Seasonal variability in sepsis hospitalisations

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We would like to report significant seasonal variation in patients hospitalised for sepsis over a 10-year period (1 July 2004 to 30 June 2014). Sepsis is the systemic inflammatory response syndrome due to an infection.\(^1\)

We evaluated seasonal variation in sepsis admissions to all public and private hospitals in Victoria. Admission rates were computed from the *Victorian Admitted Episodes Dataset* frequency counts divided by the Australian Bureau of Statistics’ *Estimated Resident Population* for the given period and presented as average seasonal (3-month) rates normalised to the year 2011 Australian census. Seasons of the year were defined according to admission dates in four month periods: summer (December, January and February), autumn (March, April and May), winter (June, July and August), and spring (September, October and November).

There were 44,222 sepsis admissions over the period. There was a statistically significant (\(p < 0.01\)) increase in the rates of sepsis admissions across seasons. The average seasonal rate of sepsis with co-morbidities and complications increased 18.1% from a low 14.4 (95% CI, 12.7-15.8) per 100,000 population in the summer to a high 17.0 (95% CI, 15.2-18.6) per 100,000 population in winter (Figure 1). Similarly, the rates for sepsis without comorbidities and complications were lowest in summer and highest in winter at 8.4 (95% CI, 6.3-9.1) and 10.1 (95% CI, 8.6-11.2) cases per 100,000 population, respectfully. The autocorrelation for a seasonal lag in sepsis admissions was 0.79, but this fell to -0.20 when adjusted for the seasonal and longitudinal changes, using autoregressive integrated moving average method. This suggests no additional trends outside the seasonal and longitudinal changes.

The average length of stay of the sepsis admissions was 8.3 days, approximately three times that of all hospitalised cases (2.9 days). The admission rates were highest in the adult age groups, in both men (54% of the cases) and women. One in seven of the sepsis admissions resulted in death in hospital; the seasonal variation observed for these deaths is consistent with Figure 1.

The results are similar to a prior study\(^2\) that examined seasonal variation in sepsis hospitalisations in acute non-federal United States hospitals between 1979 and 2003. It found sepsis admission rates to be seasonal and consistently highest during the winter.

Explanations for the increased rates of sepsis hospitalisations in winter may include the effect of viral infection, as influenza epidemics tend to occur in the winter months and respiratory syncytial virus epidemics often overlap the influenza season,\(^3,4\) and photo-periodicity influence on leukocyte function.\(^5\)

Sepsis is a common reason for hospitalisation with significant healthcare costs.\(^6\) Patients with a diagnosis of sepsis are often hospitalised in intensive care units.\(^7\) While seasonal variations have been established for common conditions like asthma and chronic obstructive pulmonary disease,\(^8\) cardiac arrests\(^9\) and stroke mortality,\(^10\) there has been limited analysis of the seasonality of sepsis. Studies of seasonal trends in sepsis are useful for improving the accuracy of forecasting hospital demand beds and services and for optimising patient care.
LETTERS


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