



STAFF REPORT ACTION REQUIRED

Measles Outbreak 2015 and Ontario's Immunization System

Date:	June 11, 2015
To:	Board of Health
From:	Medical Officer of Health
Wards:	All
Reference Number:	

SUMMARY

In early 2015, Toronto Public Health (TPH) and four other public health agencies in Ontario experienced an outbreak of measles. There were a total of 19 confirmed cases, including ten in Toronto. The investigation and management of Toronto's outbreak was very resource-intensive, involving the investigation of the ten confirmed cases, 140 suspect cases and the identification, follow-up and management of 1548 high-risk contacts. The outbreak likely started when an unidentified unvaccinated individual travelled to an area where measles is still spreading and brought this infection to Toronto. All ten cases acquired the infection locally and did not travel. The outbreak was declared over on March 23, 2015.

TPH and the other local public health agencies involved faced a number of challenges in investigating and managing this outbreak. Some of these challenges are related to weaknesses in Ontario's immunization system. For example, due to the lack of a provincial immunization registry, TPH had to send letters to and/or call 1548 high-risk contacts to determine their immune status and ensure appropriate follow-up. The 2015 outbreak of measles illustrates that if these challenges in Ontario's immunization system are not addressed, then the prevention and control of outbreaks of vaccine-preventable diseases will continue to face costly challenges due to inefficiencies of the system.

These challenges were identified in two provincial reports published in December 2014: the Auditor General's "value-for-money" audit and the provincial Immunization System Review.

The Auditor General for Ontario issued a "value for money" audit report on the publicly funded immunization system in Ontario. TPH and two other local public health agencies

participated in the audit at the request of the Ministry of Health and Long-Term Care (MOHLTC). The final report included 11 recommendations directed at the MOHLTC to improve the efficiency and effectiveness of Ontario's immunization system. TPH supports the recommendations made, specifically the recommendations calling for the province to develop an immunization registry, harmonize the immunization requirements between schools and day nurseries, review non-medical vaccination exemptions for children (i.e. for religious and philosophical reasons), and create a province-wide educational campaign to address vaccine hesitancy.

In addition, the Advisory Committee for Ontario's Immunization System Review released its final report on the provincial immunization system. This report echoed many of the findings of the Provincial Auditor General's report, and recommended three key priorities for the MOHLTC to optimize Ontario's immunization system: promote immunizations and build public confidence to address vaccine hesitancy; develop a provincial immunization registry, and use evidence to drive system change.

This report outlines current issues with the provincial immunization system and the impact on the public health system's ability to respond effectively and efficiently to outbreaks of infectious disease in Toronto. It also illustrates the need for changes based on the two provincial reports released in December 2014 that will provide additional structure to the system to further reduce the risk of the spread of vaccine preventable illnesses and costly outbreaks.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. The Board of Health reiterate its request to the Minister of Health and Long-Term Care and the Interim Chief Medical Officer of Health to develop a comprehensive provincial immunization registry for all health care professionals to access and input immunization records, covering all Ontarians from birth to adulthood.
2. The Board of Health urge the Ministry of Health and Long-Term Care to fund medical consultations and vaccines required for international travel to help prevent the local spread of imported infections from returning travellers.
3. The Board of Health request the Ministry of Health and Long-Term Care and the Ministry of Children and Youth Services to amend the Child Care and Early Years Act, 2014 (which replaces the Day Nurseries Act), to require children who attend a day nursery to be fully immunized in accordance with Ontario's publicly funded immunization schedule and to harmonize the immunization requirements between schools and day nurseries.
4. The Board of Health request the Minister of Health and Long-Term Care to amend the Immunization of School Pupils Act to require a physician to complete a form stating the parent(s) is aware of the risks of not vaccinating their child for

- religious or philosophical reasons, in addition to the requirement of parents submitting a notarized exemption form.
5. The Board of Health reiterate its request to the Minister of Health and Long-Term Care to develop a comprehensive, innovative and on-going communication strategy and campaign to address vaccine hesitancy and promote the importance of publicly funded vaccines.
 6. The Board of Health forward this report to Ontario's Interim Chief Medical Officer of Health, the Ministers of Health and Long-Term Care, Education, and Children and Youth Services, Public Health Ontario, the Provincial Infectious Diseases Advisory Committee on Immunization, the Association of Local Public Health Agencies, the Council of Medical Officers of Health in Ontario, the Ontario Public Health Association, the Canadian Paediatric Society, the Canadian Association of Chain Drug Stores, the Ontario Medical Association and the Ontario Pharmacists Association.

Financial Impact

There are no direct financial impacts from this report.

DECISION HISTORY

At the February 10, 2009 meeting, the Board of Health received a report, *Childhood Immunization Coverage in Toronto*. This report advocated for the systematic collection of immunization data through a local, provincial and national immunization registry. (HL 21.2 <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.HL21.2>)

At the January 20, 2012 meeting, the Board of Health received a follow-up report, *Inequalities and Immunization Rates in Toronto School Children*. This report identified the importance of Toronto Public Health's work in achieving equitable levels of immunization coverage of Toronto students. (HL10.4 <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.HL10.4>)

At the April 29, 2013 meeting, the Board of Health received, *Toronto Unvaccinated: The Impact of Vaccination on the City's Health*. This report described the risk for infection, harm and death if children in Toronto stopped getting routine childhood immunizations for three diseases. (HL21.3 <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.HL21.3>)

ISSUE BACKGROUND

Immunization is one of the most successful public health interventions. It provides a safe form of protection against infections that previously caused significant illness, disease and death.¹ However, cases of vaccine preventable diseases still occur and one of the most infectious is measles. Measles is a highly contagious virus and very high levels of immunity (>95%) are needed in the population to stop the disease from spreading. In

2010-2014, an average of 3.4 cases of measles were reported in Toronto each year, of which 1.4 were known to be travel-related. There have been recent outbreaks of measles in Toronto. In 2008 there were 29 cases associated with an exposure at the Ontario Science Centre during March Break. In 2013 there was an outbreak involving five Toronto children who had no travel history and were unvaccinated at the time of exposure.

The *2014 Annual Report* of the Office of the Auditor General of Ontario assessed the current Ontario immunization system and makes 11 "value for money" recommendations to improve it. The recommendations include having reliable immunization registry information for all Ontarians from birth to adulthood, where vaccine providers can update the registry at the time of immunization; establishing provincial immunization targets; harmonizing immunization requirements between schools and day nurseries; reviewing non-medical vaccine exemption requirements to make it more stringent for parents to opt out of vaccinations; and coordinated public education about vaccines. Many of these recommendations directly impact immunization rates in Toronto and the ability of TPH to respond to outbreaks of infectious diseases.

The December 2014 Report of the Advisory Committee for Ontario's Immunization System Review identified opportunities to improve the overall effectiveness of Ontario's immunization system. The report highlights elements of a high performing immunization system and suggests solutions to build upon the existing immunization system in Ontario. The recommendations of this report also echo those of the Provincial Auditor General's report. These two reports, as well as TPH's ongoing advocacy to the province, highlight a need for change and improvement in order to protect and promote the health of the population.

COMMENTS

2015 Measles Outbreak

At the end of January 2015, TPH received reports of three unrelated measles cases, which prompted an extensive public health investigation and subsequent declaration of a measles outbreak. In the following weeks, there were seven additional confirmed cases. All ten measles cases acquired the infection locally, likely from an unvaccinated person who recently traveled and was contagious while in Toronto.

The confirmed cases ranged in age from 1 to 55 years old. The majority of cases were unvaccinated (9 of the 10 cases were unvaccinated or had incomplete/unknown vaccinations). TPH identified a total of 112 sites where the ten Toronto cases could have acquired or transmitted measles infection, including a day nursery. All sites required some form of follow up and investigation.

In addition, there were 140 suspect cases investigated by TPH, and 1,548 high risk contacts required follow up and assessment. TPH set up a public inquiry line to support investigation efforts and to provide important information to the public, including risk of exposure. TPH staff worked closely with key stakeholders and partners, including the

four school boards, private schools and approximately 1,200 licensed non-profit and for-profit day nurseries on a weekly (and in some instances daily) basis, to address staff, student and parental concerns, immunization needs and requirements for exclusion. A memorandum to all parents (schools and day nursery facilities) was issued by the Medical Officer of Health, reminding parents about the importance of measles immunization and the importance of ensuring children and adult immunizations are up-to-date, especially before travel (March break).

While TPH worked closely with four other local public health agencies, Public Health Ontario and the provincial government to ensure coordinated outbreak efforts, Toronto's recent experience of the outbreak of measles in early 2015 underscores the need for ongoing vigilance and attention to immunization.

Further details of the measles outbreak are available in Appendix A.

Current Challenges in Ontario's Immunization System

A number of significant challenges and opportunities in Ontario's immunization system have been identified through the recent provincial reports, as well as through ongoing advocacy by TPH and others. The recent measles outbreak illustrated some of the challenges:

1. Lack of a comprehensive immunization registry
2. Vaccine hesitancy immunization promotion
3. Travel medicine consultations and vaccinations

Some other important challenges and opportunities are:

1. Immunization requirement standardization for day nursery attendees
2. Philosophical and religious exemptions to immunization

Comprehensive Immunization Registry

The overall immunization rates in Toronto for children and adults are not known due to a lack of a comprehensive immunization registry that records all immunizations regardless of an individual's age. While TPH and other local public health agencies across the province are now able to track immunization rates for school-aged children through the recently implemented provincial Panorama system, to realize the full benefits, Panorama must become a fully comprehensive registry that includes immunizations across the lifespan. Having a comprehensive registry can ensure that all local public health agencies and health care providers have access to reliable immunization information in the event of an outbreak; as well as identifying those individuals at risk due to immune status and incomplete immunization records – without having to do extensive manual follow up for all individuals potentially exposed to a vaccine preventable disease. An additional benefit of a provincial registry is the ability for health care professionals to issue reminders to those who are due for immunizations or vaccine boosters, regardless of their age; and easier recording of immunization at point of vaccination by a health care professional, rather than requiring the parent to update the local public health agency when their child is vaccinated which requires the public health agency to manually enter the record.

Impact on 2015 Measles Outbreak Experience

During the measles outbreak children, parents and staff at a Toronto day nursery were exposed to a case of measles. TPH lacked information about the immunization status of the children attending the day nursery and additional resources were required to contact the families and determine the vaccination status of those at risk. If the immunization status of all exposed children, staff and parents were known through a registry, fewer resources would be needed to follow up people who were already immunized. It would also prevent parental anxiety associated with having to prove their child's immunization status during an exposure, to ensure attendance at the day nursery.

If a comprehensive immunization registry was in place, access to vaccination status information for the majority of contacts would have been more timely once site exposure lists became available; and staff would only have to follow up with those individuals whose registry record indicated they were not vaccinated, immunization status unknown, or not up-to-date. This registry would provide a quicker response time and potentially reduce the costs associated with outbreak investigation and management.

The direct financial costs to TPH to investigate and control the 2015 outbreak totalled over \$500,000 – mostly resulting from confirmed case and contact follow up, including 1,548 high-risk contacts. This does not include indirect costs such as the backlog of routine public health work that has to be completed when the outbreak is over, the cost incurred by other local health agencies and health care providers/institutions such as local hospitals, medical offices, provincial public health organizations, public health laboratories, or the opportunity costs of other public health work that was not done during the investigation.

Since 2009, TPH has advocated for a comprehensive provincial immunization registry as the best means of monitoring vaccination coverage in children and adults. It was also a key recommendation found in both the 2014 Ontario Immunization System Review² and 2014 Ontario Auditor General's Report on Immunization³.

Vaccine Hesitancy and Immunization Promotion

Vaccine hesitancy is a term used to describe concerns and misconceptions of vaccines which cause parents and/or guardians to delay immunization, question the vaccine, or refuse immunization for their children.

In 2015, Mainstreet Technologies conducted a survey of vaccine hesitant parents, polling 1,013 Canadian parents of children aged 1 to 14 years of age who indicated that their child was unvaccinated against Measles, Mumps and Rubella (MMR). The poll found that 39% of unimmunized children come from households with an annual income of over \$100,000; 38% of these parents hold a University degree; and 66% of the parents have completed post-secondary education. Reasons reported by parents for not vaccinating their children include: 65% who cited health reasons, and 19% for religious reasons. Most (79%) of these parents stated that they were still not at all likely to vaccinate their child, even knowing about the recent measles outbreak in Canada and the USA.⁴

The 2015 C. D. Howe report "A Shot in the Arm" describes three groups of parents who do not vaccinate their children: religious or ideological-objector parents; vaccine-hesitant parents; and free-riders (parents who do not vaccinate their children for "reasons of time, energy or complacency").⁵ The report recommends that policies to increase immunization rates focus on the latter two groups of parents since they are more likely to be convinced to vaccinate.

Both the 2014 Provincial Auditor General's report and the Advisory Committee for Ontario's Immunization System Review report highlight the need to provide accurate information to parents who are vaccine-hesitant. The provision of appropriate and accurate educational materials about immunization, as well as having health resources that address vaccine-hesitancy, increase the effectiveness of immunization promotion. Addressing the concerns of parents—such as described in a recent Angus Reid poll⁶ where a significant proportion felt that the science behind immunizations is unclear and that vaccines have the potential for serious side effects—could help provide consistent messaging about the benefits and safety of vaccines.

Impact on 2015 Measles Outbreak

Nine of the ten Toronto measles cases were either unvaccinated or did not know their vaccination history. An infant who was too young to be vaccinated was exposed to measles at their doctor's office from an individual who was presumably not vaccinated⁷. This situation occurs frequently in measles outbreaks.

During the measles outbreak, media attention was focused on parents who chose not to vaccinate their children. Media coverage also focused on the social responsibility of those individuals who can be vaccinated to protect others who are vulnerable, such as infants and those with a weak immune system who cannot be immunized.

Stronger provincial campaigns, tools and materials need to be developed and delivered for vaccine hesitant individuals in Ontario. Communications need to be on-going to reach expectant and new parents, and reiterate the message that vaccines are scientifically proven safe, effective and necessary. Normalizing vaccinations and reiterating the fact that over 97% of parents get their children vaccinated are important on-going messages.

Travel Medicine Consultations and Vaccinations

Currently in Ontario, travel medicine consultations and most travel vaccines are not publicly funded and must be paid for out-of-pocket by individuals who are planning to travel. Many of the cases of vaccine preventable diseases that occur in Toronto are the result of individuals who have travelled outside of Canada and import the infection back to the City. This places other Torontonians at risk. Ensuring travellers are adequately protected before they leave Canada should be a priority to protect the traveller and the local community upon return. TPH recommends that the Ministry of Health and Long-Term Care fund medical consultations and vaccines required for international travel, to prevent the local spread of imported infections from returning travellers.

Impact on 2015 Measles Outbreak

The 2015 measles outbreak likely resulted from an unidentified person importing the disease from abroad. Having more opportunities to become appropriately vaccinated prior to travel will reduce the chance that someone will inadvertently bring a vaccine-preventable infectious disease back to Canada.

In the 2015 provincial budget, it was announced that the Ontario Government is considering allowing Ontarians to receive travel vaccines in their local pharmacies⁸. Without a proper travel medicine consultation, determining which vaccines are required for travel is difficult. TPH recommends the Province re-examine the public health benefits of travel medicine consultations to prevent the local spread of imported infections from returning travellers.

Immunization Requirement Standardization for Day Nursery Attendees

The Child Care and Early Years Act 2014 and regulations will replace the Day Nursery Act. It is unclear whether the Regulations will impose revised immunization requirements for day nursery attendees. TPH recommends that the new regulations require children who attend a day nursery to be fully immunized, in accordance with Ontario's publicly funded immunization schedule and harmonized with the Immunization of School Pupils Act (as compared with the current requirements which are "as recommended by the local Medical Officer of Health").

While the measles outbreak highlighted many of the challenges with Ontario's immunization system, the following challenges are also important to address.

Philosophical and Religious Exemptions to Immunization

Under the Immunization of School Pupils Act (ISPA 1990), parents may file a medical, philosophical or religious exemption from vaccination for their child. Exempt students will not be suspended from school, but may be excluded if there is an outbreak or an exposure such as a case of measles in a school.

In the past five years, overall exemption rates in Toronto schools have been stable, ranging from 1-3%, though there has been a trend of rising philosophical and religious exemptions and decreasing medical exemptions. The same trend has been seen provincially⁹. In the USA it has been shown that families that opt out of vaccination tend to cluster within localized communities, with individuals sharing religious or philosophical beliefs. Clustering erodes herd immunity, facilitating disease outbreaks that can spread¹⁰. While overall exemption rates are low in Toronto schools, some schools have clusters of exempted students and school exemption rates can exceed 40%. Schools with high exemption rates are geographic clusters of unvaccinated individuals and are thus vulnerable to outbreaks of vaccine preventable diseases.

Research in the United States has also shown that states with stronger requirements for obtaining an exemption have higher immunization rates. By contrast, states that have less stringent criteria for exemptions, such as California, have seen rising exemption rates and resultant large outbreaks of measles, pertussis and other vaccine preventable diseases.

Strengthening the process for attaining a non-medical exemption from immunization in Ontario could help reduce the number of immunization-exempt children. Currently, parents who want a philosophical or religious exemption for their child need to fill out a form and have it notarized. The 2014 Ontario Auditor General's report suggested that parents who want an exemption should be required to speak to a physician about the risks of not getting their child vaccinated and get a signed statement stating they are aware of these risks³.

TPH supports amending the Immunization of School Pupils Act to require parents seeking a non-medical exemption for their children to include a form completed by a physician stating that parents are aware of the risks. This will help ensure parents are fully informed and may reduce the number of non-medical exemptions, particularly in those schools where exemption rates are highest.

In summary, the 2015 measles outbreak underlined the need for vigilance to ensure the overwhelming majority of the population are immunized against vaccine-preventable diseases to reduce the risk of outbreaks. This outbreak created a significant, but avoidable, burden for the public health and health care systems. Having a comprehensive immunization registry, effective communication strategies for vaccine hesitant parents, harmonized immunization requirements for school and daycare attendees, and increased access to travel medicine immunizations, will create a stronger immunization system for Toronto and the rest of Ontario.

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SIGNATURE

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ATTACHMENT

Appendix A: Measles Outbreak Summary – Toronto 2015

REFERENCES

- ¹ <http://www.phac-aspc.gc.ca/im/vs-sv/vs-faq02-eng.php>
- ² http://www.health.gov.on.ca/en/common/ministry/publications/reports/immunization/docs/immun_sys_review_march2014_en.pdf
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