

CASE SUMMARY: PERTUSSIS IN THE SOUTHERN HEALTH SANTÉ SUD REGION

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Introduction

Pertussis, also called whooping cough, is a vaccine preventable respiratory tract infection caused by *Bordetella pertussis*.¹ It is a highly contagious infection transmitted via inhalation of respiratory droplets, with the highest morbidity and mortality occurring in infants less than four months of age.² In developing countries without vaccination coverage, pertussis is one of the leading causes of death, with around 400,000 deaths per year.¹ In developed countries, the highest incidence of pertussis occurs in the unimmunized population, typically infants and adolescents. In these patients, pneumonia is the most common cause of death.¹

With respect to the epidemiology of pertussis in Canada, since the implementation of whole cell vaccines, and the transition to acellular vaccines with an adolescent acellular vaccine booster, case reports and acute care hospitalizations have decreased by 92% from 1995 to 2010.³ Despite vaccinations, there was a 7 fold increase in the national incidence of Pertussis in 2012, with the highest incidence rates in those less than 1 year of age.¹

The current immunization schedule for Tdap (tetanus, diphtheria, acellular pertussis) for all children is at 2, 4, and 6 months of age, with booster doses given between 12-23 months of age, 4-6 years, and 14-16 years.¹ Within the current vaccination schedule, immunization of pregnant women, regardless of their immunization history, is not recommended unless there is a regional outbreak. In this circumstance, it states that Tdap may be provided to pregnant women 26 weeks of gestation or greater.¹

In 2016, the total population of Manitoba was just under 1.4 million. The Southern Health-Santé Sud (SHSS) region represents 14% of Manitoba's population with 197,000 people.⁴ Despite the relatively successful implementation of the Tdap vaccines provincially, the SHSS region has the majority of pertussis cases in the province. The goal of this report was to look at ways in which we can control the rising rates of pertussis in the region in a cost-effective manner.

A recent project was done by Dr. Conrad at the CW Wiebe Medical Centre (within the SHSS region) looking at Tdap in Pregnancy and how the Manitoba Prenatal Form can be slightly altered to remind and encourage physicians to administer Tdap in pregnant women at their regular prenatal appointment at 26-28 weeks gestation.⁵ The vaccination would thus occur at the same time as the oral glucose tolerance test (OGTT). This intervention had very promising results, is minimally expensive, and is not labour intensive so as not to be a burden on healthcare.

Methods and Results

The epidemiological data on pertussis from the SHSS region was obtained from the local public health nurse, with permission of the Medical Officer of Health, as well as from the Manitoba Monthly Surveillance Reports. What this demonstrated was that the amount of pertussis cases in Manitoba has increased from 14 in 2014, to 57 in 2015, to 118 in 2016.⁶ Similarly, the number of cases in SHSS have increased. Comparing the SHSS region to all other health regions in Manitoba over the past 3 years, 55% of pertussis cases were from SHSS, while all the other regions combined comprised only 45%.

In 2015, of the 57 documented pertussis cases, an enormous 81% occurred in the SHSS region. Of these cases, 72% were not immunized against pertussis. In 2016, SHSS had 36% of pertussis cases in Manitoba, again with 74% not vaccinated. In 2017 up to and including May, SHSS has had 70% of the pertussis cases in Manitoba, with 82% of cases being unimmunized.

Combining the data from 2015, 2016, and inclusive of May 2017, 19% of cases have been in patients less than 1 year of age. Of particular note is that there were only 10 cases in the SHSS region that required hospitalization in the past 3 years, and 80% of them were under 1 year of age.

Pertussis in the Southern Health-Santé Sud Region

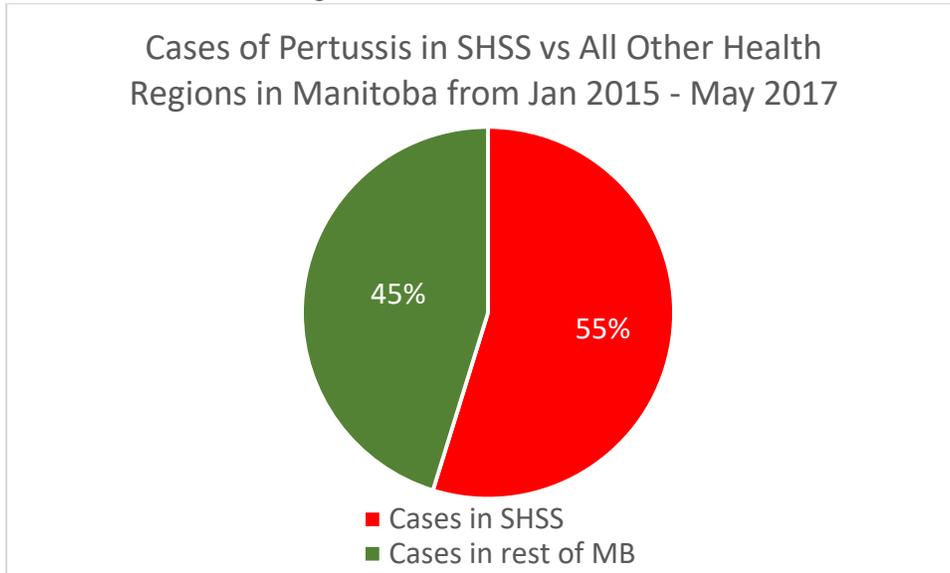


Figure 1. Cases of pertussis in Southern Health Sante Sud (SHSS) compared to Winnipeg Regional Health Authority (WRHA), Interlake East Regional Health Authority (IERA), Northern Regional Health Authority (NRA), and Prairie Mountain Health (PMH) combined.

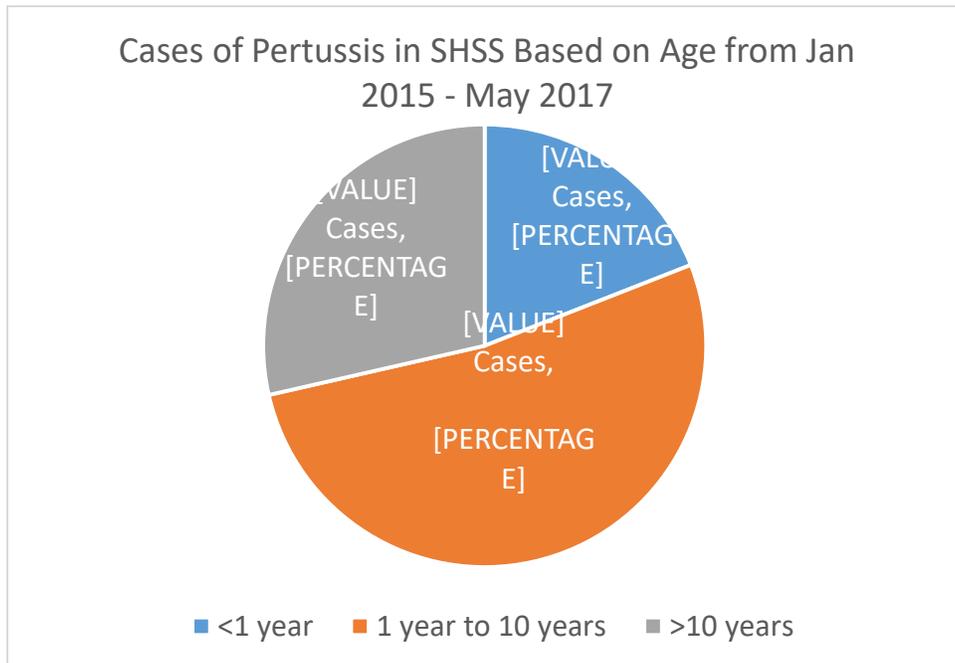


Figure 2. Pertussis cases in SHSS region based on years of age from January 2015 to May 2017 inclusive. Of the 24 cases <1 year of age, a 6 week old, three 7 week old infants, two 3 month old infants, and a 4 month old all required hospitalization. The other cases that required hospitalization were 18 months, 4 years, and 11 years of age.

Discussion/Conclusion

The SHSS region contains only 14% of Manitoba's population, yet is responsible for 55% of the pertussis cases. This is clearly demonstrating a higher than average number of cases of pertussis proportionally to its population size. The population at the greatest risk for a severe pertussis infection are infants less than 4 months of age. However, in our current immunization schedule, vaccination with Tdap does not start until 2 months of age, leaving infants less than 2 months vulnerable. This is further evidenced by the results that in the SHSS region, of the cases that required hospitalization in the past 3 years, 40% occurred before 2 months of age.

The optimal timing of Tdap administration is between 27-36 weeks gestation, and the placental transfer of maternal antibodies to the fetus has been shown to provide passive immunity against pertussis.⁸ Clinically, it has been shown to protect against pertussis up to a year of age.⁷ This is a significant benefit, as demonstrated by Figure 2 above, approximately 19% of all cases in the SHSS region were patients younger than 1 year of age. Tdap in pregnancy has also been compared to postpartum immunization, with the results showing it is 85% more effective than a postpartum immunization against pertussis in infants who are younger than 8 weeks.⁹

Worldwide, the importance of Tdap in pregnancy is being recognized. The Advisory Committee on Immunization Practices (ACIP) in the United States recommended back in 2012 that Tdap be provided for all pregnant woman who are at their third trimester, regardless of immunization history.^{9,10} It is already recommended in Australia, Ireland and the United Kingdom that Tdap vaccines are provided to every pregnant woman.⁹ In Brazil it was demonstrated to be a cost-effective practice for preventing pertussis.⁹ In a case control study conducted in Australia during a pertussis epidemic, Tdap in pregnancy reduced pertussis at less than 4 months of age by 51%.¹¹

A trail of implementing intrapartum immunization via augmenting the Manitoba Prenatal Form was done at the CW Wiebe Medical Centre. They augmented the prenatal form by including 2 check boxes indicating 26 weeks Tdap was done, or declined. Implementation of this program demonstrated a pre-implementation group immunization rate of 29% dramatically increase to a 96% immunization rate of eligible patients. Furthermore, prior to the antenatal vaccination implementation, in Winkler and surrounding area there were 11 cases. After the intervention, there have been 0 cases so far in 2017.⁵

SHSS has the highest pertussis rates in Manitoba, and would benefit from a program or initiative to reduce the prevalence and ultimately the morbidity and mortality of pertussis in the future. The positive results from the implementation done in Winkler are promising and could pave the way for Manitoba to embrace the current guidelines set by the ACIP. Having the vaccine administered during regular prenatal visits between 26-28 weeks along with the OGTT appears to be a cost-effective approach, and one that should be considered for implementation within the region.

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