data from Organizational Archives: Offers historical context and baseline metrics.	To ensure a comprehensive understanding of existing knowledge, gather diverse perspectives, and observe real-world practices that may not be documented elsewhere.

Table. 3 Research traditions and key components that contribute to this research.

Research Component	Details?	Why?
	- Informal Interviews: Gathers rich qualitative insights from stakeholders. - Staff Observations: Reveals nuances of the implementation process.	
Ethics	- Ensures anonymity of the case study organization and individuals involved - Protects sensitive information and encourages open participation from staff.	To build trust with participants, allowing them to share honest feedback without fear of repercussions, which is essential for gathering accurate data.
Generalisation	- Limited to this case study but offers valuable insights for similar contexts - Provides analytical generalization contributing to theoretical understanding - Identifies best practices for other implementations.	To recognize that while findings may not be universally applicable, they can inform similar initiatives in different settings, enhancing overall knowledge in the field.

Source: The Researcher (2024).

Approach: Pragmatic approach to study actual practice.

The study employs a pragmatic approach by addressing a recognised issue in primary care, ensuring its relevance to real-world practice. This methodology includes real-world applicability, broader participant inclusion, and flexibility in intervention delivery. It also considers multiple outcomes beyond clinical efficiency, such as cost-effectiveness and implementation factors. By engaging stakeholders and acknowledging the unique challenges of primary care, the study aims to produce findings that are accurate yet directly applicable to improving patient care in everyday settings.

Case Study Strategy: A primary care organisation was selected, and access granted to conduct the study. The study was conducted from April 2023 to April 2024.

This research adopts a pragmatic epistemological stance to critically evaluate existing patient pathways and propose a new model of community-based care in West Wales. The pragmatic approach focuses on examining actual practices within the healthcare system, emphasising real-world outcomes and practical solutions. This method allows for the integration of both quantitative and qualitative data, providing a comprehensive understanding of the patient pathways and the impact of the new community-based care model. A case study strategy was employed, focusing on a care organisation in West Wales from April 2023 to April 2024. This approach enables an in-depth examination of the context, processes, and outcomes of the new service model, including the innovative team's interventions. The study aims to identify inefficiencies, evaluate the effectiveness of the new service model, and provide evidence-based recommendations for improving patient pathways and healthcare delivery in West Wales.

Swimlane mapping has been used as a visual tool used in process modelling to organise and clarify complex workflows such as this. The process has been divided by lanes, each representing a different participant or department involved in the process. This helps to clearly outline responsibilities and interactions between different parts of an organisation and shows how the patients' journey through this pathway can be timely and complex.

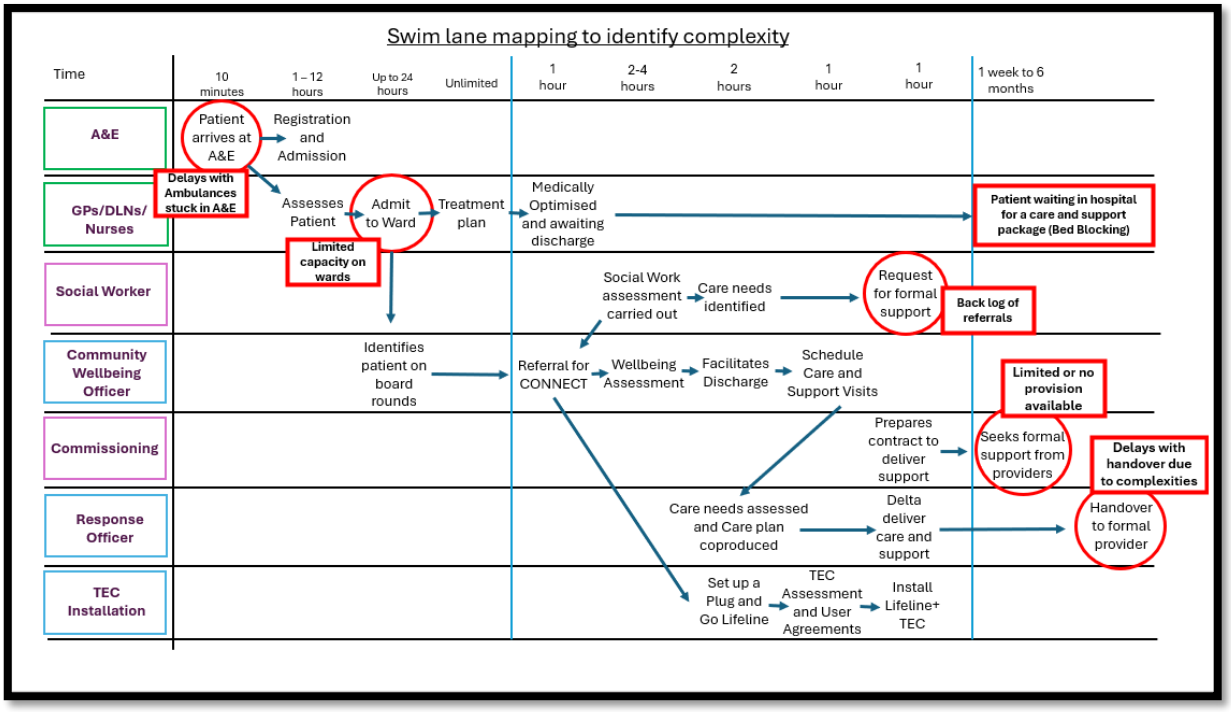


Figure 4. Swimlane map identifying delays and bottlenecks. (Source: The Researcher, 2024).

Each lane also contains the specific steps or actions that a particular participant is responsible for. This has been useful for identifying inefficiencies, redundancies, or bottlenecks in the process, making it easier to optimise workflows and improve overall efficiency. The patient pathway is outlined below:

Table 4. Specific steps of each participant involved in patient flow through swim lane mapping.

Step	Process	Potential Delays
Arrival and Assessment	- Patient arrives at A&E - Registration and admission - Assessment by GPs and Nurses	- Ambulances stuck outside hospitals - Limited ward capacity delaying admission
Treatment and Optimisation	- Treatment plan implementation - Medical optimisation - Preparation for discharge	- Issues identifying and addressing care needs
Social Work and Community Wellbeing	- Social worker assessments - Community Wellbeing Officer referrals - Wellbeing assessments	- Backlog of referrals - Delays in discharge planning
Commissioning and Support Provision	- Preparation of support contracts - Seeking formal support from providers	- Limited or unavailable provisions - Complex and time-consuming process
Response and TEC Installation	- Community Response Officer assessments - Care plan co-production - Lifeline setup and TEC assessments	- Delays in handover to formal providers - Complexities in transition
Discharge	- Patient awaits care and support package	- Bed blocking due to waiting for care packages - Inefficient coordination and resource management

Source: The Researcher (2024).

Methods

Introduction

This chapter outlines the research methodology used in this study which employed a mixed-methods approach, combining several data collection techniques. This table shows the various techniques of research methodology and considerations.

Table 5. Various techniques of the research methodology and considerations.

Method	Description
Secondary Data Analysis	- Examined existing data sources (patient records, organisational reports, healthcare statistics) - Allowed analysis of historical trends and contextual information - No new data collection required
Researcher Day Book	- Detailed field notes and observations maintained throughout the study - Captured qualitative insights, reflections, and emerging themes
Team Observations and Reflections	- Direct observation of primary care teams in action - Reflective discussions conducted afterwards - Provided rich qualitative data on practices and team dynamics
Sampling and Participants	-Focused on key informants: • Team leaders • Management personnel • Clinicians - Participants selected for their central roles in primary care systems
Limitations	- Single case study of one organisation in Wales - Findings may not be fully generalisable - Most organisations likely operate with similar processes, technologies, and staff roles
Ethical Considerations	- Ethical approval granted by Swansea University in June 2024 - Ensured adherence to ethical standards

Conclusion

This multi-faceted methodology allowed for a context-rich examination of professional practices in primary care. By combining perceptual data, existing records, researcher observations, and team reflections, the study aimed to provide comprehensive insights to inform service improvements.

The Case Study of Welsh Care Organisation (WCO)

The organisation that took part in this study offers an innovative approach to primary care and emergency response services in west Wales. This case study examines how the WCO enhances efficiency and effectiveness while maintaining quality and safety standards, particularly in responding to elderly patients who are either waiting to be discharged from acute sites or have already been discharged but are at risk of readmission. In 2023 and 2024, the organisation was awarded the iese Public Sector Transformation Certificate of Excellence and were finalists in multiple categories at the HSJ Digital Awards. At the Great British Care Awards 2023, they secured four wins and one finalist position. Their success continued with a win at the Caring UK Awards 2023 for Best Initiative in Care. The Great British Care Awards 2023 saw them as finalists in three categories and national winners in the Putting People First Award, further evidencing their commitment to excellence in healthcare and social care services.

The organisation coordinates primary care and emergency response services across west Wales and focuses on providing assistive technology and proactive monitoring to support older and vulnerable people

to live more independently. This service has been identified as a key area of innovation and improvement with scope to further develop and support discharge planning pathways. The service aims to promptly assist individuals who are waiting to be discharged from hospital, or support those who are at home but require appropriate assistance, care, assessment, and ongoing support in the event of an emergency to prevent unnecessary readmission to hospital.

The service also aims to respond to non-medical emergency calls through the lifeline within 45 minutes, avoiding inappropriate hospital admission or use of emergency services which could add additional pressure to hospital capacity and delays in triage and discharge. A large majority of calls are for non-injurious falls and welfare needs, so the 24/7 support offered gives clients and their families complete peace of mind knowing that help is always available.

The organisation's commitment to continuous improvement and patient-centred care positions it as a model for primary care organisations across the UK. This case study demonstrates how the organisation is striving to improve its response service by focusing on patient needs, integrating technology, and streamlining processes. By implementing these innovative approaches, WPCO enhances the efficiency and effectiveness of its services while maintaining high standards of quality and safety.

Findings

The themes of the research and responses

The information provided outlines various health and social care costs in the UK for different services and time periods.

Early discharge of medically fit patients is a critical aspect of efficient healthcare delivery. According to Department of Health and Social Care (2024) Studies have shown that implementing early discharge initiatives can increase bed availability by 16% and potentially save billions in healthcare costs annually. However, it's crucial to ensure that patients are discharged only when medically appropriate and with adequate support and follow-up care in place to maximise benefits and minimise risks.

For context of the evaluation, the costs associated with the NHS are listed below:

Table 6. Costs associated with National Health Service (NHS).

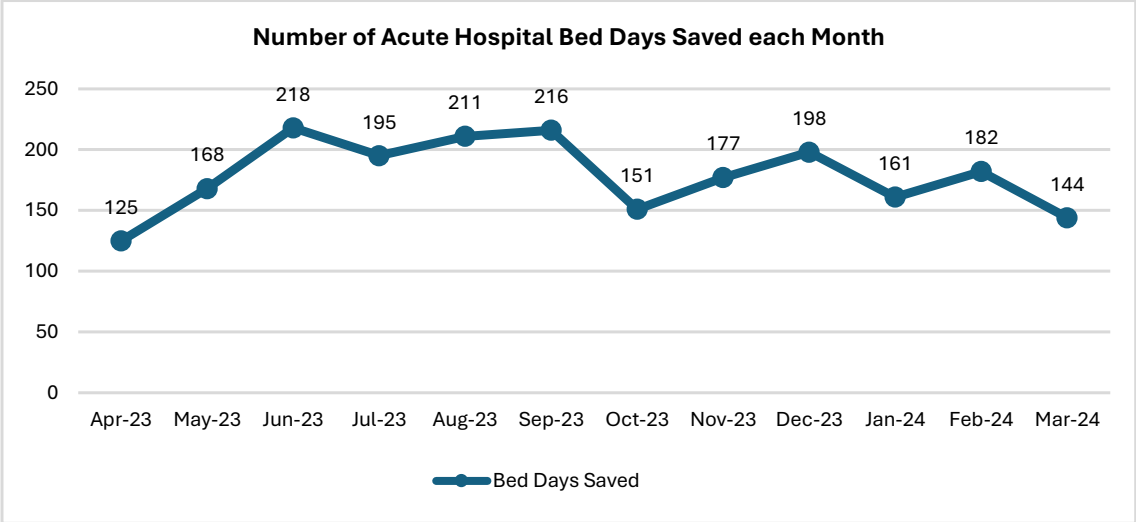
Health Costings	Cost	Year
Cost of attending A&E receiving the lowest level of investigation and treatment	£91.00	2024/25
Cost of attending major A&E department and receiving more complex investigation and treatment	£137 - £445	2024/25
Cost of an Ambulance trip to A&E.	£417.00	2022/23
Ambulance call outs that didn't result in a trip to A&E.	£287.00	2022/23
Cost of a GP Appointment (average 10-minute face to face GP consultation	£56.00	2022/23
Cost of a medical bed day (Excluding overheads)	£472	2022/23
Social Care Costings		
Cost of a local authority-funded care home place for someone aged over 65 per week.	£842.00	2022/23
Cost of a local authority-funded care home place for working-age adults per week	£1,540	2022/23
Cost per hour for commissioned community home care service	£20.57	2022/23

Source: King's Fund (2024).

Cost savings

The table below shows the number of acute hospital bed days that were saved each month as part of the sample data collected. This equates to a total of **2,146** bed days. According to research a medical bed day in hospital costs the NHS **£472.00** so this could be a cost saving of **£1,012,912**.

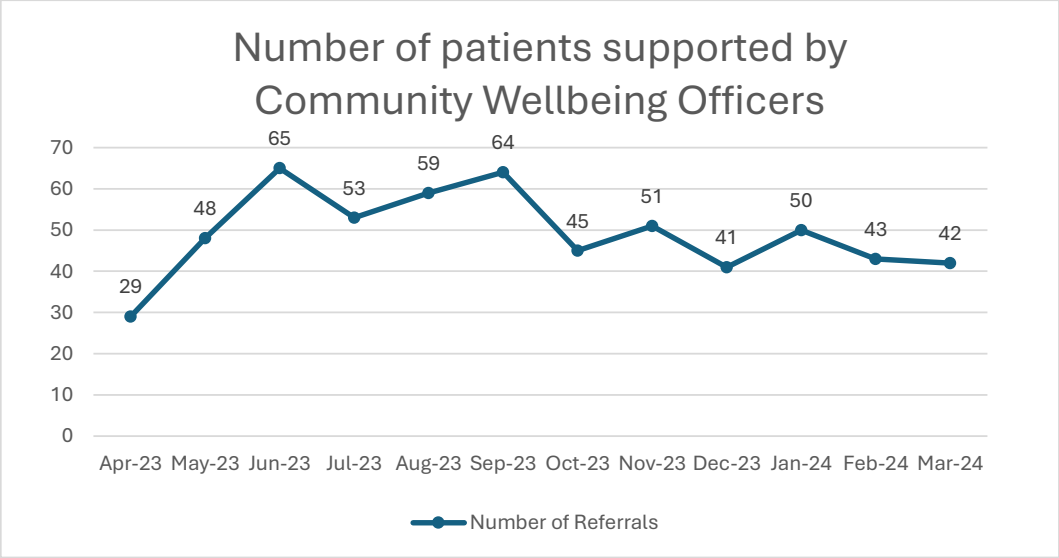
Table 7. Number of acute hospital bed days saved each month.



However, early discharge of medically fit patients primarily results in resource savings rather than immediate cost savings as there is always a patient waiting to be allocated the bed when another patient has been discharged. While it may not always lead to direct financial benefits, it significantly improves hospital efficiency by freeing up beds, allowing staff to focus on more acute cases, and optimising equipment utilisation. This also enables hospitals to admit new patients, reduces emergency department crowding, and improves overall patient flow. It could be argued that the cost implications are complex, as fixed expenses often remain constant regardless of occupancy, and potential savings may be offset by post-discharge support needs. This is why we need to view discharge as part of a broader strategy to optimise healthcare resources and improve patient care, recognising that its value extends beyond immediate financial impact to encompass better health outcomes and increased patient satisfaction.

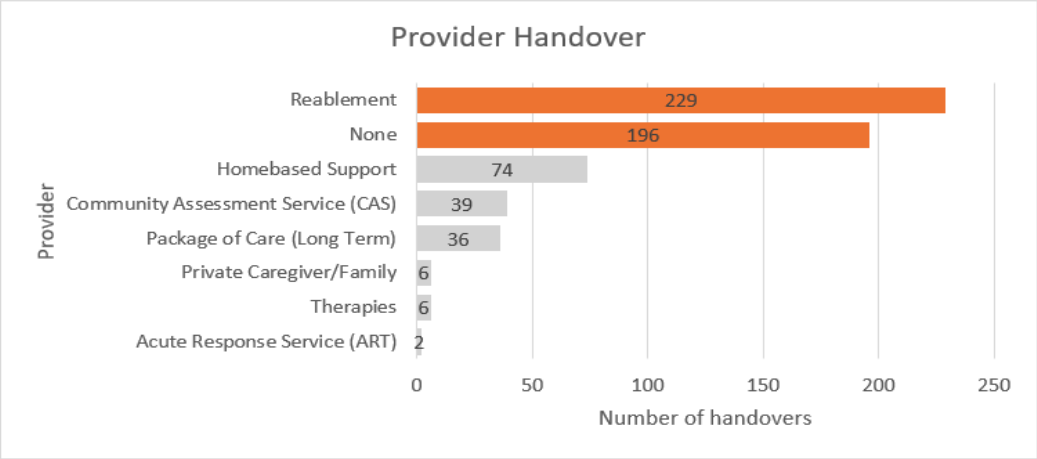
A total of 590 patients went home sooner than planned with wrapping around, bespoke care and support and twenty-four-hour monitoring with access to information, advice and assistance.

Table 8. Number of patients supported by Community Wellbeing Officers.



The analysis of discharge data for 196 patients revealed a significant opportunity for improving hospital efficiency and patient care as this cohort of patients required no support on discharge which potentially resulted in occupied hospital beds for 512 unnecessary days. This figure represents a substantial use of hospital resources that could potentially have been allocated more effectively.

Table 9. Patient handover arrangements following discharge.



However, it's important to note that this doesn't necessarily mean all 512 days were entirely avoidable. Some patients may have been waiting for elements of their care, such as test results, further medical assessments, or medication reviews, which are essential for safe discharge. Nevertheless, this data highlights a clear opportunity for healthcare providers to investigate and address the specific reasons behind these delays. By examining the factors contributing to extended stays for patients who are medically fit for discharge, hospitals can potentially streamline their processes, reduce unnecessary bed occupancy, and improve overall patient flow.

Among patients discharged during the period, a positive 93.3% required assistance from only one staff member of the community response service, while just 6.7% needed double staffing. This high percentage of patients needing minimal support is significant, indicating that the majority of discharged patients have maintained or regained substantial independence since being in hospital. It also suggests effective discharge planning and hospital-based rehabilitation.

The data represents the number of adults occupying an NHS hospital bed, who were 'clinically optimised' ready to return home or move on to the next stage of care, that experienced a delay in their transfer of more than 48 hours beyond the point they were clinically optimised during the period of research. 'Next stage of care' refers to all destinations outside of NHS hospitals. The data clearly indicates significant delays in the assessment process, with consistently high numbers of cases awaiting completion across various categories such as social care, nursing, and joint assessments.

Table 10. Number of adults occupying an NHS hospital bed, who were 'clinically optimised'.

Month	Total Assessment Issues	Awaiting Social Worker Allocation	Awaiting Completion of Assessment by Social Care	Awaiting Completion of Assessment by Nursing	Awaiting Continuing Healthcare Assessment	Awaiting Joint Assessment	Awaiting Completion of Assessment AHP	Awaiting Completion of Assessment Psychiatry
Apr-23	278	68	55	19	2	9	0	0
May-23	230	52	45	11	5	0	1	0
Jun-23	247	44	46	27	2	4	0	0
Jul-23	256	33	50	28	0	7	0	0
Aug-23	238	33	40	29	5	8	0	0

Sep-23	222	30	44	25	2	5	0	0
Oct-23	192	10	35	23	6	6	0	0
Nov-23	227	15	45	38	0	3	0	0
Dec-23	190	10	23	22	2	4	0	0
Jan-24	207	20	48	28	5	0	0	0
Feb-24	212	13	39	32	3	5	0	0
Mar-24	220	15	49	32	5	11	0	0
Apr-24	237	30	38	26	0	12	6	2

Key Findings

Based on the case study of the Welsh Care Organisation (WCO), the key findings of this research include:

Table 11. Key findings from the thesis.

Key Finding	Description
Significant bed day savings	2,146 acute hospital bed days saved, equating to potential cost savings of £1,012,912 (based on £472 per medical bed day)
Earlier discharges	590 patients discharged sooner with wrap-around care, support, and 24-hour monitoring
Unnecessary hospital stays	512 unnecessary hospital days identified for 196 patients requiring no support on discharge
Minimal post-discharge support	93.3% of discharged patients needed assistance from only one staff member
Persistent discharge delays	Significant delays in assessment processes across social care, nursing, and joint assessments
Potential for improved patient flow	Opportunities identified to streamline processes and reduce unnecessary bed occupancy
Cost-effective care	Early discharge improves hospital efficiency by freeing up beds for more acute cases
Technology integration	Assistive technology and proactive monitoring supported independent living for older and vulnerable people
Reduced emergency service use	24/7 community response service helped avoid inappropriate hospital admissions
Recognition of excellence	Multiple awards received for innovative approach to care delivery

These findings demonstrate the potential benefits of implementing a community-based care model with integrated technology and proactive monitoring to improve patient outcomes, reduce hospital stays, and enhance overall healthcare system efficiency.

Revised Swim-lane mapping to demonstrate efficiencies and resource allocation.

The implementation of the new community-based care model has effectively addressed resource waste and streamlined the service, as evidenced by the updated swim-lane map. By introducing Community Wellbeing Officers and Community Response Officers, the organisation has significantly reduced bottlenecks in the discharge process. These roles have facilitated faster assessments, quicker care plan co-production, and more efficient TEC installations. The integration of a 24/7 support service has minimised unnecessary hospital re-admissions and reduced pressure on A&E departments. Furthermore, the new model has improved coordination between hospital staff, social workers, and community care providers, resulting in smoother transitions and reduced delays. The streamlined process has eliminated many of the waiting periods previously seen in social work assessments, commissioning, and support provision. As a result, patients are experiencing faster discharges. This optimised workflow has not only improved patient outcomes but also led to significant resource savings.

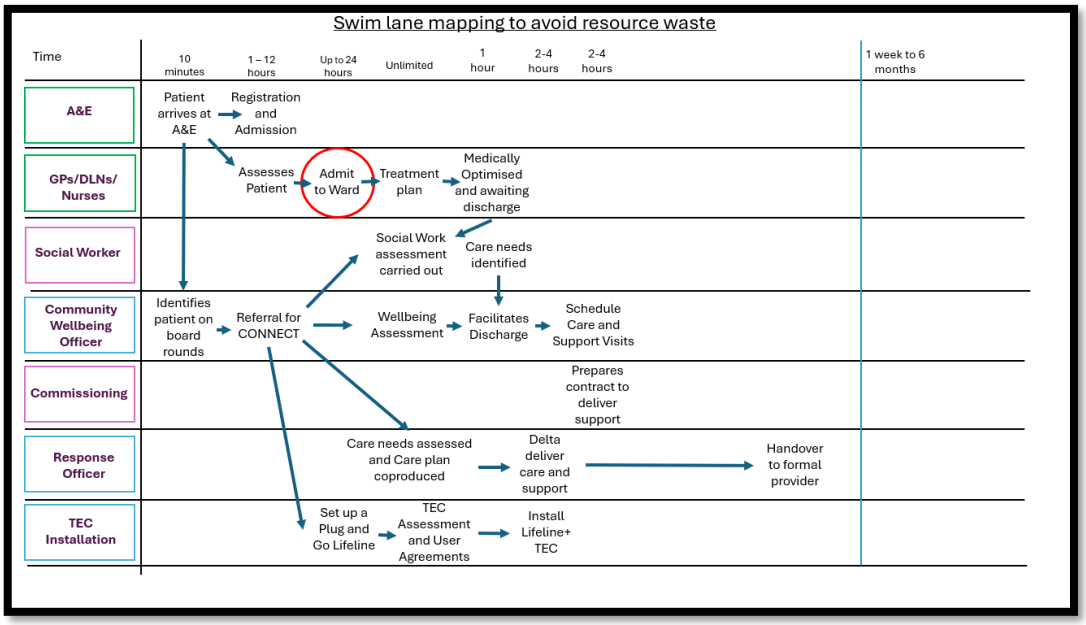


Figure 5. Swimlane map showing the model avoiding resource waste.

Recommendations

Table 12. Key Recommendations.

Recommendation	Description
Expand capacity to deliver the model	Implement the model more widely with adequate staffing and more collaborations with multidisciplinary teams
Enhance coordination and communication	Improve handover processes and implement standardised communication protocols
Utilise technology enabled care	Expand use of telehealth, remote monitoring, and tech-enabled virtual wards
Address social care gaps	Increase investment in social care services and develop partnerships with local authorities
Focus on preventive care and early intervention	Strengthen community-based services to prevent admissions and support early discharge

Table 12. Key Recommendations.

Recommendation	Description
Optimise resource allocation	Use data analytics to identify inefficiencies and implement lean management principles
Enhance workforce development	Provide training for healthcare managers and foster a culture of continuous improvement
Measure and monitor performance	Develop and track key performance indicators related to patient flow and outcomes
Engage patients and families	Involve patients and families in discharge planning and follow-up care decisions
Strengthen partnerships	Develop stronger collaborations between health, social care, and community organizations

Discussion

The findings from this thesis highlight both the successes and challenges in implementing an efficient discharge process and community-based care model in West Wales. The innovative twenty-four-hour community response along with the hospital-based team approach has demonstrated significant potential in addressing gaps in health and social care delivery, particularly in facilitating early discharges and providing wrap-around support for patients transitioning from hospital to home.

The data reveals substantial bed-day savings, with 2,146 acute hospital bed-days saved over the study period, potentially translating to cost savings of over £1 million. Moreover, the high percentage (93.3%) of discharged patients requiring assistance from only one staff member indicates effective discharge planning and rehabilitation efforts, avoiding patients from deconditioning and regaining their independence, and avoiding the need for double staffed care calls.

The literature also uncovers persistent inefficiencies, such as unnecessary bed occupancy for medically fit patients and delays in discharge for a significant number of individuals. These findings evidence the need for continued improvement in coordination between hospital and community services, as well as potential expansion of community support capacity to address the needs of a larger proportion of patients facing discharge delays.

Overall, while the new service model shows promise in enhancing patient flow and reducing hospital stays, there remains room for optimisation to fully realise the benefits of community-based care in improving healthcare efficiency and patient outcomes in West Wales. This would require investment, and ongoing development is these issues and challenges were to be addressed.

Revised conceptual framework.

The revised Cost Model Framework emphasises the importance of community response services and community wellbeing officers in hospital wards. This model has proven to be crucial for enhancing patient flow and optimising resource allocation. By integrating community services directly into the hospital setting, the framework ensures timely secondary care provision and effective communication of clinical optimisation strategies. This collaboration supports seamless transitions for patients, reduces waste, and enhances overall efficiency, safety, and resilience within the healthcare system. The well-being officers play a pivotal role in facilitating these processes, ensuring that patient care is both comprehensive and continuous whilst the Community response officers are crucial in providing twenty-four-hour support in the community.

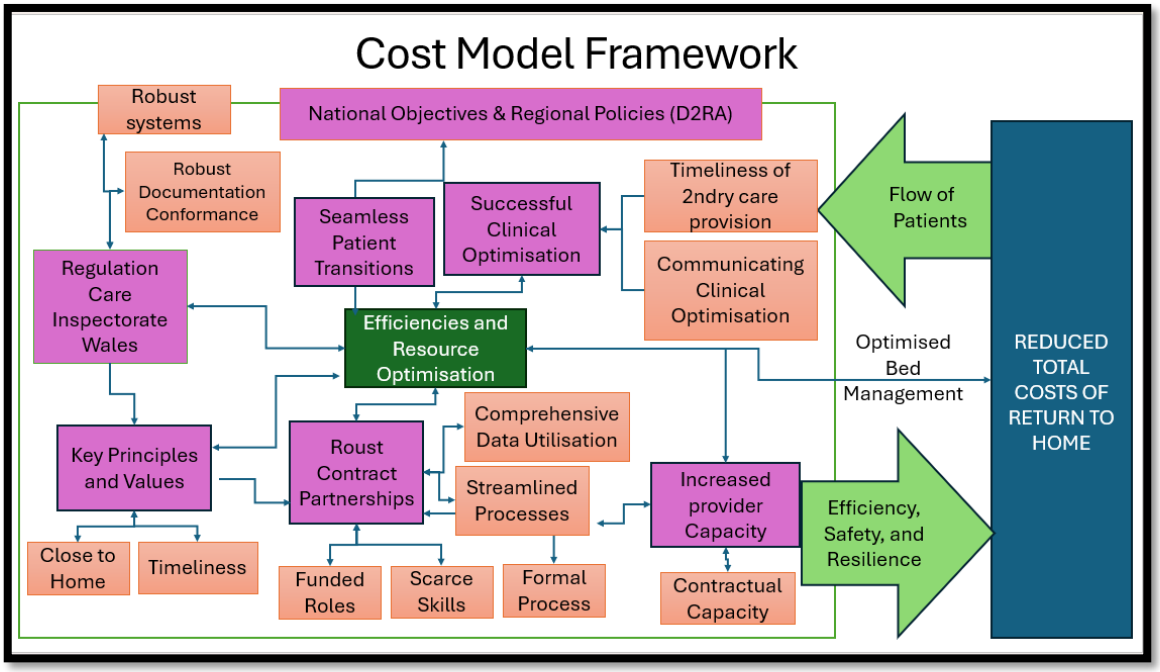


Figure.6 Revised conceptual framework. Source: The Researcher (2024).

Conclusion

The innovative community-based care model implemented by the west Wales organisation demonstrated significant potential for improving patient flow and reducing hospital bed occupancy. Over the study period, 2,146 acute hospital bed days were saved. Additionally, 590 patients were able to be discharged home earlier than planned with wrap-around care and 24-hour monitoring support, highlighting the effectiveness of the community response service.

The implementation of the new model has effectively addressed resource waste and streamlined services, as evidenced by the updated swim-lane mapping. By introducing Community Wellbeing Officers and Community Response Officers, significant bottlenecks in the discharge process have been reduced. These roles have facilitated faster assessments, quicker care plan co-production, and more efficient TEC installations.

The integration of a 24/7 support service has minimised unnecessary hospital re-admissions and reduced pressure on A&E departments. Furthermore, the new model has improved coordination between hospital staff, social workers, and community care providers, resulting in smoother transitions and reduced delays. The streamlined process has eliminated many of the waiting periods previously seen in social work assessments, commissioning, and support provision.

Analysis revealed opportunities for further efficiency improvements, as 196 patients who required no support on discharge occupied hospital beds for 512 unnecessary days. However, the high percentage (93.3%) of discharged patients requiring assistance from only one staff member indicates effective discharge planning and rehabilitation processes.

While early discharge may not lead to immediate cost savings, it significantly improves hospital efficiency by freeing up beds, allowing staff to focus on more acute cases, and optimising overall patient flow. The organisations approach, combining technology-enabled care, 24-hour community response, and integrated health and social care services, offers a promising model for addressing challenges in patient discharge and community care.

The organisation's success is evidenced from the data that has been analyzed during this period. Overall, the study demonstrates that innovative, community-based care models can effectively address challenges in patient flow and discharge processes, potentially leading to improved patient outcomes and more efficient use of healthcare resources.

Final Words

As we conclude this MSc programme and the final project, it's clear that this journey has been both valuable and impactful. The research methods applied throughout this thesis have not only enhanced our understanding of service gaps and inefficiencies but have also inspired a renewed commitment to service redesign and development.

This final report shows the researcher's dedication to uncovering and addressing critical issues in healthcare service delivery in the hope that readers will find value in these insights and be motivated and inspired to further explore and evaluate the findings presented in this study, potentially leading to more research and continued improvements in healthcare systems.

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Appendix A: Ethics Approval

Swansea University
Prifysgol Abertawe

Approval Date: 09/08/2024

Research Ethics Approval Number: 1 2024 11273 10039

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	Delta Wellbeing and Frailty Service Evaluation
Applicant name	PROF Nicholas Rich
Submitted by	PROF Nicholas Rich /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/13409

The Humanities and Social Sciences ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Humanities and Social Sciences Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Dyddiad Cymeradwyo: 09/08/2024

Rhif Cymeradwyo Moeseg Ymchwil:

Diolch am gwblhau cais moeseg ymchwil am gymeradwyaeth foesegol ac am gyflwyno'r ddogfennaeth ofynnol drwy'r platfform ar-lein.

Teitl y Prosiect	Delta Wellbeing and Frailty Service Evaluation
Enw'r Ymgeisydd	PROF Nicholas Rich
Cyflwynwyd gan	PROF Nicholas Rich /
Dolen i'r ffurflen gais lawn	https://swansea.forms.ethicalreviewmanager.com/Project/Index/13409

Mae'r pwyllgor moeseg Humanities and Social Sciences wedi cymeradwyo'r cais moeseg ymchwil, yn amodol ar yr amodau a amlinellir isod:

Amodau cymeradwyo

1. Mae'r gymeradwyaeth yn seiliedig ar yr wybodaeth a roddir yn y cais, a gwneir y gwaith yn unol â hyn. Yr ymgeisydd sy'n gyfrifol am sicrhau bod yr holl reoliadau, polisïau a deddfau mewnol ac allanol perthnasol yn cael eu dilyn.

- Gall y prosiect hwn gael ei adolygu gan y pwyllgor o bryd i'w gilydd. Gellir atal neu ddirymu'r gymeradwyaeth ar unrhyw adeg os bydd yr amodau'n cael eu torri.
- Caiff unrhyw addasiadau sylweddol i'r cais a gymeradwywyd eu cyflwyno i'r pwyllgor moeseg cyn i'r fath newidiadau gael eu rhoi ar waith.

Amodau penodol ynghylch y cais hwn:

Barnwyd bod y cais yn risg Low i'r Brifysgol.

Dim amodau ychwanegol.

Datganiad o gydymffurfiaeth

Penodir y pwyllgor yn unol â'r trefniadau llywodraethu ar gyfer pwyllgorau moeseg ymchwil. Mae'n cydymffurfio â chanllawiau Ymchwil ac Arloesi yn y DU (UKRI) a'r concordat i gefnogi uniondeb ymchwil.

Cadeirydd Ymchwil a Moeseg, Humanities and Social Sciences

Prifysgol Abertawe.

Os oes gennych ymholiadau ynghylch yr hysbysiad hwn, yna mae croeso i chi gysylltu â gweinyddwr moeseg ymchwil eich cyfadran.

- Ar gyfer Gwyddoniaeth a Pheirianneg, e-bostiwch FSE-Ethics@abertawe.ac.uk

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Appendix B: List of Acronyms

Acronym	Definition
D2RA	Discharge to Recover then Assess
DLN	Discharge Liaison Nurses
ICMDT	Intermediate Care Multi-disciplinary Teams
CWO	Community Wellbeing Officers
CRO	Community Response Officers
HF	Home-first
CIW	Care Inspectorate Wales
PHC	Primary Health Care
IS	Information Systems
WPCO	Welsh Primary Care Organisation

Evaluating the Impact of Local Area Coordination as an Early Intervention Strategy: An Action Research Study on Outcomes, Value, and Practice within a Welsh Local Authority

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Abstract:

This action research study evaluates the role of Local Area Coordination (LAC) as an early intervention and preventative strategy within a Welsh local authority. Against a backdrop of rising demand, constrained resources, and competing statutory priorities, LAC is positioned as part of a second wave of preventative approaches designed to strengthen community resilience, promote independence, and reduce reliance on crisis-driven statutory services. The research combines a review of existing literature with qualitative comparative analysis of outcomes across four locations, supported by life-story case studies. Findings highlight the multi-layered impact of LAC at system, community, and individual levels. Coordinators were found to play a critical role in bridging gaps between formal services and communities, reducing social isolation, and enabling individuals to build confidence and independence. While evidencing impact within traditional service models remains challenging, the study demonstrates the value of LAC in embedding strengths-based practice and supporting cultural transformation in public services. The research concludes that LAC delivers meaningful outcomes through bespoke, tailored interventions rather than fixed configurations of activities. Recommendations emphasise the need for further robust evaluation, particularly on the cost-effectiveness of LAC, to inform future policy and resource allocation decisions.

Keywords: Local Area Coordination; Early Intervention; Prevention; Strengths-Based Practice; Community Resilience; Social Care; Wales; Public Service Transformation; Action Research; Cost-Effectiveness

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INTRODUCTION

Background and Context

The combination of rising demand and reduced resources results in public services facing increasing strain. Within this climate, both the UK and Welsh Government promote prevention and transformation of systems as a response to such challenges.

In direct opposition, however, is the reduction in allocated funding for public services, which in turn results in challenging decisions around prioritising prevention, where limited funds are required to meet statutory duties

The Association of Directors of Adult Social Services describe the conflict as:

'Trapped in a vicious circle of having insufficient funds to be confident they can meet all their statutory obligations, whilst being unable to release funding to invest in approaches that might reduce the number of people with higher needs in future' (ADASS 2019; p.25).

In spite of these challenges, proactive local authorities are advancing and transforming from the standard approaches towards prevention which include: reablement, signposting etc. This results in having now embedded more advanced approaches, known as second wave approaches, including approaches such as Local Area Coordination and place-based hubs.

Such enhanced approaches deliver an increased robust commitment and demonstrate an understanding of the associated benefits of prevention through supporting individuals and communities' wellbeing and social connectedness.

This transformation has required a radical change for Local Authorities in how they perceive the role and relationships between services, citizens and communities (Tew et al., 2021). This change includes 'a doing with' as opposed to 'doing to' approach, which places local authorities as a 'place shaper' as opposed to being a provider of services (Lunt et al., 2021).

The transformative opportunities offered by second wave preventative interventions sit within the potential opportunity to relieve demands and resource strain on stator services, with this being achieved while also delivering more efficient systems of empowerment and support for individuals and communities.

Although providing care for an ageing population is a global challenge, in the UK Adult Social Care is described as heading towards an 'existential crisis', where the increased demand for services creates discord with the annual financial reduction on budgets to adult social care (Oliver, 2022). The Health Foundations 2023 analysis estimates a funding pressure of £8.3bn, also noting that between 2021/22 and 2032/33, spending would need to increase by around 3.4% a year to keep up with the projected growth in demand.

It should be noted that significant funding pressures, such as this, result in serious implications, not only for individuals, but for social care and the National Health Service (NHS England, 2016).

Bedford & Harper, (2018) state that this challenge cannot be managed without transforming existing ASC systems/services. They further critique, stating that merely increasing thresholds of statutory services means late access to services where presenting needs are then acute; and what is required is an improved focus on prevention, as well as an increased promotion of independence and wellbeing, which therefore prevents or delays the deterioration of health.

Local Area Coordination (LAC)

The Local Area Coordination approach was developed during the 1980s and 1990s to initially support individuals with learning disabilities in Australia (Bartnik & Chalmers, 2007).

The concept has sought to improve access to services and/or promote social inclusion, through offering direct family support, signposting and networking which is achieved through local collaborations and service redesign, underpinned by a strengths-based philosophy.

In 2000, a Scottish review of services to people with learning disabilities recommended the advancing of Local Area Coordination with Local Authorities being recommended to implement the approach (Scottish

Government, 2000; Stalker et al., 2008). By 2006, Scotland had 59 Local Area Coordinators across 25 Local Authorities, which then increased to 80 by 2009 (SCLD, 2010).

Since 2010, a number of Welsh Local Authorities have also introduced Local Area Coordination, against a broader ever changing policy landscape, including: the Social Services and Wellbeing Act 2014, which focuses on outcomes and prevention; the National Health Service (NHS) Five Year Forward, which develops new models of care; and the 2015 Well-being of Future Generations Act, (Wales) which requires public bodies to be more sustainable.

Within the UK, Local Area Coordination eligibility criteria is open to all, regardless of whether an individual is known or unknown to existing services. The support is arranged on a ward level of 10–12,000 people and requires the development of community resources.

Personal motivation of author

The author is an experienced social worker, working as a senior leader within a Welsh Local Authority that has recently expanded its Local Area Coordination offer to cover all ward areas. The motivation to undertake this action research was based on a personal interest in Local Area Coordination, after working within a Welsh valley community where the positive benefits of LAC were evident within her social work caseload.

Objective of the research

This action research focuses on solving practical problems and promoting change, through taking action to collate and analyse data. It will investigate how LAC makes a difference for service users and what value it brings to local authorities as an early intervention/preventative initiative.

Action research is ordinarily iterative, with researchers and practitioners reflecting on their actions, which results in adjustments based on the data collected. The aim of action research is to produce tangible outcomes and positive impacts on the target population.

This action research will look at existing literature, with the aim of considering improved practices to enhance the overall effectiveness of a LAC within the Welsh Authority in which the author is employed within.

Research from Hull University, 'Bridging the Gaps In Evidencing Prevention: Key Findings from a Multi-site Study of Local Area Coordination', will be critically evaluated through the action research approach, whilst drawing comparisons to LAC within the authority in which the author is based. Broadly, the action research will evaluate how LAC outcomes can be evidenced, how LAC engages and contributes to community resources across four selected locations.

Search strategy

The research undertaken by Hull required a systematic review methodology to obtain the required data. The studies were chosen following the recommendations of the Cochrane and SCIE guidance, in addition to the systematic review methodology suitable for social care (Higgins et al., 2019). Searches were all undertaken using the terms either 'local area coordination' or 'local area coordination'.

The following databases were searched:

- MEDLINE
- HMIC
- Social Policy and Practice
- ASSIA
- IBSS
- Sociological Abstracts
- Social Care Institute for Excellence (SCIE)

Delving into this approach, it would be considered robust with supplementary search methods including research noted within reference lists.

The research also included a case study research approach, which is a research design that is used widely in a variety of disciplines, particularly in the social sciences.

Yin (year), states that case studies can be used to explain, describe or explore events in day-to-day contexts in which they occur, and that this can support understanding causal links and pathways resulting from a new policy initiative or service development.

Study Focus and Design

The study examined four established LAC sites where individuals, stakeholders and LAC were able to participate and share experiences, benefits and limitations. The research expanded the current evidence base by achieving the first multi-site comparison of LAC, which was delivered through a combination of qualitative and quantitative methods, replicated across four sites.

A critique of this method is the limitation created due to four sites being considered for the multi-site comparison. Given the prevalence of LAC across the UK, it could be considered that the LAC sample is not wide enough to deliver a true representation across a wide number of LAC approaches. The small sample pool creates limited generalizability, as the results are based on a small number of cases, which limits the generalizability of findings to a broader cohort.

The study adopted a Participatory Action Research approach (Bradbury, 2015), which combined system and ward level research, combined with in-depth life stories. A Participatory Action Research approach is considered ideal, as it works with professionals, communities and individuals in research, and delivers outcomes that benefit all involved, not restricted to benefiting only academic knowledge.

The project adopted a combination of qualitative and quantitative methods. This was delivered through a series of workshops with the LAC teams in four sites. Workshops looked at the operation of LAC, its processes, value and role within the wider public services and community systems.

Given the variation in how Local Authorities have interpreted LAC and fund such approaches, the analysis of such information gathered through workshops would provide challenges for such research specific to cross analysis of findings, particularly with qualitative data, which is further variable in nature. Such research methods would be prone to subjectivity, due to the high level of researcher interpretation, which may lead to bias during the analysis.

During this phase there was also an analysis of LAC secondary data, both quantitative and qualitative, life stories, and semi-structured individual interviews which were undertaken with stakeholders from each of the four sites.

The data collated was analysed through Qualitative Comparative Analysis (QCA), with system level data being compared against the life stories, using thematic coding of emerging themes (Mason, 2002; Ritchie) and an inductive thematic analysis (McShane and Cunningham, 2012).

A further phase of analysis entailed working within four wards to complete workshops with local stakeholders and life story interviews with individuals working with LAC.

Within phases of the research, system level information, LAC network in place and life story data were obtained. The chosen combination of methods had been selected to support a comprehensive examination of the value of LAC, specifically in relation to delivering benefits to individuals, families and communities and as a preventative/capacity building approach.

Although an extensive approach was adopted, the methods do have disbenefits, which are noted below:

Table 1. Limitations of Qualitative Comparative Analysis (QCA)

Subjectivity	Qualitative Comparative Analysis is open to a high level of researcher interpretation, which can introduce subjectivity and bias into the analysis.
Complexity	Qualitative Comparative Analysis is usually a more complex and time-consuming method of analysis, which also requires a certain level of expertise and familiarity with the approach.
Difficulty in handling outliers	Qualitative Comparative Analysis can be ineffective in managing outlier cases that do not fit neatly into the identified patterns, potentially leading to misleading results.

Limited ability to identify causal relationships	Qualitative Comparative Analysis can highlight patterns and configurations of factors linked with a specific outcome, but it does not provide a clear understanding of the causal relationships between variables.
Limited ability to detect small effects	Qualitative Comparative Analysis may not be flexible enough to identify minor effects, especially where various factors are interacting with each other.
Reliance on qualitative data	Qualitative Comparative Analysis relies heavily on qualitative data. This data type is open to interpretation and subjectivity when compared to quantitative data.
Potential for oversimplification	Qualitative Comparative Analysis involves the process of minimising complex relationships between variables which are then translated into simplified configurations. As a result, this may oversimplify the dynamics in a situation.
Limited statistical analysis	Qualitative Comparative Analysis omits statistical analysis and therefore restricts its ability to quantify and test the strength of relationships between variables.

Qualitative data findings

LAC responds to the challenges for individuals at a local level, which requires a focus on community building. The place-based approach focuses on systems change, and a transformation and collaboration of relationships between the individual, public services and the third sector to address community problems (Taylor et al., 2017).

LAC focuses on supporting people to find non-statutory solutions which therefore reduces reliance on services. LAC, at a community level, looks to build stronger and improved resource communities. At the system level, LAC focuses on prevention, which is achieved through improving support and services. This is underpinned through partnerships and joint working between statutory and non-statutory organisations (see Glasby et al., 2013)

LAC is underpinned by 10 core Principles, which informs the design and implementation of the programme and guides working relationships, conversations and behaviours alongside individuals, communities and services.

Table 2. Core Principles Underpinning Local Area Coordination (LAC) (Community Catalysts, n.d.)

Citizenship	All people in our communities have the same rights, responsibilities and opportunities to participate in and contribute to the life of the community, respecting and supporting their identity, beliefs, values and practices.
Relationships	Families, friends and personal networks are the foundations of a rich and valued life in the community.
Natural authority	People and their families are experts in their own lives, have knowledge about themselves and their communities, and are best placed to make their own decisions.
Lifelong learning	All people have a lifelong capacity for learning, development and contribution.
Information	Access to accurate, timely and relevant information supports informed decision-making, choice and control.
Choice and control	Individuals, often with the support of their families and personal networks, are best placed to lead in making their own decisions and plan, choose and control supports, services and resources.
Community	Communities are further enriched by the inclusion and participation of all people and these communities are the most important way of building friendship, support and a meaningful life.

Contribution	We value and encourage the strengths, knowledge, skills and contribution that all individuals, families and communities bring.
Working together	Effective partnerships with individuals/families, communities and services are vital in strengthening the rights and opportunities for people and their families to achieve their visions for a good life, inclusion and contribution.
Complementary nature of services	Services should support and complement the role of individuals, families and communities in supporting people to achieve their aspirations for a good life.

Within BCBC, the 10 principles noted as underpinning LAC have strongly influenced the design and way in which LAC functions across Adult Social Care. Although BCBC has not adopted the 'traditional' trademarked LAC model, the 'Local Community Connector (LCC)' function operates fully in line with the ethos of LAC in terms of its principles, values and strength-based practice.

The LCC function evidence, through performance measures, a commitment to seeing people as citizens and not 'service users', assisting individuals to access the relevant information and empowering individuals to regain control of their lives.

The LLC function supports individuals already drawing on services to access such in a way that works effectively for them. This is reflective of the principle of services being complementary to the individual's vision for a better life. Such results are considered across data findings and all sites, and then themed along three areas, being system, community and individual.

The research stated that although 4 differing sites were considered, findings showed consistency of results on the value, outcomes and impact of LAC.

Such findings highlight the significance of the LAC model and principles towards delivering standardised outcomes at various levels. To deliver such consistency the 10 principles which underpin the LAC model are key.

Strength-based practice

Principles of strengths-based practice are key to the delivery of LAC (Bennett & Bijoux Ltd, 2009).

Elements of strengths-based practice such as building the capacity, skills, connections, knowledge, and potential in individuals and communities are in keeping with the ethos of LAC (Pattoni, 2012).

LAC is in opposition to the delivery of service led responses, in preference to facilitating connections and/or relationships and building resilience (Bartnik & Chalmers, 2007; Broad, 2015).

Strengths-based practice therefore shapes the relationship between individuals and support providers, this is done with individuals who are supported with a approach with highlights their capacities and competencies (Saleebey, 1996, p. 297).

As a result, co-produced outcomes build on the strengths of individuals which therefore requires robust trusting working relationships to be established (Pattoni, 2012).

Strength-based practice approaches are key to delivery of LAC. These include practices such as joint conversation and shared agreements and outcomes, in addition the focus of meaningful working relationships and informed decision also (Rapp et al., 2005).

Study focus and design

The study focused on three areas, these being the way of working, relationship and outcomes and impacts: all in relation to LAC.

The research delved into the ways that LAC shapes and works together with the statutory services system. One finding set within the project related to LAC's approach having the ability to embed within the system, while influencing alternate services, to deliver support through strengths-based practice.

Ways of working

Two key themes were identified from the research: firstly, that LAC is a facilitator between services and the community; and secondly LAC supporting access to services at system level.

When looking at facilitation between services and the community, workshops highlighted that LAC practitioners and stakeholders considered LAC's presence at community spaces as support for new routes for services to engage.

During the workshops, examples were shared which included serving as conduits for local community knowledge, in addition to engaging with people for indefinite periods of time.

A critique of findings within the research is that although stakeholders from all four locations participated in such workshops, a closer look at data identifies that such thoughts were largely discussed and dominated by only two stakeholders.

When looking at the theme of LAC supporting access to services at a system level, data obtained through the life story approach highlights that for the majority of individuals, formal service support remained a key element of their journey. 75% of individuals were reported to have received support that included accessing welfare rights and public services.

Such support consisted of filling in forms and making phone calls, assistance in attending appointments and facilitating the right service/contact.

The data obtained through the life story approach illustrates the challenges in the way that LAC navigates the service system. As a critique, it should be noted that there is little evidence in the data to back the concept that LAC has reduced individuals accessing support services.

However, there is evidence to demonstrate that LAC has supported individuals to better access eligible support services and/or resources. Life story data highlights instances where LAC has played a role in preventing individuals from an escalation towards a crisis and therefore requiring more extensive formal support.

Individual level findings for ways of working

The concept of 'walking alongside' individuals sit at the centre of LAC. The research considered the principle to achieve this and the various ways in which LAC supports individuals, with the understanding that the effectiveness of delivering such is interrelated with the system and community it operates within.

Analysis of all four selected LAC sites highlighted the LAC 10 principals shaped practice and approaches to 'working alongside' individuals as they deliver LAC within their authorities.

Although LAC practitioners noted their practice of 'walking alongside', in contrast, life story participants did not consider this as their experience. They did, however, share experiences on the value of their positive interactions with LAC practitioners, with two primary themes coming from this area of research. These were time as an enabler through a strengths-based approach and being person-centred.

When exploring time as an enabler, LAC practitioners highlighted that time was a key aspect of enabling practitioners to develop relationships with individuals. Life story data evidenced such a commitment to time from LAC practitioners, where individuals described the relationship as being bound by accessibility, availability and consistency.

A critique of the research is that there was no robust data relating to 'safe waiting spaces' when discussing with individuals, equally there was also inadequate exploration of the concept from a system stakeholder. In spite of this lack of 'safe waiting spaces', there were some stakeholders who stated LAC would fill the void where alternate services were not available, and this therefore could be considered as 'safe waiting'.

In terms of being person-centred, all 4 LAC sites highlighted the value of respecting individuals' autonomy with an emphasis on facilitating independent decision making, confidence building and building self-esteem around making choices and insight.

While a quarter of individuals across the four sites noted autonomy as a value, these individuals also describe their relationship with their LAC practitioner as one of mentorship.

In this area of research, an inconsistency raised was that whilst LAC practitioners consistently described their role as building independence rather than 'doing for', in opposition a number of individuals across all four sites stated their relationship with the LAC practitioners was 'doing for'.

In BCBC, senior leaders recognise the need to alter the relationship between citizens and authority. This was largely relating to the transition from a paternalistic model to one that is strength-based, and outcome focused.

The recent launch of Adult Social Care's practice model, 'Strength-based and outcome focused practice', sets out clear principles for practitioners, partners and citizens with regards to moving to a move enabling approach. The principles are in harmony with the 10 principals of LA, with the vision of the practice model being collaboration, person centered and an enabling approach. This is to be expected given both the practice model and LAC similarly embody strengths-based practice.

This concept of enabling citizens is not new, with the shift from a more relational model where local government is a "place shaper", as opposed to a provider of services being developed in central government for over a decade.

Mulgan (2012) (IPPR report relationship state) states that this goal and transformation develop as follows:

- Initially, the state stands over the people, as warrior, policeman, tax-collector or paternalistic protector.
- Secondly, the state becomes a provider, offering welfare, education and health.
- Thirdly, the state increasingly acts with the public to achieve common goals, sharing knowledge, resources and power.

Specific to BCBC, the need to respond to an increasing aging population (ONS, 2021) and inequalities faced by adults with learning disabilities (Stalker et al, 2008) required the need to both reshape the relationship between the authority and citizens, in addition to the development of strategies that respond to local need, as set with the Adult Social Care, 3 year sustainability plan.

This is not an isolated response, with other authorities such as Waltham Forest taking a similar approach with their 'Think Family' strategy which also tackles both inequalities and shift the relationship between formal services and communities.

Relationships

The position of LAC within the system of public sector and wider was explored during the research, in particular looking at where value is achieved through alignment.

The optimal position of LAC varied from Adult Social Care, Communities or Public Health. However, stakeholders at ward level from all sites agreed that LAC was ideally based within the local authority, due to the ability to have increased influence and reach because of the position it offers within the system.

Differing from ward level stakeholders, managers of LAC stated that the formal positioning of LAC is not the primary focus for its effectiveness, but rather that achieving a shared vision and relationship building across the system is of more value.

In BCBC, the position of the LAC function sits with the Poverty and Prevention function of the authority. This gives LAC the ability to remain committed to its principles and practices without being 'diluted' with alternate services, such as statutory services, which is a risk should the function operate under the social work directorate.

The position of LAC in BCBC is evidenced to be effective with communities having easily accessible and present LAC practitioners. Introductions to LAC are described as occurring flexibly and through a number of ways, including:

- By a service partner (for example social worker, housing, GP)
- By a family member, friend or local community member
- Self-referral due to LAC presence in the local community

Within the BCBC model, similar to findings from Hull research, it was evidenced that introductions were the result of LAC practitioners operating with a 'foot in two worlds', with being positioned in local communities whilst being employed in the service system.

Funding performance measures evidence of outcomes relating to positive working relationships that are strength-based, and outcome focused, with appropriate signposting of services being delivered.

Impacting relationships is the demand within the overall system. Moderate evidence across all four sites highlighted capacity issues within LAC, which impacted the ability to achieve collaboration at various levels. LAC practitioners also advised of their inability to focus on developing collaborations due to the crisis led nature of a demanding caseload.

One third of LAC practitioners also advised that tensions were present between service priorities and the LAC approach when resource constraints resulted in their inability to deliver truly person centred work.

The concept of 'why' LAC works for some individuals and not others was also explored.

LAC practitioners at all four sites comprehensively discussed the significance of this being lasting relationships that were created with individuals they supported. A key factor of successful relationships was noted as 'being human', which in turn supported a reciprocal and trusting relationship.

The element of strong and trusting relationships with LAC practitioners were key for individuals, who noted relationships as personal (such as family or a friend), a mentor, a community engage or a 'fixer'.

When considering comparisons being made to family relationships and friendships, it poses a challenge to the principles set within the strength-based approach and can be considered as blurring the lines and compromising professionalism.

When analysing findings further, some individuals acknowledged that the relationship between themselves and the LAC practitioner was a professional relationship, however, the human connection between themselves and the practitioner created some sense of informality.

Where LAC practitioners enabled individuals to push their boundaries through activities such as attending a new group or club, individuals described such relationships as more relatable to mentoring and coaching. Unlike those individuals who considered relationships as friendship with potentially burred boundaries, with individuals who described relationships as mentoring, such individuals tended to then also comprehend the authority of the LAC practitioner in relation to final decision making.

Across all four sites, a number of individuals described their relationship with the LAC practitioner as being centred around engaging and developing community relationships. In these instances, the value of LAC was associated with connectedness, community knowledge and trust in the LAC practitioners support towards active engagement and confidence building.

Blockers to effective relationships across the system

Although enablers for relationship building were considered, equally the research raised barriers to effective relationships also, with three themes emerging around inconsistency in approach, role and information.

One blocker identified related to the misalignment of strength-based practice with the more traditional transactional approach. The research highlighted views of some stallholders who view strength-based approaches as inadequate when responding to particular issues such as anti-social behaviour.

In direct opposition to the strength-based practice ethos, some LAC practitioners stated that they were operating with a more clinal approach being problem solving and then closing a case. It should be noted, however, that this finding cannot be generalised, as equally some LAC practitioners were opposing transactional approaches due to the limitation it produces towards genuine collaboration.

A further blocker identified related to the disconnect around information, where stakeholders considered a one directional process of information sharing that compromised collaborative working and did not consider a holistic approach.

As a critique of this identified barrier, when analysing such comments further, it should be noted that such views were derived from a minority of participants. Furthermore, comments contradict the experiences of other stakeholders who, as noted above, considered engagement with LAC as an effective approach to gain comprehensive community knowledge.

The misunderstanding regarding the role of LAC creates an additional blocker. LAC practitioners noted the experience of navigating misunderstandings around the role of LAC role and managing expectations from other services.

LAC practitioners reflected on the consequence of this being the risk of aligning LAC with other service pathways which, although strengthens other services, does so at the compromise of the LAC approach and principals.

Such misunderstandings were demonstrated in the number of inappropriate referrals and passing of complex crisis cases to LAC practitioners, where opportunity of prevention has surpassed.

Although the research illustrated the building of relationships between LAC and wider systems supporting an improved understanding of LAC, the research is contradictory in that it also then highlights equal examples where gaps around understanding of LAC are still apparent. This is in particular around strict performance measures which restrict some elements of LAC practice, such as time and outcome measures.

Outcome and impact in individual level

All data sets strongly evidenced the positive impact of LAC specifically for individuals. This was grouped into two main themes being, firstly the reduction in isolation and being accompanied, and secondly building confidence and independence.

Outcomes of significant value were identified by individuals as being accompanied and less isolated. As a result of achieving such outcomes, individuals felt more confident and reassured which in turn prevented personal crisis. Individuals described being able to respond more positively to challenges and having improved skills around anxiety and stress management.

Individuals also described the impact of being accompanied and sensing a trusting relationship with LAC practitioners as resulting in increased confidence and independence. Again, this experience was further attributed by individuals as a preventative measure to avoid falling back into crisis.

In regard to building confidence and independence, individuals and LAC practitioners agreed that LAC supports stepped changes toward engagement and the building of relationships.

Increased confidence and independence for some individuals related to being achieved through community engagement, with some individuals progressing onto community leadership roles which in turn increased self-esteem also.

A large number of individuals noted increased confidence as being linked to being able to respond better to changes associated with mental health. A small number of individuals reported increased confidence and independence which then provided positive outcomes for their family, due to reducing informal carers strain.

Across all sites, LAC practitioners noted challenges when performance measures are set in a traditional, transactional measure. Such measures are not ideal for capturing prevention or relational ways of working, which is fundamentally the way in which LAC operates.

When exploring barriers to evidencing impacts, a key theme which emerged related to case stories which can only use for partial evidence.

LAC practitioners agreed that case studies were better suited to illustrating the impact of LAC as an evidence base.

Although case studies are accepted as a method of evidencing performance, some stakeholders advised that other forms of evidence, in particular numerical measures, are helpful.

In today's climate, with a significantly over spent position within adult social care in BCBC, the focus on resources and 'value for money' is of significance for senior leadership. The lack of accurate numerical measures for the LCC outcomes achieved with the authority poses risks to the function where current decisions have been to reduce third sector preventative services due to the combined financial position and lack of evidence relating to numerical value of such services.

There have been ongoing discussions and varying views relating to LAC and its impact on other services and value for money.

While some participants in the study vocalised their view in terms of LAC reducing strain on other services, on the contrary, the data also shows the views of others who question the cost saving impact of LAC based which is based counter-factual and evidencing causality.

A strong theme coming from the study is LAC's role in preventing crisis and the need for statutory service input. Findings demonstrate LAC's focus on minimising reliance on services and steering support to lower-level support to prevent crises.

LAC practitioners from all four sites demonstrate examples where LAC minimised involvement with statutory services through preventive offers. This includes re-referral routes for repeat returners who may be facing long-term issues which are not medical.

Identified Impacts

Although life story data failed to offer system level outcomes, stories did, however, illustrate how LAC assists individuals to better access services.

Across all four sites, LAC practitioners noted their influence towards shifting public service and the cultural transformation towards working holistically in a person centred and strength-based way.

Similarly, in BCBC case studies shared highlighted examples of intentional practices that are consistent with the LAC approach. Such case study evidence good LAC design, such as taking the time to get to know someone, delivering support at the individual's pace, commencing support from an individual's vision of a good life, and working with 'the whole person' not just focusing on one presenting issue.

Positively, within BCBC such case studies demonstrate the LCC's ability to manage the tension of 'walking alongside people' rather than 'fixing' and doing things to people and offering solutions. Whilst delivering this, case studies also evidence the LCC's ability to respond appropriately to immediate and urgent concerns that people shared with them either. This balance of standing alongside vs taking proportionate action when required, for example safeguarding, is known as 'Safe Waiting' in the Local Area Coordination literature.

LAC practitioners across all sites discuss the concept of plugging 'gaps' within the system. The flexibility offered with LAC enables the ability to plug holes in the current system which in turn prevents individuals from falling through the gaps of service provision.

The research highlighted examples where LAC had provided support to address long term challenges through assisting individuals who had been 'bounced' around the system for significant periods of time.

The lack of time standards for interventions and eligibility criteria provide the ideal setting for such cases to be successfully managed within.

Exploration and analysis of secondary LAC case study data

To supplement the qualitative comparative analysis, the study further analysed life stories which were derived from three out of four locations.

A challenge with taking the approach was found in that all sites both collated and recorded life stories in differing layouts, format and detail. In response to this the study created a specific coding method which supported comparison of stories both within and across locations.

As a way of linking an individual's life story to the logic model, a framework was co-designed with LAC practitioners.

This specific coding framework centred on highlighting issues raised by LAC practitioners and the subsequent actions which were progressed, with these being broken down into short- and medium-term outcomes

To ensure this data task provided a robust and adequately representative data set, the sample was chosen purposively. This sample set was of 30 life stories which were selected for each of the three LAC locations.

The sample cases were selected based of characteristics such as age, in addition to being based within a cross-section of the wards. Codes were assigned to each category described in the logic model. The findings are noted below:

Table 3. Mapped Issues and Outcomes from LAC Case Study Data

Problems addressed	Activities	Short term outcome	Medium term outcome
Social Isolation	One to one work with residents (walking alongside)	Improved ability to use available skills, information and support	Increased ability to self-manage and navigate systems
People struggle to navigate public services	Recommend, signpost, refer to and support people to make use of community resources.	Better able to navigate systems.	Improved well-being and sense of value
Mental and Physical Health	Advocate for referral into statutory services	Less isolated	Improved relationships with professionals
Housing and Financial issues	Sounding board for individuals-	Learn new skills	Skills/resilience developed
	Make introductions	Develop natural supportive relationships	Individual less likely to fall into crisis
	Frequency and duration of engagement not determined (Tailored)		Increased participation in community
	Relationship building into communities		

In all locations, physical and mental issues were the prevalent problems addressed. 43% of individuals struggled with problems of mental and physical health, followed by social isolation (26%), financial and housing issues (19%) and struggling to access public services (12%).

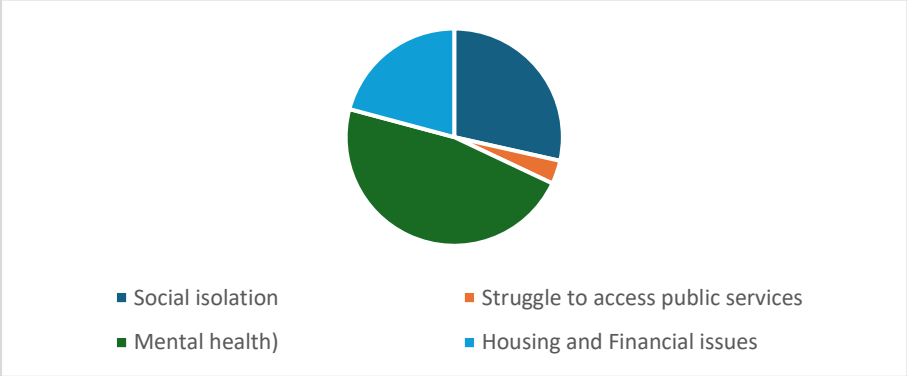


Figure 1. Problems addressed - Across all regions

When taking a closer analysis of life story data, the data highlights the challenges in placing areas of support needs presented by individuals into specific and narrow categories.

As support needs were described by individuals, it is often the case that the problem can sit within more than one category. An example being a large number of individuals who identify themselves as being socially isolated equally would categorise themselves as having support needs relating to mental health issues. Another example being data illustrates examples where individuals often face connected problems within three areas, housing and financial issues and mental health.

Conclusion

The analysis draws together the importance of LAC functioning across two different but interrelated levels. Within these findings is the facilitating role that LAC possesses between the levels of the system, individuals and the community. This function is crucial to providing community knowledge and insight into the formal system, whilst connecting individuals to the appropriate services and leading on connecting individuals and extending services into communities.

Also of importance is the influencing role of LAC regarding transforming public service cultures towards strength-based working.

The research illustrates the complexities relating to the roles and activities undertaken by LAC. This includes the barriers in evidencing the impact of these interventions within traditional linear and transactional service models.

However, life story case studies do importantly highlight the essential role that LAC plays in 'plugging the gaps' which exist within public services provision and that in turn enables early intervention for those at risk of falling through the net of provision.

Although analysis of data shows that individuals did not adopt the language of skills and strengths and focused on deficits and problems, the outcomes and value at this level did illustrate a strengths-based approach and the impact it has.

As noted, the two primary outcomes were 'feeling accompanied and reduced isolation' and 'building confidence and independence'. The data relating to this gave robust evidence that achieving these two outcomes enabled individuals to respond to challenges with more resilience and having minimised stress and anxiety with a reduced risk of falling into crisis.

When summarising findings from the qualitative comparative analysis, which considered if specific activities could be identified if LAC was able to achieve its aims, it focused on individual levels of outcomes, in particular the autonomy and increased control of individual's lives for themselves.

There were three key factors which were to control the aim. At a system level, the individual stated the ability to navigate systems, both independently and with assistance when accessing the required support.

At a community level, individuals discussed community support which delivered a reduction of social isolation.

Within the majority of activity, the qualitative comparative analysis, identified 'Coordinators advocating for an individual' to a key fundamental activity undertaken by LAC practitioners.

It was noted that this alone was not significant enough to achieve a meaningful outcome, and further activities such as LAC practitioners holistic and strengths base approach were also required.

The data highlighted the bespoke approach taken by LAC practitioners in those interactions between all three dimensions, system, community and individual, and personal circumstances (such as age health and trauma) would influence a personalised approach.

As a result, the qualitative comparative analysis was not able to highlight a particular configuration of activities, which would deliver a certain positive outcome, or any specific activity which was deemed crucial to all outcomes.

What was found, however, was the achievements accomplished with the LAC approach involve selecting a range of possible activities, and that such activities would be tailored and most appropriate to deliver with an individual.

As a critique, although the individual level qualitative comparative analysis proposed pathways to outcomes, it also then posed questions relating to linear models, like those adopted in the qualitative comparative analysis, being deemed as the most relevant method for analysis data from models such as LAC which are strength-based models.

Recommendations

Whilst considering the value and impact of LAC, it was clear that further evaluation relating to more focused data to the cost consequence of LAC would be the next steps.

Although there have been studies relating to the cost effectiveness of LAC, such research has been critiqued around the accurateness of such findings. With the current financial climate posing challenges to decision makers prioritising preventive services, such as LAC, when facing deficits when delivering statutory services, robust and accurate research relating to the cost effectiveness of LAC would be key for the future of LAC across the UK.

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