

Position Statement

Potential strategies to improve childhood immunization rates in Canada

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Abstract

Immunization rates in Canada are suboptimal. Strategies such as making immunization mandatory for child care or school entry and financial incentives are used in other countries. Additional strategies that could work in the Canadian context include requiring accurate immunization records at school entry, implementing immunization registries at the provincial/territorial level, educating parents and school-aged children about vaccine-preventable diseases and making it more convenient for parents to ensure their children are fully immunized.

Keywords: *Immunization; Immunization mandate; Immunization programs*

From a population perspective, the health benefits of the childhood vaccines being offered routinely in Canada are overwhelming compared with the potential side effects (1). Yet many children are underimmunized. Common reasons for this problem include parents simply forgetting that their child is due for an immunization, having difficulty getting to a clinic during regular hours, being unconvinced that vaccine-preventable diseases pose a real threat, believing that children are ‘too young’ for certain vaccines (or that they are receiving too many vaccines or that they should develop ‘natural immunity’), and, finally, having concerns about the trustworthiness of health care workers or the safety and efficacy of vaccines (2).

Recent outbreaks of measles and a growing public recognition that measles will spread unless approximately 95% of the general population is immune have raised interest in using school entry requirements to increase immunization uptake and prevent spread of vaccine-preventable diseases. In Ontario and New Brunswick and throughout the USA and Australia, it has long been required that children be fully immunized before they can enter school.

Immunization uptake rates in Canada can only be estimated because regional registries are relatively new and vaccines can be obtained from multiple providers. Table 1 shows the uptake of recommended doses-for-age as obtained from provincial/territorial websites in January 2018 (3–17). The percentages noted here are not always directly comparable because methods of data collection vary significantly, making formal analysis impossible. However, uptake rates in Ontario and New Brunswick, the two provinces with school entry requirements, appear to be similar to other jurisdictions. Also, general uptake in Canada appears to be similar to 2016 rates in the USA. In the USA, 70% of 19- to 35-month olds were completely up-to-date for age; 94% received minimum three doses of diphtheria, tetanus and acellular pertussis vaccine (DTaP) and 91% received minimum one dose of varicella and measles, mumps and rubella vaccine (18), while 88% of adolescents had received at least one dose of DTaP vaccine after age 10 years, 83% received meningococcal vaccine and 50% received all doses of human papillomavirus vaccine (females only) (19). However, uptake appears to be much higher in Australia, with 94% of 12-month-olds, 91%

Table 1. Summary of immunization rates in Canada, from provincial/territorial websites (data accessed January 2018)

Province/Territory (reference)	2 years: DTaP-IPV-Hib, PCV, MCV, MMR ^a	2 years: UTD for all vaccines	4–7 years: DTaP-IPV, MMR ^a	4–7 years: UTD for all vaccines	HPV (all doses—females)	HBV (all doses)	Adolescent DTaP/Td booster
Jurisdictions without school entry mandates							
Newfoundland-and-Labrador 2014/2015 (3)	96–98%	–	95%	–	89%	93%	94%
Nova Scotia 2015/2016 (4)	–	–	–	–	81%	77%	94%
Prince Edward Island 2016/2017 (5,6)	–	89%	–	–	–	–	–
Quebec 2010/2011 (7) 2014 (7,8)	89–95%	85%	–	–	67%–96% in different schools	–	–
Manitoba 2014 (9)	70–88%	66%	67–92%	62%	58%	71%	55% (DT); 52% (pertussis)
Saskatchewan 2016 (10)	77–88%	–	76–90%	–	78% ^b	(age 11 years) 71% ^b	71% ^b
Alberta 2016 (11)	77–89%	–	79–80%	–	65%	66%	82%
British Columbia 2016 or 2017 (12) ^c	78–87%	73%	76–95%	68%	67%	93%	81%
Northwest Territories 2010 (13)	76–89%	66%	–	–	–	–	–
Yukon 2011 (14)	61–82%	–	–	–	50%	80%	–
Nunavut 2013 ^d	61–78%	–	46–73%	–	53%	(age 2 years) 43%	36%
Jurisdictions with school entry mandates							
New Brunswick 2015/2016 (16)	–	–	81–91%	78% ^e	75%	–	83%
Ontario 2015/2016 (17)	–	–	84–96%	–	61%	70%	72% (DT); 65% (pertussis)

DT diphtheria tetanus vaccine; DTaP-IPV-Hib diphtheria, tetanus, acellular pertussis, inactivated polio and Haemophilus influenzae type b vaccine; DTaP/Td diphtheria, tetanus and acellular pertussis/tetanus and reduced diphtheria toxoid; HBV hepatitis B vaccine; HPV human papillomavirus vaccine; MCV Meningococcal vaccine; MMR measles, mumps and rubella vaccine; PCV Pneumococcal vaccine; UTD up-to-date for age.

^aRange of up-to-date coverage rates for these vaccines

^bAt age 17 years

^cExcludes data from Vancouver Coastal Health Authority

^dThis data is from the 2013 National Immunization Survey: <http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/immunization-coverage-children-2013-couverture-vaccinale-en-fants/alt/icc-2013-cve-eng.pdf>. Based entirely on parental report, this data is presumably less accurate than data from other jurisdictions

^eRather than true coverage rates, these are the rates of those proven to be up-to-date at school entry (decreased from 93% in 2008/09). It is not clear whether children whose parents cannot produce records are considered to be unimmunized.

of 24-month-olds and 94% of 5-year-olds being up-to-date for age in 2017 (20).

Because the decision to immunize is complex for many parents, new Canadian immunization strategies need to be carefully considered and implemented. One disadvantage of changing school entry requirements is that even parents who support immunization might see this approach as impinging on their right to choose what they consider to be best for their child. School entry requirements could thus, inadvertently, feed into rights-based objections in anti-immunization campaigns, both in print and across social media. This problem is partially anticipated by allowing nonmedical exemptions, but recent reviews have also reported rising rates of requests for nonmedical exemptions both in the USA (21) and Ontario (22), ultimately defeating the purpose of revising school entry requirements. While school entry requirements in the USA increased uptake (23) initially and significantly, they were introduced decades ago, at a time when societal responsibilities still outweighed individual rights. This balance may not exist in Canada today. One recent systematic review found that studies to support school entry requirements were primarily from jurisdictions with relatively low baseline immunization rates (24). Also, negative publicity surrounding school entry requirements might cause parents who would otherwise have immunized their children on time to delay until school entry. There is some evidence that such delays are occurring more often in the USA (25). Because many vaccine-preventable infections are most severe in young children, this trend is concerning. Parents could also 'bypass' mandates by home-schooling their children. Substantial economic and legislative resources are required to enforce school entry requirements.

Financial incentives to encourage parents to immunize their children have been instituted in Australia, with no allowance for nonmedical exemptions (26). These programs and outcomes are yet to be studied. It would be difficult to initiate financial incentives in Canada, as the patchwork of registries makes it difficult to verify each child's immunization status.

Canadian health policy must aim to ensure that parents immunize their children for positive reasons: to protect against disease and minimize risk, rather than to avoid legal repercussions associated with nonvaccination (27).

RECOMMENDATIONS TO IMPROVE IMMUNIZATION UPTAKE

The following recommendations are primarily based on expert opinion as most studies do not reflect the current Canadian context.

1. Provinces and territories should be required to establish electronic immunization registries, with online records for all children being readily accessible to health care providers.

Having current, searchable databases would improve data collection and tracking.

2. Parents should be notified automatically when their child is overdue for an immunization. Text messages with e-mail follow-up are probably the most effective reminders for young parents, who tend to change their home addresses frequently. Online registries and transferrable immunization records would help to expedite this process.
3. Public health clinics and all vaccine providers should promote the CANimmunize app (www.canimmunize.ca) to help parents to keep track of immunizations.
4. Clinic or health centre hours and locations should be convenient for working parents. In every community, there should be at least one 'walk-in' clinic offering immunizations on certain days without appointment. When appointments are scheduled, the process should be simple and linguistically inclusive. Wait times should be no longer than 2 weeks from the date of request. In regions where immunizations are usually delivered by physicians, family medicine walk-in clinics should be required to provide all routine vaccines.
5. Providing accurate immunization records should be mandatory for school entry. Such records are invaluable for public health authorities when outbreaks occur.
6. To serve children whose parents may be noncompliant but not opposed to immunization, a school-based immunization program should be provided at least once during each school year. Parents of children who do not return consent forms should be contacted individually. Vaccine-hesitant parents should be guided to appropriate resources, ideally a short local course offered at the school or online.
7. Canadian school curriculums should include education on vaccine-preventable diseases and the benefits of vaccines, such that the next generation of parents better understands disease risks, vaccine effects and the importance of community immunity.

Further research is needed on health outcomes and cost-effectiveness related to new or newly enforced immunization requirements at child care or school entry, financial incentive programs and other potential strategies to increase vaccine uptake.

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References

1. Orenstein WA, Seib K, Graham-Rowe D, Berkley S. Contemporary vaccine challenges: Improving global health one shot at a time. *Sci Transl Med* 2014;6(253):253ps11.

2. MacDonald NE. Canadian Paediatric Society, Infectious Diseases and Immunization Committee. Working with vaccine-hesitant parents. *Paediatr Child Health* 2013;18(5):265-7. www.cps.ca/en/documents/position/working-with-vaccine-hesitant-parents (Accessed January 16, 2018).
3. Government of Newfoundland and Labrador, Department of Health and Community Services, Communicable Disease Control System. Communicable Disease Report: Quarterly Report 2015-2016;32(4): www.health.gov.nl.ca/health/publichealth/cdc/pdf/CDR_Dec_2015_Vol_32.pdf (Accessed January 16, 2018).
4. Nova Scotia Department of Health and Wellness. School-based Immunization Coverage in Nova Scotia: 2015-16. (August 25, 2017). <https://novascotia.ca/dhw/populationhealth/documents/School-Based-Immunization-Coverage-Nova-Scotia-2015-2016.pdf> (Accessed January 16, 2018).
5. Government of Prince Edward Island. Health PEI. Annual Report: 2016-2017. <http://www.assembly.pe.ca/docs/2016-17-healthPEI-ar.pdf> (Accessed January 23, 2018).
6. Government of Prince Edward Island. Health PEI. Health for all Islanders: Promote, Prevent, Protect; PEI Chief Public Health Officer's Report. 2016; https://www.princeedwardisland.ca/sites/default/files/publications/cphorpt16_linkd.pdf (Accessed January 16, 2018).
7. Institut national de santé publique du Québec. Évaluation de l'implantation du Programme de vaccination contre les virus du papillome humain (VPH) chez les adolescents du Québec. www.inspq.qc.ca/publications/1561 (Accessed January 23, 2018).
8. Institut national de santé publique du Québec, Centre d'expertise et de référence en santé publique. Enquête sur la couverture vaccinale des enfants de 1 an et 2 ans au Québec en 2014; www.inspq.qc.ca/publications/1973 (Accessed October 26, 2017).
9. Manitoba Health, Healthy Living and Seniors, Public Health and Primary Health Care Division, Epidemiology and Surveillance. Manitoba Annual Immunization Surveillance Report. January 1 to December 31, 2014; <http://www.gov.mb.ca/health/publichealth/surveillance/mims/docs/2014.pdf> (Accessed October 26, 2017).
10. Government of Saskatchewan. Immunization Services; Immunization Rates in Saskatchewan. <https://www.saskatchewan.ca/residents/health/accessing-health-care-services/immunization-services#immunization-rates-in-saskatchewan> (Accessed January 23, 2018).
11. Alberta Interactive Health Data Application. Childhood Coverage Rates. 2016; http://www.ahw.gov.ab.ca/LHDA_Retrieval/selectSubCategoryParameters.do (Accessed January 16, 2018).
12. B.C. Centre for Disease Control. Immunization Coverage. <http://www.bccdc.ca/health-info/immunization-vaccines/immunization-coverage> (Accessed January 16, 2018).
13. Government of Northwest Territories. Public Performance Measures Report 2016; NWT Health and Social Services System. <http://www.hss.gov.nt.ca/sites/www.hss.gov.nt.ca/files/resources/public-performance-measures-report-2016.pdf> (Accessed January 16, 2018).
14. Yukon 2012 Health Status Report Focus on Children and Youth. http://www.hss.gov.yk.ca/pdf/health_status_report_2012.pdf (Accessed January 16, 2018).
15. Public Health Agency of Canada. Vaccine Coverage in Canadian Children: Results from the 2013 Childhood National Immunization Coverage Survey (CNICS). http://publications.gc.ca/collections/collection_2016/aspc-phac/HP40-156-2016-eng.pdf (Accessed October 26, 2017).
16. Government of New Brunswick. Daycare, School Entry and School Program Immunization Report, September 2015: Data for School Year 2015-2016. http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/HealthProfessionals/Immunization_Report_Regional_PH_2016.pdf (Accessed January 16, 2018).
17. Public Health Ontario. Immunization coverage report for school pupils in Ontario 2013-14, 2014-15 and 2015-16 school years. https://www.publichealthontario.ca/en/eRepository/Immunization_Coverage_Report_2013-16.pdf (Accessed January 16, 2018).
18. Hill HA, Elam-Evans LD, Yankey D, Singleton JA, Kang Y. Vaccination coverage among children aged 19-35 months - United States, 2016. *MMWR Morb Mortal Wkly Rep* 2017;66(43):1171-7.
19. Walker TY, Elam-Evans LD, Singleton JA, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years - United States, 2016. *MMWR Morb Mortal Wkly Rep* 2017;66(33):874-82.
20. Australian Government, Department of Health. Immunise Australia Program. <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/acir-curr-data.htm> (Accessed January 16, 2018).
21. Wang E, Clymer J, Davis-Hayes C, Bittenheim A. Nonmedical exemptions from school immunization requirements: A systematic review. *Am J Public Health* 2014;104(11):e62-84.
22. Wilson SE, Seo CY, Lim GH, Fediurek J, Crowcroft NS, Deeks SL. Trends in medical and nonmedical immunization exemptions to measles-containing vaccine in Ontario: An annual cross-sectional assessment of students from school years 2002/03 to 2012/13. *CMAJ Open* 2015;3(3):E317-23.
23. Lantos JD, Jackson MA, Opel DJ, Marcuse EK, Myers AL, Connelly BL. Controversies in vaccine mandates. *Curr Probl Pediatr Adolesc Health Care* 2010;40(3):38-58.
24. Lee C, Robinson JL. Systematic review of the effect of immunization mandates on uptake of routine childhood immunizations. *J Infect* 2016;72(6):659-66.
25. Salmon DA, Dudley MZ, Glanz JM, Omer SB. Vaccine hesitancy: Causes, consequences, and a call to action. *Am J Prev Med* 2015;49(6 Suppl 4):S391-8.
26. Hurst D. Parents who refuse to vaccinate children to be denied childcare rebates. www.theguardian.com/society/2015/apr/12/parents-who-refuse-to-vaccinate-children-to-be-denied-childcare-rebates-reports (Accessed October 26, 2017).
27. Salmon DA, MacIntyre CR, Omer SB. Making mandatory vaccination truly compulsory: Well intentioned but ill conceived. *Lancet Infect Dis* 2015;15(8):872-3.

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