International Journal of Population Data Science

Journal Website: www.ijpds.org

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 >26µmol/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.

http://dx.doi.org/10.23889/ijpds.v3i4.778