Solutions to Increase Youth Human Papillomavirus Immunization in Canada: Findings from Wellington-Dufferin-Guelph, Ontario

To:	Chair and Members of the Board of Health
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Recommendations

It is recommended that the Board of Health receive this report for information.

Key Points

- Human papillomavirus (HPV) is prevalent in Canada and can lead to a variety of cancers (i.e., cervical, oropharyngeal, anal, vaginal), which are highly preventable with HPV immunization.
- Over a 10-year period (2010 to 2020), school-aged youth in Wellington-Dufferin-Guelph (WDG) had an average completed HPV vaccination rate of 58.6 percent, with a decrease in coverage rates seen in the 2019/20 school year. Given the timing of the decline, the COVID-19 pandemic may have played a factor.

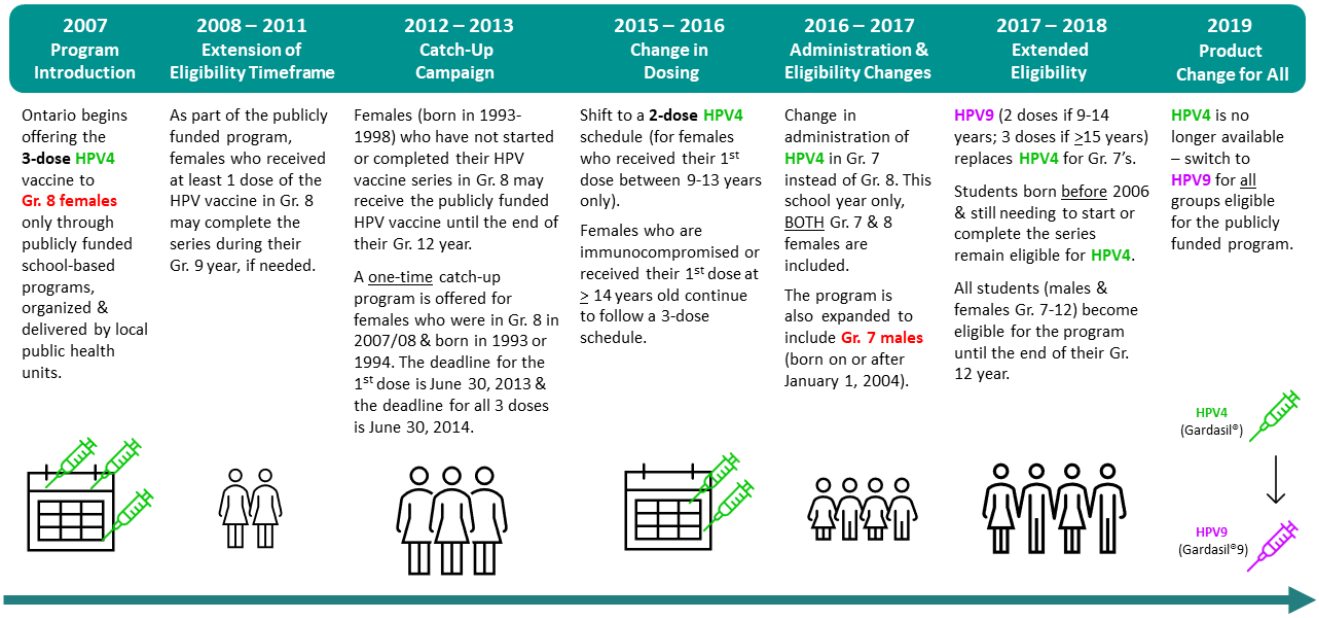
- Wellington-Dufferin-Guelph Public Health (WDG Public Health) was invited as one of 12 national sites to conduct local research as part of a nationwide project funded through Urban Public Health Network aimed at identifying and addressing barriers to HPV vaccination in Canada.
- Parents of youth in WDG who were not fully immunized against HPV reported that this was due to their lack of knowledge on the topic, and a variety of personal factors (i.e., age and gender of child).
- Three recommendations to increase HPV vaccination in WDG have been proposed based on the study findings: (1) updating HPV communication items for parents/guardians, (2) hosting information sessions for parents/guardians and (3) involving youth in HPV and HPV vaccine discussions. These recommendations will be implemented and further researched to determine the impact on HPV vaccine series completion in WDG.
- The findings from WDG Public Health were recently presented at a Research Symposium and will be included in a national report by Canadian Partnership Against Cancer to be released in summer 2023.

Background

Human papillomavirus (HPV) is highly prevalent in Canada, as more than 75 percent of sexually active Canadians will acquire the infection in their lifetime.[1,2] While many HPV infections resolve on their own, specific high-risk types may lead to a variety of cancers (i.e., cervical, oropharyngeal, anal, vaginal, and other anogenital cancers), as well as genital warts.[3] In Canada, there are 3,800 new cancer cases per year attributable to HPV; by 2024, estimates suggest this incidence will increase to 6,600.[4]

Cancers attributable to HPV infections are highly preventable through HPV vaccination.[5] In the 2007/08 school year, Ontario implemented a publicly-funded school-based HPV vaccination program led by local public health units. Figure 1 presents a detailed overview of the evolution of Ontario's publicly funded school-based HPV immunization program.

Figure 1. Evolution of Ontario's publicly funded school-based HPV immunization program. Figure adapted from Dubé et al. 2021 [6] and Malkin et al. 2022. [7]



All 34 public health units in Ontario deliver publicly-funded school-based vaccination programs for three vaccines (HPV, hepatitis B, and meningococcal vaccines) to grade seven students.[8] Of these, only the meningococcal vaccine is mandated under the *1990 Immunization of School Pupils Act* (*ISPA*).[9]

HPV immunizations are offered to all students in Ontario at no cost, up until the end of their grade 12 year (17 years of age), as part of the publicly-funded program.[10,11] If eligible students do not wish to participate in their school's HPV vaccine program, they may receive the HPV vaccine for free from their family doctor or local public health unit . For Ontario residents that are not eligible for the publicly-funded HPV program (e.g., individuals 18 years and older), the vaccine (three doses) can be purchased privately (approximately $510, or $170 per dose) with a prescription and may be covered or partially covered through private insurance.[11]

The Government of Canada created goals under the Action Plan for the Elimination of Cervical Cancer in Canada 2020-2030 designed to meet the World Health Organization's objective of eliminating cervical cancer by 2040.[12] This includes achieving 90 percent HPV vaccine coverage of 17-year-old Canadians by 2025.[12] Despite its widespread availability, uptake and completion of the HPV vaccination series in Ontario remains well below this goal, with rates at approximately 60 percent.[13]

Wellington-Dufferin-Guelph Public Health HPV Immunization Pathways

WDG Public Health conducts an annual school-based HPV immunization program, offering publicly funded HPV vaccines (Gardasil®9 or HPV9) to grade seven students, consistent with Ontario guidelines. At the start of each school year, WDG Public Health sends information home to parents/guardians about the grade seven school immunization program. Parents/guardians are instructed to complete and submit the online consent form for the grade seven immunization program. During each school's scheduled immunization clinic, public health nurses discuss risks and benefits of the HPV vaccine with students, provide the opportunity for them to ask questions and ask students to provide verbal informed consent.

Over the course of the school year, WDG Public Health visits approximately 100 elementary schools to provide both doses of the HPV vaccine (one visit in the fall and spring), and approximately 16 high schools for catch-up clinics. In June 2022, WDG Public Health began the practice of sending out a "Vaccination Recommendation Letter" to high school students who have not received or completed the HPV vaccine series as a reminder to receive the publicly funded HPV vaccine.

Discussion

To reach Canada's HPV immunization target outlined in the Action Plan, the Canadian Partnership Against Cancer (CPAC) is funding a nationwide project led by the Urban Public Health Network (UPHN) to drive system-level changes to increase HPV immunization in school-based and youth-focused programs. As part of this project, WDG Public Health was invited to assess HPV vaccine coverage and identify factors influencing HPV vaccine uptake across Wellington County, Dufferin County, and the City of Guelph.

HPV Vaccination Coverage Rates in WDG

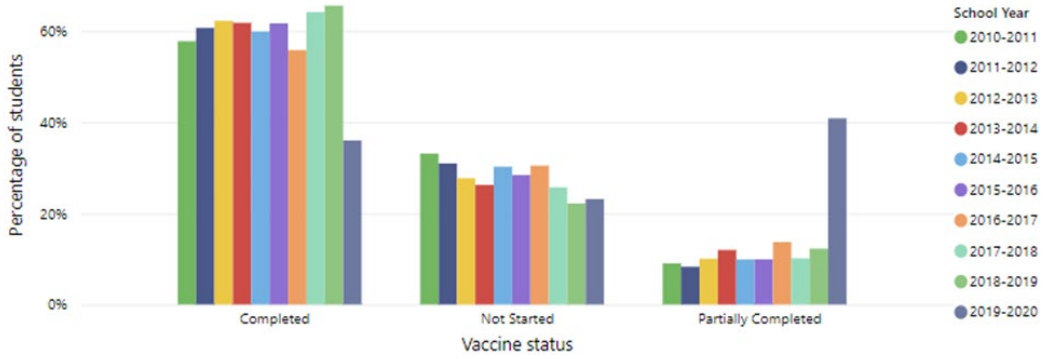
Using WDG Public Health's vaccine record management system, HPV vaccination coverage rates were calculated from an average of 65 publicly funded elementary schools (for grade seven or eight students, depending on eligibility for that school year) in WDG over a 10-year period (2010 to 2020). On average, 58.6 percent of this cohort completed the full HPV vaccine series, 13.6 percent partially completed the HPV vaccine series and 27.8 percent did not start the HPV vaccine series.

HPV Vaccination Coverage in WDG versus Ontario

Completion of the HPV vaccine series generally increased from 2010/11 to 2018/19 (refer to Figure 2), with the greatest percentage of students completing the series (65.6 percent) in the 2018/19 school year. This exceeded the Ontario average – 57.9 percent of grade seven students (12 years of age) across the province completed the HPV vaccine series in 2018/19.[14]

Locally, completion of the full HPV vaccine series was lowest (36.0 percent) and partial completion was highest (40.9 percent) during the 2019/20 school year (refer to Figure 2). Ontario's HPV vaccine series completion rates were similarly low in 2019/20, at 5.8 percent for grade seven students.[14] These decreases are likely a result of the COVID-19 pandemic, as province-wide school closures due to the pandemic interfered with the ability to host school-based immunization clinics.

Figure 2. HPV vaccine series completion by school year in WDG between 2010 to 2020.

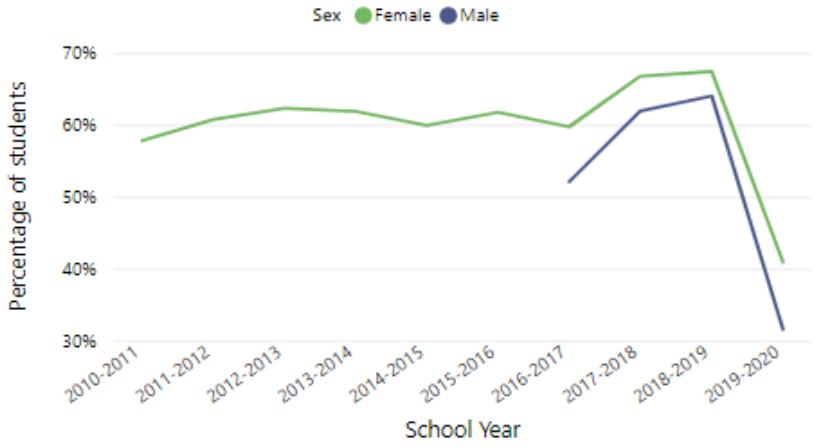


Vaccine status	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Completed	58%	61%	62%	62%	60%	62%	56%	64%	66%	36%
Not started	33%	31%	28%	36%	30%	28%	30%	26%	22%	23%
Partially completed	9%	8%	10%	12%	10%	10%	14%	10%	12%	41%

Sex-based Differences in HPV Immunization Uptake

Figure 3 illustrates sex-based differences in HPV immunization uptake and series completion in school-based programs across WDG from 2010 to 2020. HPV vaccine series completion increased between 2010/11 to 2018/19 for females and 2016/17 to 2018/19 for males. Overall, females averaged a 59.9 percent completion rate, while males averaged a 52.4 percent completion rate. The greatest percentage of females and males (67.4 percent and 64.0 percent, respectively) completed the HPV vaccine series in the 2018/19 school year. Similarly, both females and males experienced a decrease in HPV vaccine completion in the 2019/20 school year (40.9 percent and 31.6 percent, respectively), again likely related to the COVID-19 pandemic and associated school closures.

Figure 3. HPV vaccine series completion by sex and school year in WDG between 2010 to 2020.



Series completion by sex	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Female	58%	61%	62%	62%	61%	62%	60%	67%	67%	41%
Male	N/A	N/A	N/A	N/A	N/A	N/A	52%	62%	64%	32%

Motivators and Barriers of HPV Immunization

WDG Public Health conducted three virtual focus groups in February 2023, which included a total of 12 parents/guardians of school-aged youth who attend a school in WDG and were not (or not fully) immunized against HPV. The purpose of the focus groups was to explore parental understanding and views of the HPV vaccine, the decision-making process regarding immunizing their children against HPV and experiences with the school-based immunization program in WDG.

Knowledge and Understanding

Gaps in Knowledge

While parents had a general understanding of how HPV may spread (i.e., sexual transmission) and believed HPV infections could potentially increase cancer risks, the specific types of cancers and their impacts on both sexes were not well known. For example, parents acknowledged the relationship between HPV and cervical cancer in females but were unaware that specific strains of HPV increased the risk for a variety of head and neck cancers, especially in males. One parent stated:

> "*I just wasn't aware of the throat cancers and neck cancers that can be associated with* [HPV] *for males…it's just been more recent that I learned the dangers for* [HPV to] *males as well."*

Knowledge gaps about the populations eligible for the publicly funded HPV vaccine and costs of each HPV vaccine dose were also present.

Decision-Making Process

Information Sources and Education Received

Parents reported discussing HPV vaccination with their partner/spouse or other parents, as well as conducting their own research (e.g., internet searching) related to HPV vaccine safety and efficacy. They also expressed a desire to learn more about HPV infections and their relation to a variety of cancers in both males and females, the strength of a younger person's immune system as a factor in the age of HPV vaccine programs, evidence on potential short- and long-term side effects of HPV vaccines and clear messaging regarding who is eligible to receive the HPV vaccine for free.

Generally, parents were unsure about what their children might know and what their sources of information might be. Some expanded on this, explaining that their children's fears related to needles and the potential for discomfort at the injection site may interfere with their intent to be vaccinated or to learn more about the vaccine. One parent stated:

> *"I think, for my kids anyways, it was like 'Needle? Oh, no thanks.' It doesn't matter what it is, really, right? 'If I don't have to take it, that's great,' but less about what it actually is."*

Age & Gender

Parents reported that their decision-making process was greatly influenced by the age of their children. For example, parents expressed feeling hesitant to have their children vaccinated against a virus that is commonly transmitted through sexual activity when they did not believe that their children were sexually active. As a result, some questioned why the vaccine would be offered to grade seven students, where one parent said:

> "*I remember getting the letter when they were in grade seven. The vaccine that was related to sexually transmitted diseases seemed so far away from a grade seven, from a 12-year-old. But now that they're 15 and 16, this is a reality that we're facing, so it does seem more relevant at this age."*

In terms of the child's gender, some parents expressed that it did not influence their decision and attitudes towards HPV vaccination, as they felt equally worried about HPV and its potential consequences across all genders. However, others identified gender-based impacts and recognized the importance for their daughters to receive the HPV vaccine but did not see the value for their sons.

COVID-19 Pandemic

When asked whether the COVID-19 pandemic impacted their ability and/or decision to immunize their children with the HPV vaccine, parents did not have many remarks, as pandemic-related school closures and subsequently paused school-based immunization programs did not affect most families interviewed (i.e., those who had a child who was in grade seven prior to the pandemic). Conversely, a few parents reported feeling hesitant about vaccines in general due to the level of controversy surrounding the COVID-19 vaccines.

School-Based Immunization Program

Experiences With School-Based Programs

In general, parents described positive experiences with their children's school-based immunization programs. Parents appreciated having the option to provide consent online for their children's vaccines and did not mention any issues with this process.

As the grade seven immunization program in schools includes three vaccinations (HPV, hepatitis B and meningococcal vaccines), several parents voiced concerns about there being too many vaccines offered at one time and how this might affect their children's health. One parent said:

> "*I will say the bundling of kind of three* [vaccines] *at once does seem a bit overwhelming…my major concern is side effects and bundling three vaccines all at once…"*

Recommendations

Based on the study findings, three main recommendations were developed to increase HPV vaccine coverage in WDG:

(1) Updating HPV Communication Items for Parents/Guardians

- Revise HPV education materials provided by WDG Public Health to schools for parents/guardians of grade seven students, outlining up-to-date, sex-specific cancer risks/rates associated with HPV infections and the importance of HPV vaccination prior to sexual activity (i.e., why vaccinate children in grade seven).
- Improve education to parents/guardians about the publicly funded program eligibility and HPV vaccine costs outside of the program.
- Use a variety of digital communication methods (i.e., email, social media) to reach parents/guardians.
- Continue to send frequent mail reminders to parents/guardians of children who either have not started or not completed their HPV vaccine series with information about why individuals should be vaccinated against HPV, where their children can receive HPV vaccinations, when their children are no longer eligible for free HPV immunization and the costs of HPV vaccines if they do not participate in the publicly funded program.

(2) Hosting Information Sessions for Parents/Guardians

- Host information sessions led by health professionals (e.g., public health nurses) for parents/guardians of youth between 11 to 17 years of age interested in learning more about HPV and the HPV vaccine.
- Enhance promotion of the Client and Community Support Call Centre (1-800-265-7293 ext. 7006; Monday to Friday between 9:00 AM and 4:00 PM) offered by WDG Public Health that allows parents/guardians to speak with a public health nurse directly.

(3) Involving Youth in HPV and HPV Vaccine Discussions

- Offer information to grade seven students at the beginning of the school year providing an overview of HPV and its potential to cause cancer and genital warts, as well as the benefits associated with HPV immunization.
- Receive feedback from students which may include a list of fears (e.g., needles, pain, side effects) and questions that could be used to inform the planning and preparation for upcoming in-school vaccination clinics hosted by WDG Public Health to foster a more positive immunization experience.
- Expand partnerships with local youth-serving organizations to provide more information about HPV and the HPV vaccine to youth.
- Encourage students to use the Client and Community Support Call Centre offered by WDG Public Health if they have additional questions or concerns about HPV vaccines.

These findings were presented at a Research Symposium in Calgary, Alberta hosted by CPAC and UPHN in May 2023, and will be used for a national report that is set to be released in summer 2023 with further recommendations at the national level.

Health Equity Implications

This study has potential limitations. First, this study period did not take into consideration students who may have initiated or completed the HPV vaccine series beyond grade seven or eight or outside of their school-based program, given inconsistencies in catch-up programs across WDG which made it difficult to account for accurately. Additionally, some discrepancies exist in the data between total number of students and HPV immunization (i.e., number of vaccine doses and/or status of vaccine series) as some students changed schools during the year. If students remained within the same municipality, they were only counted once. Those who moved outside of the municipality, however, may have been counted multiple times given difficulties in accurate tracking. Regardless, these discrepancies are minor, and it is unlikely that they significantly impacted results. Lastly, despite best efforts, the study focus groups did not contain a truly representative sample of parents/guardians across WDG. Given that individuals volunteered to participate, and other specific eligibility criteria such as requiring access to the internet, there was a greater probability of selection bias and therefore the qualitative findings are not generalizable to all WDG. Obtaining a representative sample should be prioritized in future investigation.

Conclusion

As part of a nationwide project funded by CPAC, WDG Public Health assessed HPV vaccine coverage and identified factors influencing HPV vaccine uptake across Wellington County, Dufferin County and the City of Guelph. Overall, the study's cohort in WDG had an average completed HPV vaccination rate of 58.6 percent across a 10-year period (2010 to 2020). Findings reveal that, to meet Canada's target of 90 percent HPV vaccine coverage of all 17-year-olds by 2025, there is a need for an evidence-informed HPV vaccine uptake strategy across WDG. Despite progress in increased completion of the HPV vaccine series amongst students in WDG from 2010 to 2018, COVID-19 pandemic-related school closures likely contributed to the decrease in HPV vaccine coverage seen in the 2019/20 school year. WDG's HPV vaccine coverage may also be attributable to HPV vaccine hesitancy in parents of children who are under-immunized. This study indicated knowledge gaps about HPV and cancer risks and the publicly funded HPV immunization program. The decision-making process for parents regarding their children's HPV immunization may have been, and may continue to be, influenced by education received, their child's age or gender, cost of the HPV vaccine and vaccine hesitancy.

The results revealed three recommendations to enhance HPV and HPV vaccine knowledge: (1) updating HPV communication items for parents/guardians, (2) hosting information sessions for parents/guardians and (3) involving youth in HPV and HPV vaccine discussions. These findings will be included in a national CPAC report along with research from various project partners across Canada. Further research will be conducted locally to study the impact of HPV vaccine series completion in WDG following the implementation of the study recommendations.

Ontario Public Health Standards

Foundational Standards

☒ Population Health Assessment
☐ Health Equity
☒ Effective Public Health Practice
☐ Emergency Management

Program Standards

☒ Chronic Disease Prevention and Well-Being
☐ Food Safety
☐ Healthy Environments
☐ Healthy Growth and Development
☒ Immunization
☐ Infectious and Communicable Diseases Prevention and Control
☐ Safe Water
☒ School Health
☐ Substance Use and Injury Prevention

2023 WDGPH Strategic Directions

☐ **People & Culture:** WDGPH has an organizational culture of engagement, inclusion and agility.

☒ **Partner Relations:** WDGPH collaborates with partners to address priority health issues in the community.

☒ **Health System Change:** WDGPH is positioned to be an agent of change within the broader health sector.

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