

## AKI episodes – do episode definitions impact outcomes reported?

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### Background:

Acute Kidney Injury (AKI) is a common condition associated with significant morbidity and mortality(1). There is growing interest into the impact of recurrent AKI events on outcomes, however there is no consensus as to when an AKI episode ends and therefore how to count events and their effects(2-4).

### Aim:

To describe four different definitions of an AKI episode and compare the effect these definitions have on outcomes.

### Method:

This study used an anonymised data linkage databank containing biochemical data for our region (population ~430,000 adults). Using serum creatinine (SCr) results we replicated the NHS England electronic AKI alerts algorithm, then by linking with our dialysis and transplant dataset we were able to create an AKI cohort. A patients' initial AKI alert in 2011 was used to mark the start of the first AKI episode and it ended when each of the 4 different definitions below were met respectively, or if no further testing, 90 days had passed.

The definitions were that the episode continued until:

- (i) the SCr is <20% above the baseline (<1.2 rule),
- (ii) the SCr is <50% above the baseline (<1.5 rule),
- (iii) 90 days after the first alert (90 day rule),
- (iv) the SCr no longer triggers an alert (Alerts rule),

After this a second episode could start and similarly finish using the same definitions, and subsequently third episode and so on. These definitions were applied to SCr tests until the end of 2013.

The differently defined episodes were linked to hospital episode, dialysis, critical care and mortality datasets to allow for morbidity and mortality comparisons.

### Results:

There were 1,776,101 SCr test in 316,955 adults between 2011 and 2013, with 581,346 tests in 194,886 people in 2011. In 2011 there were 24,478 alerts in 8,333 patients with 81,948 alerts (21,979 patients) from 2011 to 2013. Over the 3 years, amongst the 21,979 patients who had at least one alert, there were 31,505, 33,759, 26,657, or 34,904 AKI episodes using the <1.2, <1.5, 90 Days and alerts episodes definitions respectively. In those with an AKI alert, 7,792 (35.5%) were dead within a year of their first alert. Higher numbers of AKI episodes within a year correlated with an increased 1 year mortality in all groups except the 90 day definition (table). The Likelihood of dialysis within 1 year increases with number of episodes of AKI across the 4 definitions.

### Conclusion:

There is a consensus definition for the beginning of AKI, but when it ends is not well described. In categorising AKI into discreet episodes based on different end points we observe a variation in the number

of overall episodes in our cohort. The mortality and dialysis requirements at one year varied between the different episode definitions when multiple episodes were compared. If researchers use different definitions of an AKI episode, then comparison of outcomes may not be accurate. A consensus approach for the definition of the duration of an AKI episode is needed to standardise the approach.