

.....Spatio-temporal Analysis of MMR Immunization Rates in Alberta, Canada

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Short Abstract

It is well accepted in the medical community that immunizations help protect children against potentially life threatening illnesses. However, there are many factors that influence whether or not a child actually receives their immunizations in accordance with the recommended time schedule as outlined by the Public Health Agency of Canada (PHAC) and the World Health Organization (WHO). When the herd immunity threshold for immunization is not met, this puts society at risk for an epidemic of a potentially fatal disease. This study will evaluate the spatial temporal variation of immunization rates for the measles, mumps, and rubella (MMR) immunization in the province of Alberta using yearly immunization rates for 132 Health Service Areas (HSA) between the years of 2008 and 2012, obtained from the Alberta Health's Interactive Health Data Application (IHDA). Methods for analysis will include the local indicators of spatial association (LISA), Getis and Ord's G^* to indicate hot spot and cold spot clusters of immunization rates over space based on nearest neighbours. Additionally, Anselin's Local Moran's I will be used to identify spatial outliers (high values surrounded by low values) in ArcGIS. To assess the temporal nature of the data, the covariance, autocorrelation function, and Bartlett's Kolmogorov-Smirnov test will be calculated in S-Plus. Any departures from a random outcome for both time and space will be mapped in ArcGIS. It is anticipated that this research will demonstrate which areas have low or high immunization rates over space and time. Information and associations learned from this study will help enable the province of Alberta to learn what policy and/ social programs have been implemented or could be implemented in identified areas of interest. Ultimately, this research will help Alberta Health in reaching their goal of having 95% of children immunized on schedule in agreement with the PHAC's guidelines.