

## **Socio-Demographic Factors and Testing Practices Are Associated with Spatial Patterns of Clostridium difficile Infection in the Australian Capital Territory, 2004-2014**

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**Abstract :** Background: Clostridium difficile infections (CDIs) have been on the rise globally. In Australia, rates of CDI in all States and Territories have increased significantly since mid-2011. Identifying risk factors for CDI in the community can help inform targeted interventions to reduce infection. Methods: We examine the role of neighbourhood socio-economic status, demography, testing practices and the number of residential aged care facilities on spatial patterns in CDI incidence in the Australian Capital Territory. Data on all tests conducted for CDI were obtained from ACT Pathology by postcode for the period 1st January 2004 through 31 December 2014. Distribution of age groups and the neighbourhood Index of Relative Socio-economic Advantage Disadvantage (IRSAD) were obtained from the Australian Bureau of Statistics 2011 National Census data. A Bayesian spatial conditional autoregressive model was fitted at the postcode level to quantify the relationship between CDI and socio-demographic factors. To identify CDI hotspots, exceedance probabilities were set at a threshold of twice the estimated relative risk. Results: CDI showed a positive spatial association with the number of tests (RR=1.01, 95% CI 1.00, 1.02) and the resident population over 65 years (RR=1.00, 95% CI 1.00, 1.01). The standardized index of relative socio-economic advantage disadvantage (IRSAD) was significantly negatively associated with CDI (RR=0.74, 95% CI 0.56, 0.94). We identified three postcodes with high probability (0.8-1.0) of excess risk. Conclusions: Here, we demonstrate geographic variations in CDI in the ACT with a positive association of CDI with socioeconomic disadvantage and identify areas with a high probability of elevated risk compared with surrounding communities. These findings highlight community-based risk factors for CDI.

**Keywords :** spatial, socio-demographic, infection, Clostridium difficile

**Conference Title :** ICSSG 2016 : International Conference on Spatial Statistics and Geostatistics

**Conference Location :** New York, United States

**Conference Dates :** June 06-07, 2016