Influenza Immunization Coverage Impact on Hospitalizations

Results from a Mathematical Model

Influenza is an acute viral respiratory infection. It is characterized by high fever, cough, myalgia (muscle pain), and fatigue. Severe cases of influenza can result in life threatening complications such as viral or bacterial pneumonia. Hand hygiene and the covering of coughs are effective measures to reduce transmission of the influenza virus. Influenza immunization is an effective method for reducing the risk of infection.

In the fall of 2009, Alberta introduced a universal influenza immunization program for all Albertans aged 6 months and older. A mathematical model[1] was developed to assist in public health planning and better understand the effects and interrelationships between immunizations, antiviral treatments, influenza infections, hospitalizations and deaths.

The model was used to predict the number of hospitalizations expected at different levels of influenza immunization coverage.

Hospitalizations decline with increasing immunization coverage

Using the mathematical model and accounting for some prior immunity, the expected number of hospitalizations at different immunization coverage rates were estimated. Even with complete (100 per cent) coverage, some level of morbidity is expected for a number of reasons (e.g. vaccine efficacy,

delayed immune response). If no one was immunized, an estimated 1,650 hospitalizations would occur in Alberta. As coverage increases, the number hospitalized decreases. At a coverage rate of 30 per cent, the model estimates there would be 650 hospitalizations, a 61 per cent reduction. At coverage rates above 60 per cent, the expected number of hospitalizations stabilizes at approximately 50. Immunization coverage of 30% will save the province $17 million by reducing the number of individuals hospitalized.
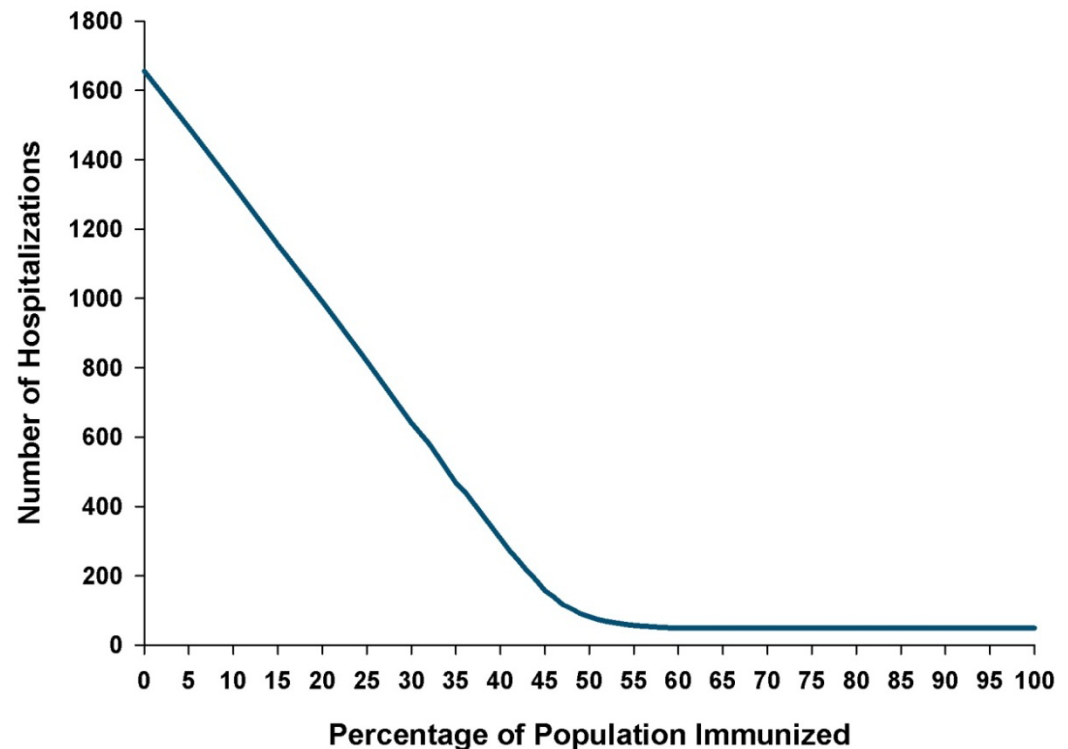
[1] A mathematical model is a simplification of reality that allows users to investigate outcomes across a variety of different scenarios. The Pandemic Risk Assessment Model (PRAM) used in this *Health Trends Alberta* is calibrated to the Alberta 2009 pandemic H1N1 experience and is freely available to interested health professionals.