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An application of gravity models to identify factors related to community pandemic influenza A/H1N1 vaccine coverage

Nineteen vaccination clinics were established in Montreal, Canada, as part of the 2009 A/H1N1p mass vaccination campaign. Though approximately 50 percent of the population was vaccinated (e.g. compared to 8 percent in France), there was considerable geographic variation in vaccine coverage. Analysis of the geographic variation in healthcare utilization could potentially reveal underlying barriers of access to healthcare services. In this talk I discuss an application of gravity models to identify characteristics of the communities and the mass vaccination clinics that were associated with vaccine uptake. Gravity models are well suited to this problem as they examine the features of origin and destination that affect traffic, or flow, from origin to destination. Typically, the shorter the distance between origin and destination and the larger the mass of the origin/destination (e.g. population size/clinic capacity), the greater the 'gravitational pull' or flow between origin and destination. We identified several factors associated with rates of vaccinations. For example, communities in which only a small proportion of the population spoke English or French, tended to have low vaccine coverage. Clinics placed in materially deprived neighbourhoods with high residential density and high violent crime rates did not perform well, in general.