

Burden and deaths associated with vaccine preventable diseases in Canada, 2010-2014

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Objective

To describe the recent trends in the burden of disease and mortality associated with vaccine preventable diseases (VPDs).

Introduction

Vaccination is one of the most successful public health interventions. Despite this, there are a variety of reasons that VPDs continue to be seen in developed countries such as Canada. This analysis describes the recent trends in the burden of disease and mortality associated with VPDs for which publicly funded vaccination programs for infants or children are implemented across the country and for which national surveillance data are available.

Methods

Surveillance data on VPDs were obtained from the Canadian Notifiable Disease Surveillance System. Population and death data were obtained from Statistics Canada. Death data were only available to 2012. In total, 11 VPDs have been included in the analyses namely tetanus, diphtheria, pertussis, polio, haemophilus influenza (Hi), measles, mumps, rubella, congenital rubella syndrome (CRS), invasive meningococcal disease (IMD), invasive pneumococcal disease (IPD). Exclusion of non-vaccine preventable serotypes from either data source was not possible. Analyses included incidence rate, proportion, mortality rate and risk ratio.

Results

Surveillance data indicate that from 2010 to 2014, an average of 6,020 cases of VPDs were reported annually, representing an average annual crude incidence rate of 17.3 cases per 100,000 population. VPDs accounting for the largest proportion of reported cases include IPD (54.4%) and pertussis (29.6%). Age groups most affected include children less than 1 year of age (92.6 cases per 100,000) and children between 1 and 4 years of age (36.0 cases per 100,000). Age groups least affected include adults between 20 and 24 years old (6.9 cases per 100,000 population) and between 25 and 29 years old (7.3 cases per 100,000 population). Age groups affected differed by VPD.

Death data indicate that from 2010 to 2012, VPDs accounting for the largest proportion of deaths across all ages include IPD (58.2%), Hi (16.3%) and IMD (15.3%). Youth aged 19 years and under accounted for 26.1% of VPDs deaths (mortality rate of 0.17 per 100,000 population). Children less than one year old have the highest mortality rate due to VPDs (2.0 per 100,000 population) and were 26.9 times more likely to die from VPDs compared to children between 1 and 19 years of age. Adults aged 20 years and older accounted for 73.9% of VPD deaths (mortality rate of 0.14 per 100,000 population). A high mortality rate was also seen in adults 60 year old and over (0.3 per 100,000 population); adults 60 years old and over were more 2.6 times more likely to die from VPDs compared to adults between 20 and 59 years old.

Conclusions

The results of routine Canadian surveillance data suggest that despite high vaccine coverage rates generally seen in developed countries such as Canada, a possible preventable burden of illness

due to VPDs still occurs across all age groups. Consideration of VPDs as a whole allows a real appreciation of the burden and deaths associated with VPDs in general. The analysis has shown that while the incidence rates are highest among children 4 years old and younger, mortality due to VPDs continues to occur and primarily affects infants and elderly. Due to the asymptomatic nature of some VPDs and data limitations, reported cases are likely underestimates of the true burden.

Keywords

Vaccine; Disease; epidemiology; mortality; Burden

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