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## Using weighted hospital service area networks to explore variation in preventable hospitalisation.

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### Objectives

'Preventable hospitalisations' are used internationally as a health performance indicator of access to and quality of primary care services, yet there's been recent debate about the true 'preventability' these admissions. Much research has compared rates of hospitalisation with the supply of general practitioners (GPs), but there's surprisingly little understanding of how patients are actually using out of hospital services. This study explored patterns of health events and service use in the lead up to, and following, preventable hospitalisations.

### Approach

Visual trajectories of health events were created for 266,950 participants in the 45 and Up Study, NSW Australia. Data linked by the NSW CHeReL on hospital admissions, emergency department (ED) presentations, deaths, as well as GP and specialist consultations from the Department of Human Services, were visually displayed over time. Different health events were juxtaposed using different markers and panels of data. Concurrent patterns of events were identified by sorting, filtering and stratifying participants on number of admissions, self-rated health, geographic remoteness, and compared with a propensity matched cohort of non-admitted participants matched on socio-demographic and health characteristics. Health events were explored over calendar year and in the 90 days surrounding first preventable hospitalisation.

### Results

8715 participants were admitted for a preventable hospitalisation in 2010, 22% having more than one admission. The visualisations revealed patterns of clustering of GP consultations in the lead up to and following preventable hospitalisation, with 14%

of patients having a consultation on the day of admission, and 27% in the prior week. Many patients in regional areas, but not major cities, had GP consultations during admission, suggesting it may have been a part of coordinated care.

There was a clustering of deaths and other hospitalisations following discharge, particularly for patients with a long length of stay, suggesting patients may have been in a state of health deterioration. Specialist consultations were clustered during the period of hospitalisation. Rates of all health events were higher in patients admitted for a preventable hospitalisation than the matched non-admitted cohort.

### Conclusion

We didn't find evidence of limited use of primary care services in the lead-up to a preventable hospitalisation, rather people admitted for preventable hospitalisations tended to have high levels of engagement with multiple elements of the healthcare system. Visualising linked health data was found to be a powerful strategy for uncovering patterns of service use, and such visualisations have potential to be more widely adopted in health services research.

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