

The Importance of Regionalisation in the Spatial Pattern of *Campylobacter* Notifications

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Extended Abstract

1.0 INTRODUCTION

This paper will identify some differences in the spatial patterns of *Campylobacter* observed for the geographic boundaries used and highlight issues in boundary choice when analysing New Zealand health data.

Members of the genus *Campylobacter* have established themselves as the most common human gastro-enteric pathogens throughout much of the developed world. In New Zealand *Campylobacter* is the most common cause of notifiable gastro-enteritis and water-borne disease accounting for approximately two thirds of all notifiable disease reports since 1992. Traditional public health interventions, which focus on the modes of transmission of *Campylobacter* (e.g. food preparation and personal hygiene), have been unsuccessful in reducing the incidence of this disease. Researchers in New Zealand have proposed a different (ecological) approach, concentrating on the environmental sources of *Campylobacter*, with the aim of reducing the frequency with which the organism contaminates food and water, thereby reducing human exposure. In order to better understand the ecology of *Campylobacter* and the resulting disease, campylobacteriosis, an accurate picture of the observed notification rates needs to be constructed. It is important to note that when aggregated data such as disease rates are displayed on a map, presented on a statistical plot, or analysed using correlation coefficients or other measures, geographic data produce results that reflect the type of areal units used. Therefore, different areal aggregations of the data might yield substantially different patterns or relationships.

2.0 METHODS

Campylobacter notifications data were obtained from the National Notifiable Disease Database, EpiSurv, for the period January 1993 to December 1998. Disease rates per 100 000 people were calculated for each summer (December, January and February), winter (June, July and August) and annual time period. These rates were analysed using two regional classification schemes, Territorial Authority (TA) and Water Distribution Zones (WDZ). TA's are an administrative area defined under the Local Government Amendment Act (No. 2) 1989. They were chosen as a unit of analysis for this study as the majority of *Campylobacter* notification data were geocoded to this unit. A Water Distribution Zone is part of a water supply network within which all consumers should receive drinking-water of identical quality and are based on the Register of Community Drinking Water Supplies in New Zealand. The consumption of contaminated drinking water is a major risk factor in campylobacteriosis. Two measures of spatial autocorrelation (Moran's I and Local Moran's I) were used to measure the degree of similarity of the disease rates between adjacent areas. In order to quantify "spatial pattern" these results were visualised in map form.

3.0 RESULTS

Preliminary results indicate that differences exist in the spatial pattern of *Campylobacter* between TA's and WDZ's at a seasonal (summer and winter) and annual time scale. Spatial patterns of campylobacteriosis notifications at the TA level of aggregation show Wellington City and Queenstown-Lakes District had high notification rates in the summer, winter and annual time periods. Far North, Taupo and Rotorua Districts showed low incidence rates for all three time periods. Notifications for WDZs have shown greater variability as shown by several zones in the Wellington-Hutt region which are highly spatially autocorrelated over all time periods,

with the exception of Wainuiomata, which is consistently uncorrelated and Johnsonville which is neither highly autocorrelated or uncorrelated over all time periods.

4.0 DISCUSSION

The spatial pattern of campylobacteriosis rates are different for TA's and WDZ's. At a national scale, TA results have aided in developing an accurate picture of the observed notification rates of campylobacteriosis. At the local scale, WDZ have shown great variability in their relationships with other zones and the notified rates of campylobacteriosis, again illustrating the complex ecology of this disease, observed by other researchers in New Zealand.

This study has also highlighted the importance of the appropriate selection of the unit of analysis. Often research in the health sector is conducted to inform policy decisions or interventions, selection of appropriate units of analysis is therefore a particularly important decision.