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## Validation of Acute Kidney Injury e-alert system in Wales

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### Introduction

Acute Kidney Injury (AKI) is a serious condition associated with increased mortality/morbidity and occurs in approximately 20% of hospital admissions. A Welsh AKI alert (e-alert) system has been in place since 2014, aiming to improve patient outcomes and care standards through early recognition of AKI using a retrospective dataset.

### Objectives and Approach

The e-alert algorithm was re-produced in SQL (structured query language) and applied to serum creatinine (SCr) values for patients from pathology departments in Abertawe Bro Morgannwg health board (ABMUHB) 2011-2014, held in the Secure Anonymised Information Linkage (SAIL) databank. The algorithm utilises ratios between current SCr value (C1) to lowest SCr value within the previous 7 days (RV1), SCr median values from the previous 8-365 days (RV2), and lowest SCr within 48hrs (D). >50% increase in RV1 or RV2 or >26 $\mu$ mol/L above D triggers an alert. Using a renal dataset to create a timeline we created a temporal AKI cohort.

### Results

2,407,590 SCr tests were performed on adult patients with 2,077,493 of these coming from people in the local area who were not on renal replacement during the time-period. The average ABMUHB population for 2011-2014 was 520,293 (2011: 517,981; 2012: 519,481; 2013: 520,710; 2014: 523,001). 85,272 (4.1%) of these tests triggered alerts for AKI. The incidence per 100,000 population of AKI for 2011-2014 were 1767, 1723, 1717, 1660 (average 1,717). The first AKI episodes per year for 2011-2014 respectively were stage 1 (least severe): 78.9%, 79.3%, 79.3%, 79.4% (average 79.2%); stage 2: 13.3%, 13.7%, 13.1%, 13.7% (average 13.5%); stage 3 (most severe): 7.8%, 7.0%, 7.6%, 6.9% (average 7.3%).

### Conclusion/Implications

The AKI e-alert algorithm can be effectively reproduced using standard query language. The AKI findings in this population are comparable to others published. The use of a renal dataset using both records of renal replacement timeline and individual dialysis session may identify and rectify where alerts have not been generated.

