

Action Plan for the

ELIMINATION OF CERVICAL CANCER IN CANADA

2020–2030



2019-2029 CANADIAN STRATEGY
FOR CANCER CONTROL



PRIORITY 1

Decrease the risk of
people getting cancer



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Decrease the risk of people getting cancer

The *2019-2029 Canadian Strategy for Cancer Control* (the Strategy) is a 10-year roadmap to improve equity in the cancer system and to deliver world-class cancer care to everyone in Canada, while focusing on a sustainable healthcare system for the future. Among the Strategy's eight priorities is a focus on decreasing the risk of people getting cancer, including eliminating cervical cancer.



Action Plan for the Elimination of Cervical Cancer in Canada 2020–2030

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This Action Plan was developed with guidance from partners and subject matter experts. First Nations, Inuit and Métis partners were engaged to inform the Action Plan as a whole and to identify Peoples-specific actions. A list of all members of the Elimination of Cervical Cancer Advisory Committee and Working Groups is found in Appendix B.

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Action Plan for the Elimination of Cervical Cancer in Canada



Every year, more than 1,300 people in Canada are diagnosed with and 400 die from cervical cancer. Canada has set the goal of eliminating cervical cancer by 2040: an ambitious target, but an achievable one. Cervical cancer is highly preventable and curable. We have the proven HPV vaccine. We know which screening approaches are most effective in reaching those who are underserved. We have engaged partners from across Canada to design the way forward.

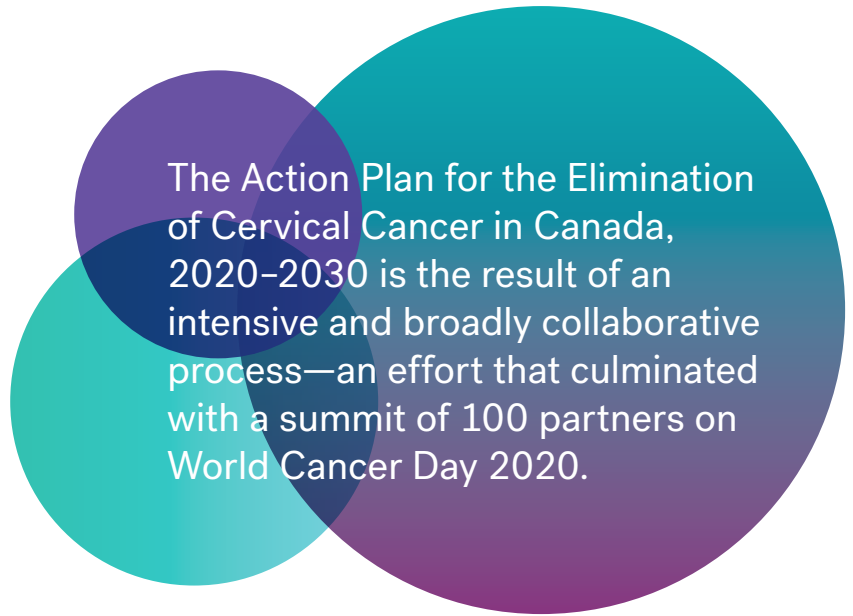
The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 is Canada's response to the call by the World Health Organization to eliminate cervical cancer worldwide within the century. At the same time, it advances a top priority of the 2019–2029 Canadian Strategy for Cancer Control (the Strategy). Plans are already underway to implement the Strategy, which includes driving forward partnerships across Canada to eliminate cervical cancer, ensuring all people receive equitable access to quality screening and care. One of the Strategy's top priorities is meeting the needs of those whose risk of cervical cancer is greatest.

The steps in this action plan will speed up Canada's transition from traditional Pap testing to HPV primary screening. They will enable self-sampling at home and appropriate follow-up for abnormal screening results so that more people in more locations can access screening and treatment—breaking down barriers that currently prevent real equity of access and outcomes in cervical cancer. The action plan will also help improve HPV vaccination rates as well as standardize data collection and reporting to help us pinpoint where there are inequities that Canada must address and determine areas for quality and program improvement.

For access and equity

The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 is the result of an intensive and broadly collaborative process—an effort that culminated with a summit of 100 partners on World Cancer Day 2020. Representatives from communities that have historically experienced barriers to screening and care were key contributors throughout the process—including First Nations, Inuit and Métis, who have experienced three times more diagnoses and four times more deaths from cervical cancer than the population overall.

That inclusiveness does not end with the publication of this action plan. As we now move to implementation, the Canadian Partnership Against Cancer and its partners will continue to engage with those who experience inequities: First Nations, Inuit and Métis, youth at risk, LGBTQ2S+ individuals, rural and other underserved populations. We will match the ambition of Canada's 2040 goal with action-oriented approaches to overcome and dismantle barriers to immunization, screening and follow-up of abnormal screening results. We will prioritize meeting the needs of those at greatest risk. We will set goals, measure and report on progress as we go.



The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 is the result of an intensive and broadly collaborative process—an effort that culminated with a summit of 100 partners on World Cancer Day 2020.

Toward a more resilient system

The COVID-19 pandemic underscores the need for fresh thinking about access. Cancer screening programs were temporarily put on hold and, by mid-summer 2020, it was clear that when screening resumed it would need to change to be able to weather future disruptions.

The Partnership is working with partners to explore and provide cancer services closer to where people live across all areas of cancer care and screening, including at-home screening where available and proven effective. Adopting the HPV self-sampling called for in the action plan across Canada will help achieve this, by allowing women to screen themselves anywhere, any time—addressing issues of privacy, confidentiality and an individual’s lack of comfort with the Pap test at the same time. It may even help improve access to care, recognizing some people’s distrust of the health system. Canada is also prepared to undertake new approaches to HPV vaccination to reach at risk youth where they live, work and gather—whether that’s online outreach or new approaches to delivery such as mobile clinics. In light of these compelling benefits and the need for immediate action to achieve the 2040 goal, the Partnership and

its partners across the country are already working to accelerate action in several key areas, including improving HPV immunization rates and rolling out HPV testing.

It is within our collective power to eliminate cervical cancer. This action plan shows how partners will put that power to use and advance the *2019–2029 Canadian Strategy for Cancer Control*. This action plan, and the Strategy it advances, are tools for bringing greater equity and accessibility to cancer prevention, screening, treatment and care. Both have been shaped directly by those whose needs must be better met, and together they will help to reduce the incidence of cancer in Canada while increasing rates of survivorship.



Cynthia Morton
Chief Executive Officer

Action Plan at a glance



PRIORITY 1

Improve HPV immunization rates

TARGET

By 2025

- 90% of 17-year-olds are fully vaccinated with the HPV vaccine

ACTIONS

1. Increase awareness and acceptability of the HPV vaccine
2. Increase vaccination uptake in school-based HPV immunization programs
3. Improve measurement and reporting of vaccination coverage rates by school-based HPV immunization programs to identify inequities and inform program improvements



PRIORITY 2

Implement HPV primary screening

TARGET

By 2030

- 90% of eligible individuals have been screened with an HPV test
- 90% of eligible individuals are up to date with cervical screening
- No less than 80% of eligible individuals in any identifiable group are up to date with cervical screening

ACTIONS

1. Implement HPV primary screening within organized screening programs across Canada
2. Ensure equity in cervical screening participation
3. Implement HPV self-sampling in cervical screening programs
4. Collect and report on aggregate data on cervical screening and use data for program improvement



PRIORITY 3

Improve follow-up of abnormal screening results

TARGET

By 2030

- 90% of all individuals with an abnormal screening result (positive HPV test) should have a clear plan of appropriate follow-up designed and communicated to them within three months of the test that generated the positive result
- 90% of all individuals identified as being at elevated risk for significant cervical abnormalities have colposcopy in a timely manner
- No less than 90% of individuals in any identifiable group receive follow-up

ACTIONS

1. Standardize timely and appropriate follow-up of abnormal screening results (positive HPV tests)
2. Provide equitable access to, and uptake of, follow-up services for abnormal screening results
3. Collect and report aggregate data on patient follow-up and use it to inform program improvement



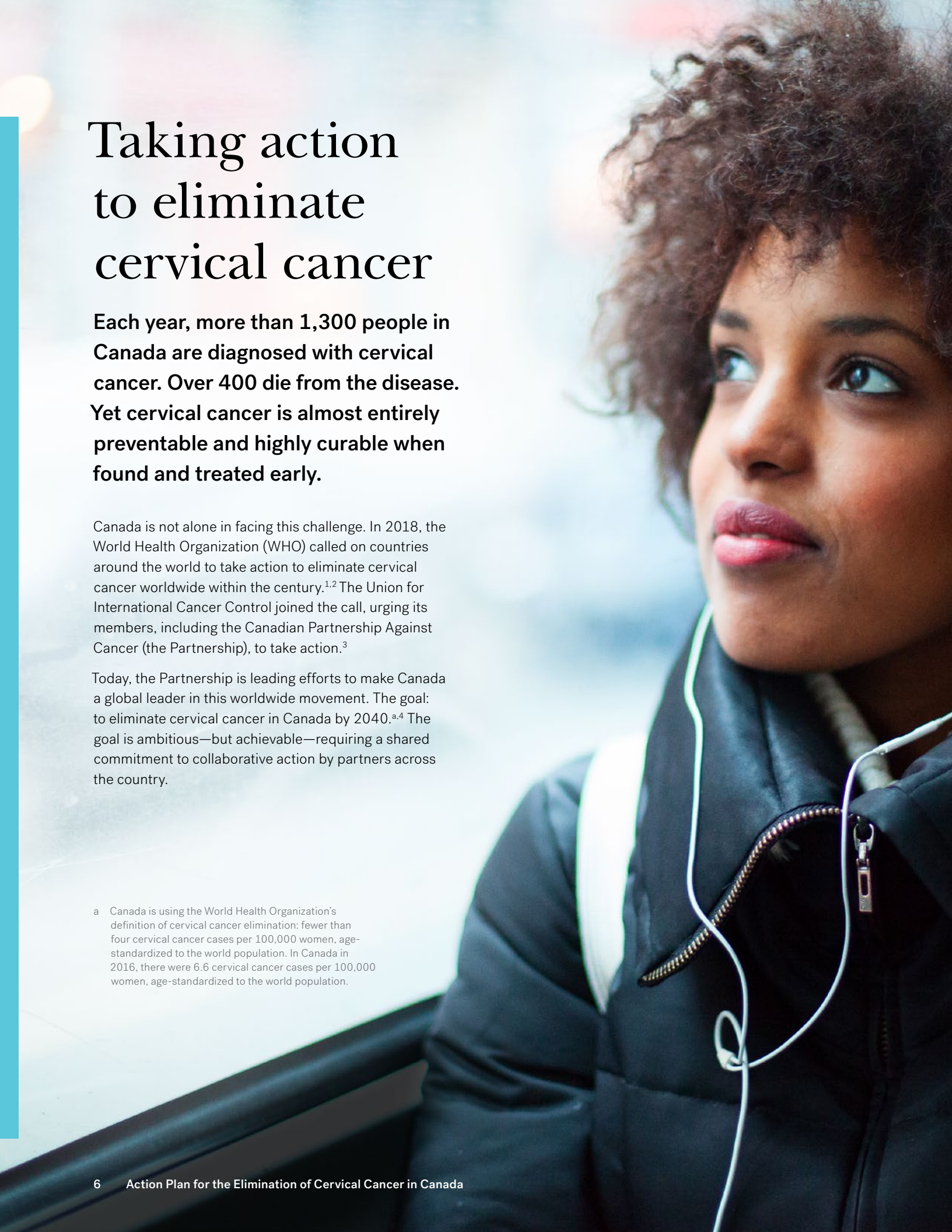
Taking action to eliminate cervical cancer

Each year, more than 1,300 people in Canada are diagnosed with cervical cancer. Over 400 die from the disease. Yet cervical cancer is almost entirely preventable and highly curable when found and treated early.

Canada is not alone in facing this challenge. In 2018, the World Health Organization (WHO) called on countries around the world to take action to eliminate cervical cancer worldwide within the century.^{1,2} The Union for International Cancer Control joined the call, urging its members, including the Canadian Partnership Against Cancer (the Partnership), to take action.³

Today, the Partnership is leading efforts to make Canada a global leader in this worldwide movement. The goal: to eliminate cervical cancer in Canada by 2040.^{a,4} The goal is ambitious—but achievable—requiring a shared commitment to collaborative action by partners across the country.

^a Canada is using the World Health Organization's definition of cervical cancer elimination: fewer than four cervical cancer cases per 100,000 women, age-standardized to the world population. In Canada in 2016, there were 6.6 cervical cancer cases per 100,000 women, age-standardized to the world population.



The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 (Action Plan) sets out priorities, targets and actions for the next decade that will move Canada toward this goal and identifies the partners who can drive this work forward. Now, the focus must shift to implementation, as partners identify their specific roles and responsibilities, and together with the Partnership, work to achieve results.

Building on achievements

Great progress has been made in reducing the incidence of cervical cancer in Canada over the past few decades. The decline is largely due to routine cervical screening to find abnormal cells (using the Pap test), followed by appropriate treatment to prevent them from developing into cancer.^{5,6}

More recent advances offer even greater promise. A vaccine that protects against human papillomavirus (HPV)—the cause of almost all cervical cancer—was introduced just over a decade ago.⁷ In Canada, the HPV vaccine has already led to significant reductions in the incidence of cervical pre-cancers in those who have been vaccinated.⁸ In the area of screening, a cervical screening test that can detect the presence of HPV is now available. And First Nations, Inuit and Métis governments, organizations and communities across Canada are leading work with their health partners to promote HPV immunization and cervical screening participation among First Nations, Inuit and Métis.

But despite these advancements, cervical cancer remains a major concern. Most people in Canada who develop cervical cancer are between the ages of 25 to 69,⁹ and in Canada in 2019, an estimated 1,350 people were diagnosed with the disease. That same year, 410 people died from cervical cancer.⁵ Furthermore, the incidence of cervical cancer remains higher in some populations in Canada, including people living in rural or remote areas, people with low income and First Nations, Inuit and Métis.^{10,11,12,13,14} Addressing these inequities is critical: cervical cancer will only be eliminated if everyone in Canada has equitable^b access to the highest quality prevention and care.

^b The World Health Organization defines equity as the absence of avoidable or unfair differences among groups of people, whether defined socially, economically, demographically, geographically or by other means of stratification. Equity in health means everyone should have a fair opportunity to attain their full health potential and no one should be prevented from achieving it.

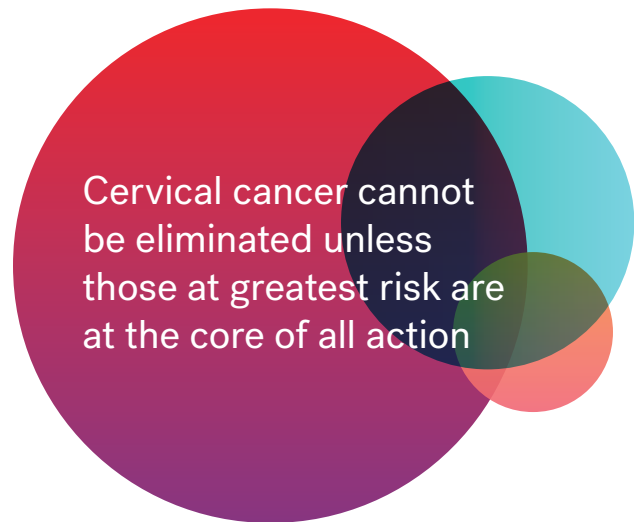
THE ACTION PLAN AND THE CANADIAN STRATEGY FOR CANCER CONTROL

The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 is a key element of the 2019–2029 Canadian Strategy for Cancer Control, an ambitious plan for the cancer and broader health system. The Strategy’s vision: that fewer Canadians develop cancer, more people survive it and those with cancer have a better quality of life.¹⁸

Shaped by input from more than 7,500 people across the country, the Strategy sets out priorities and actions to ensure that everyone in Canada has equitable access to the highest quality cancer prevention, diagnosis, treatment and support services, and that care at every step is delivered with a person-centred approach that is sustainable for future generations.

First Nations, Inuit and Métis continue to experience poorer cancer outcomes than other people in Canada due to inequities and barriers in accessing care, especially culturally appropriate care.^{11,13,14,15,16,17} Historical trauma and abuse and ongoing systemic racism and colonization contribute to these inequities. To address this, the Strategy includes Peoples-specific priorities and actions that were co-created by First Nations, Inuit and Métis governments, organizations and communities, reflecting Canada’s commitment to reconciliation.

As steward of the Strategy, the Partnership is working with a broad coalition of partners to move the Strategy into action. Among the Strategy’s priorities is a focus on decreasing the risk of people getting cancer. The Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 advances this priority, and its implementation by key partners will position Canada as a leader in the worldwide movement to eliminate cervical cancer.



Developed in partnership

The Action Plan was developed with partners across Canada who will be responsible for ensuring its implementation, and reflects evidence from research and practice, as well as guidance from national and international experts in HPV immunization, cervical screening, diagnosis and treatment. The perspectives of patients and the general public were gathered through a national survey and interviews with individuals with a history of cervical cancer. And further insights were drawn from the experience of other countries that have introduced successful strategies to reduce cervical cancer.

In addition, the Partnership hosted a February 2020 summit of close to 100 partners to review and endorse the draft Action Plan and begin to plan their role in its implementation. The summit included patients and representatives from government, non-governmental organizations, academic institutions and First Nations, Inuit and Métis governments and organizations.

First Nations, Inuit and Métis partners were engaged to inform the Action Plan as a whole and to identify Peoples-specific actions that reflect the realities affecting cervical cancer prevention and care among First Nations, Inuit and Métis. These Peoples-specific actions (see page 23) align with the three priorities that were co-created by First Nations, Inuit and Métis for the 2019–2029 Canadian Strategy for Cancer Control (the Strategy): culturally appropriate care closer to home; Peoples-specific, self-determined cancer care; and First Nations-, Inuit- and Métis-governed research and data systems.¹⁸

A commitment to equity

Adopting the approach used for the 2019–2029 Canadian Strategy for Cancer Control,¹⁸ the Action Plan begins to address the inequities and barriers in accessing prevention and care that are experienced by rural and remote communities, people with low income, recent immigrants, First Nations, Inuit and Métis and other populations, such as LGBTQ2S+ individuals.

Current data points to these inequities, but significant data gaps exist. For example, little is known about which groups have lower rates of HPV vaccination and why, and better data is needed on those who aren't receiving timely follow-up for abnormal screening results. New and different strategies and partners within these communities will be required to understand and address these challenges. Cervical cancer cannot be eliminated unless those at greatest risk are at the core of all action.

This intentional focus on equity will help ensure that plans and actions to eliminate cervical cancer in Canada are equitable and culturally appropriate, and that *all* policies and programs are developed with an awareness of barriers that prevent individuals from accessing the services they need.



Ambitious goals requires immediate action

The Action Plan identifies priorities, targets, actions and key partners to improve HPV immunization, implement HPV primary screening and ensure timely follow-up for individuals with abnormal screening results. These improvements will enhance prevention and care for all people in Canada, regardless of who they are or where they live. The Peoples-specific actions identified by First Nations, Inuit and Métis partners will further reduce health inequities and drive the system-wide changes required for Canada to eliminate cervical cancer by 2040.

But to achieve this goal, work must begin immediately.

The Action Plan calls for Canada to build on the success of immunization and screening programs already in place. Specifically, the Action Plan calls for steps to be taken now to improve HPV vaccination rates and introduce HPV primary screening to replace the Pap test. Evidence shows HPV tests are more effective than Pap tests in reducing the rate of cervical pre-cancers;¹⁹ introducing HPV primary screening quickly will save lives and have the greatest impact on Canada's ability to reach its 2040 target.^c Action to improve follow-up of abnormal screening results is also critical to begin to address current gaps in care.

Implementing the Action Plan will require the commitment and collaboration of key partners across the country that have the ability and responsibility to drive action. Success will depend on engaging a broad group of partners across the cancer and public health systems, as well as organizations working in women's health and equity. Work at the community level is essential and will require outreach to schools, community leaders and non-governmental organizations.

First Nations, Inuit and Métis governments, organizations and communities will provide valuable leadership to implement the Action Plan in a way that ensures equity for all people in Canada and advances the Peoples-specific actions identified by First Nations, Inuit and Métis. This includes working in partnership to collect First Nations-, Métis- and Inuit-specific data in accordance with OCAP[®] principles^d, OCAS^e principles and other Métis and Inuit research and data principles and guidelines.

If the targets set out in the Action Plan for HPV immunization, HPV primary screening and follow-up of abnormal screening results are achieved, Canada will eliminate cervical cancer by 2040.

^c Details are available in Appendix A – OncoSim Model.

^d OCAP[®] principles (ownership, control, access and possession) state that First Nations have control over data collection processes in their communities, and that First Nations own and control how this information is used (First Nations Information Governance Centre).

^e Métis OCAS principles (ownership, control, access and stewardship) are defined as follows: ownership refers to the legal possession of something; control refers to the power to make decisions about something and decide what should happen; access refers to the right or opportunity to use something that will bring benefits; and stewardship speaks to issues of responsible planning and management of resources and the responsibility to Métis to ensure that research that is completed is in their best interests, will result in positive changes in Métis health and health service delivery, and is done in as rigorous and ethical manner as possible (University of Manitoba. Framework for Research Engagement with First Nation, Metis, and Inuit Peoples).



Priorities



PRIORITY 1



Improve HPV immunization rates

Almost all cases of cervical cancer are caused by the human papillomavirus (HPV), a common sexually transmitted infection.²⁰ Effective HPV vaccines now exist, and immunization will play a major role in eliminating cervical cancer in Canada and worldwide.

Increasing vaccination rates

The HPV vaccine is most effective when it is given during the pre-adolescent years, prior to exposure to HPV.^{f,21} Publicly funded, school-based HPV immunization programs provide an equitable and effective means to reach young people,²² and are in place in all Canadian provinces and territories. These programs began in some provinces in 2007 (for girls only) and were in place in all provinces and territories by 2013, with boys included in all programs by 2017.²³

The majority of children receive the HPV vaccine between the ages of 9 and 13, depending on the jurisdiction. Most provinces and territories also extend the period of eligibility for the publicly funded vaccine until the completion of high school, and some extend it to adults, such as individuals at higher risk.²³

In school-based HPV immunization programs, two doses of the HPV vaccine are given, six months apart. Final-dose uptake rates in school-based HPV immunization programs vary considerably across provinces and territories, ranging from 57% to 91% for both girls and boys in the 2017/18 school year.^g Even within jurisdictions, uptake varies widely.²⁴ The Action Plan calls for efforts to increase the vaccination uptake in school-based programs across Canada using innovative education and program delivery strategies.

Addressing vaccine hesitancy

Despite the wide availability of HPV vaccination through schools, some parents choose to delay or refuse vaccination for their children. Known as vaccine hesitancy²⁵ this decision may be due to concerns about vaccine safety or effectiveness, or the result of cultural or social norms.^{26,27} Studies have shown that providing information and educating parents about vaccination can change attitudes and lead to increased vaccine uptake.^{27,28,29,30} The Action Plan calls for public education and community-based strategies to address vaccine hesitancy.

Identifying and addressing inequities

Efforts to improve immunization rates, particularly among underserved populations, are limited by a lack of standardized data. At the federal level, the Public Health Agency of Canada relies on immunization data collected through a survey distributed to parents every two years. Most provinces and territories have an immunization registry that includes data on HPV vaccination, but differences in how data is reported prevent comparisons across jurisdictions. Furthermore, very little data has been collected on the rates of HPV vaccination for specific populations based on ethnicity or socioeconomic status, or on the barriers to vaccination they experience. Data on HPV vaccination rates among First Nations, Inuit and Métis is also not readily available.

f In Canada, the National Advisory Committee on Immunization recommends HPV vaccination for individuals ages 9 to 26 years. The vaccine may also be given to people 27 years of age and older, dependent on risk.

g Unpublished data from Canadian Partnership Against Cancer. Cervical cancer screening in Canada: environmental scan, 2019. Data only available for girls and/or for the 2015/16 or 2016/17 school years in some jurisdictions.

“HPV immunization is a safe and effective public health measure for reducing the spread of HPV. One of the best things we can do for women’s health is to boost immunization rates to ensure the next generation of Canadian women are cervical cancer-free.”

Anne Pham-Huy, MD, Chair, Immunize Canada



The Action Plan calls for improved measurement and standardized reporting of vaccination coverage rates by school-based programs to identify inequities and help programs address them. It also calls for actions to ensure access to the vaccine for older students and youth who are not in school.

It is critical that strategies to increase HPV vaccination uptake and measurement among First Nations, Inuit and Métis children and youth are integrated into existing school and public health programs and developed in partnership with First Nations, Inuit and Métis governments, organizations and communities to ensure they are culturally appropriate and equitable.

HPV AND CERVICAL CANCER

Nearly all cases of cervical cancer are caused by the human papillomavirus (HPV), a common sexually transmitted infection.

There are over 100 types of HPV, but some are considered high risk and can cause cells to become abnormal and pre-cancerous. Without immunization, three out of four people in Canada will be infected with HPV at some point in their lives, and for most people the infections will disappear in a few years. Many people will not even know they have the infection. However, some infections do not disappear and can lead to cancer.²¹

HPV vaccination

HPV vaccines are now available, and vaccination is recommended for all children and youth before they become sexually active and are exposed to HPV. Boys are vaccinated to increase the number of people who are immune to HPV and because high-risk HPV types can also lead to other cancers, including anal, penile and head and neck cancers.²¹

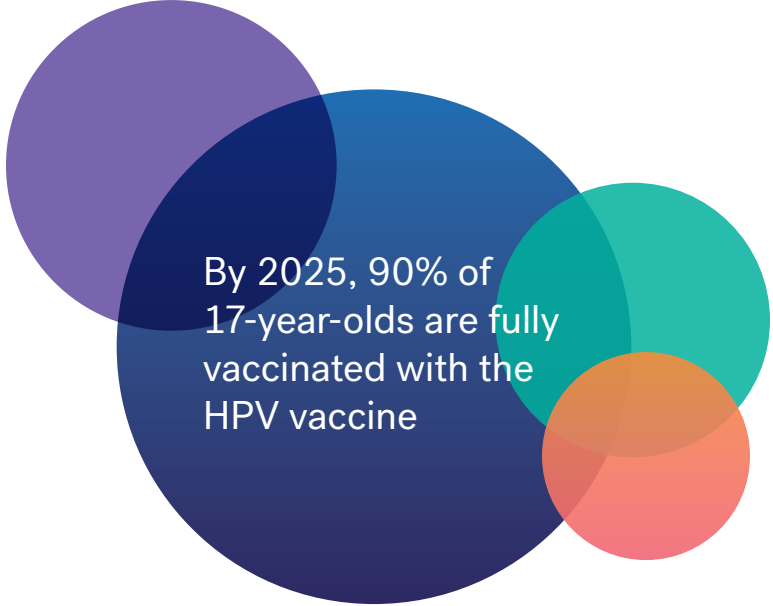
Screening for cervical cancer

Cervical screening with a Pap test, in which a sample of cells is taken from a person’s cervix, can detect pre-cancerous changes early when they are highly treatable.⁹ However, a test for HPV is now available, and screening for HPV in the cervix identifies the potential for disease at an earlier point than Pap testing and ultimately results in fewer cervical pre-cancers.^{19,31} HPV testing also allows self-sampling, in which someone collects their own sample from their vagina using a swab from a cervical screening kit. Self-sampling has the potential to significantly improve equity in cervical screening participation.

The Action Plan calls for the HPV test to replace the Pap test as the primary cervical screening tool.



PRIORITY 1



By 2025, 90% of
17-year-olds are fully
vaccinated with the
HPV vaccine

HPV IMMUNIZATION TARGET AND ACTIONS

By 2025

- **90% of 17-year-olds are fully vaccinated with the HPV vaccine**

The optimal period for vaccination is by age 13. However, the target aligns with the age for reporting adolescent vaccination rates established in the National Immunization Strategy and its implementation goal (2025).³² Adopting this target will allow Canada to reach the goal of eliminating cervical cancer by 2040.

ACTION 1: INCREASE AWARENESS AND ACCEPTABILITY OF THE HPV VACCINE

1.1 – Implement communications and education strategies for all Canadians

- Communicate widely about the availability, safety and efficacy of the HPV vaccine
- Educate health-care providers about the groups for whom the HPV vaccine is recommended
- Implement public education strategies that address vaccine hesitancy using high-quality evidence

ACTION 2: INCREASE VACCINATION UPTAKE IN SCHOOL-BASED HPV IMMUNIZATION PROGRAMS

2.1 – Implement innovative education and program delivery strategies in school-based programs

- Implement education and program delivery strategies that address vaccine hesitancy in school-based programs using high-quality evidence
- Collaborate with leaders from local communities to co-develop and implement innovative education and program delivery strategies to address vaccine hesitancy and participation barriers in school-based programs
- Establish channels to share and adapt best practices in education and program delivery strategies from school-based immunization programs that have high vaccination rates

2.2 – Create and promote additional opportunities for individuals to access HPV vaccination

- Offer the HPV vaccine in secondary school to individuals who missed receiving it in elementary/middle school
- Develop strategies to reach individuals, including youth not in school, with information about how they can access the publicly funded HPV vaccine outside the school-based program

ACTION 3: IMPROVE MEASUREMENT AND REPORTING OF VACCINATION COVERAGE RATES BY SCHOOL-BASED HPV IMMUNIZATION PROGRAMS TO IDENTIFY INEQUITIES AND INFORM PROGRAM IMPROVEMENTS

3.1 – Collect and report on standardized data from school-based HPV immunization programs

- Establish standardized measures for data collected in vaccine registries on HPV vaccination uptake rates, including stratification by relevant socio-demographic factors to inform inequities
- Publicly report on HPV vaccination coverage rates across all jurisdictions, including all doses, in comparison to national target

3.2 – Use data to inform improvements to school-based HPV immunization programs

- Establish performance measures to inform program improvements and determine if new programmatic approaches are effective in increasing vaccination rates
- Undertake program evaluation to understand how and why new programmatic approaches have or have not been effective in increasing vaccination rates

KEY IMPLEMENTATION PARTNERS

Successful implementation will require the collaborative effort of a wide range of partners, including the following:

- Public Health Agency of Canada and relevant pan-Canadian organizations/agencies (e.g., Statistics Canada, Canadian Institute for Health Information, Canada Health Infoway)
- Provincial/territorial ministries of health
- Provincial/territorial public health departments and/or agencies
- Regional/local public health departments
- First Nations, Inuit and Métis governments, organizations and communities
- Schools and school boards
- Health-care provider associations
- Parent groups and community leaders
- Immunization organizations (e.g., Immunize Canada)
- Non-governmental organizations working in cancer, health equity, women's health or youth outreach
- Researchers (e.g., Canadian Immunization Research Network)
- Canadian Partnership Against Cancer

PRIORITY 2



Implement HPV primary screening

Implementing HPV primary screening^h is critical to reach Canada’s target of eliminating cervical cancer by 2040, and making this change sooner will save lives.ⁱ Significant efforts must be made to accelerate this shift.

Implementing HPV Screening

The Pap test is the most widely used screening method to detect cervical pre-cancers and cancers and has led to a dramatic reduction in the incidence of cervical cancer in Canada since it was introduced in the 1960s.^{5,6,23}

However, HPV tests have now been developed that detect the presence of high-risk HPV types in cervical cells and have proven more effective than Pap tests in reducing rates of cervical pre-cancers.¹⁹ The Action Plan calls for the HPV test to replace the Pap test as the primary cervical screening tool in Canada.

The HPV test has several advantages over a Pap test. HPV testing identifies the potential for disease at an earlier point than Pap testing.^{19,31} The HPV test is also a more sensitive and objective test than the Pap test. While Pap tests require a cytopathologist to assess whether the cell sample shows pre-cancerous changes, HPV testing determines whether or not a high-risk HPV type is present in the cell sample.

HPV testing also allows for the possibility of self-sampling. Self-sampling tests allow people to collect their own sample in a comfortable setting and at a time they choose. For people who experience barriers to screening (including people who live in rural and remote settings, members of some cultural communities, LGBTQ2S+ individuals and First Nations, Inuit and Métis), self-sampling may help address issues related to privacy, confidentiality, accessibility of health care providers, and lack of comfort with the Pap test, which may be associated with trauma.^{33,34,35,36}

As with all cervical screening, HPV primary screening is best delivered through organized screening programs. Organized programs are critical to delivering high-quality screening and ensuring optimal participation across populations. They are also important to ensure appropriate roll-out and management of self-sampling. Organized screening programs have systems in place to ensure the right people are screened, individuals receive their results, abnormal screening results are followed up, participation rates are tracked and measured, and quality improvement is ongoing. Participation data also allows programs to develop tailored initiatives to reach underscreened populations.³⁷

^h HPV testing technology varies. In order to reach its elimination goal, Canada must adopt the oncogenic HPV 16/18 test, which identifies the two highest risk HPV types.

ⁱ Modelling using OncoSim, the Partnership’s microsimulation tool, indicates that if HPV testing (oncogenic HPV 16/18) is implemented by 2025, then by 2050, 6,810 cervical cancer cases will be avoided, and 1,750 lives will be saved. Details are available in Appendix A – OncoSim Model.

“I really hope that one day they can self-screen because then you’d have more people screening. If you could do it at home, it’s fast and easy.”

Sandra, cancer survivor





PRIORITY 2

Ensuring equity in cervical screening

The Canadian Task Force on Preventive Health Care (CTFPHC) recommends routine screening for cervical cancer every three years for women between the ages of 25 and 69.⁹ However, many people don't have regular access to cervical screening programs or don't participate due to barriers such as travel distances, language barriers or a lack of culturally safe care.^{38,39,40} In 2017, the average number of eligible^j individuals reporting at least one Pap test in the previous three years was approximately 80%, with lower screening rates in some groups (e.g., individuals with low-income, recent immigrants and LGBTQ2S+ individuals).^{10,41,42} For example, only 66% of individuals with low income and 62% of individuals who immigrated to Canada less than 10 years ago were up to date with cervical screening.¹⁰

Furthermore, while some studies show that cervical screening rates among First Nations, Inuit and Métis are similar to other people in Canada,^{43,44,45,46,47,48} few screening programs have been developed with attention to their priorities and needs. In addition, organized cervical screening programs do not exist in five provinces and territories,²³ reducing access to quality-driven screening and contributing to inequities for First Nations, Inuit and Métis and other residents. Peoples-specific and Peoples-led approaches have been developed at the community and regional level to improve equitable access to cervical screening in some of these jurisdictions. Partnerships between First Nations, Inuit and Métis governments, organizations and communities and the cancer system are required to strengthen and build on these approaches, which can also provide insights to improve quality across the cancer system.

The Action Plan calls for enhancement of existing screening efforts, creation of organized screening programs where they don't exist, and efforts to ensure equity in cervical screening access and participation. This work will also complement the introduction of HPV primary screening across the country.

Transitioning to HPV screening

While the 2013 guidelines on cervical screening from the CTFPHC made recommendations on what age group should be screened and how often,⁹ they did not consider the type of test that should be used. Since the guidelines were released, evidence has emerged in Canada and internationally that demonstrates the benefit of HPV screening. Several countries, including Australia, the United Kingdom and the Netherlands, have now introduced HPV testing as the primary screening method in their cervical screening programs. The CTFPHC is currently developing updated cervical screening guidelines.

The introduction of HPV primary screening in Canada will require significant planning and support, and will require health systems, governments and others across the country to collaborate to ensure a smooth transition.

The Action Plan calls for education for the public and health system on the safety and efficacy of HPV screening. It also calls for support for organized screening programs to help them address operational issues related to the transition, including changes to fee structures, laboratory protocols, reporting procedures and quality management programs.

New standardized data measures will also be required as HPV primary screening is implemented. The Action Plan calls for the collection, reporting and use of this data to drive improvements across cervical screening programs.

^j The Canadian Task Force on Preventive Health Care recommendations for cervical screening are for women with no symptoms of cervical cancer who are or have been sexually active, regardless of sexual orientation. They do not apply to women with symptoms of cervical cancer or previous abnormal results on screening (unless they have been cleared to resume normal screening), or those who do not have a cervix, are immunosuppressed or have limited life expectancy.



“Every woman in Canada who is screened for cervical cancer will benefit when we shift from Pap tests to HPV tests. HPV testing is a more accurate tool for detecting pre-cancerous lesions and when the result is negative, providing women with greater assurance that they will not develop pre-cancer in the next few years. This Action Plan is an important step towards Canada using new technologies such as HPV vaccine and HPV testing to eliminate cervical cancer and improve women’s health by 2040.”

Dr. Gina Ogilvie, Professor, Faculty of Medicine,
University of British Columbia

HPV PRIMARY SCREENING TARGET AND ACTIONS

By 2030

- **90% of eligible individuals have been screened with an HPV test**
- **90% of eligible individuals are up to date with cervical screening**
- **No less than 80% of eligible individuals in any identifiable group are up to date with cervical screening**

Achieving this target will allow Canada to reach the goal of eliminating cervical cancer by 2040. By setting a minimum participation rate of 80% within all groups, the target ensures equity for populations such as individuals in rural and remote areas, individuals with low income, recent immigrants, LGBTQ2S+ individuals and First Nations, Inuit and Métis.



PRIORITY 2

The Action Plan calls for enhancement of existing screening efforts, creation of organized screening programs where they don't exist, and efforts to ensure equity in cervical screening access and participation.

ACTION 1: IMPLEMENT HPV PRIMARY SCREENING WITHIN ORGANIZED SCREENING PROGRAMS ACROSS CANADA

1.1 – Support the implementation of HPV primary screening within organized screening programs

- Convene and work with groups across sectors to support the development of a business case for HPV primary screening
- Identify best practices from other jurisdictions that have implemented HPV primary screening and gather other information to support planning for the transition to HPV testing

1.2 – Implement/enhance organized cervical screening programs in all provinces and territories

- Support implementation of organized screening programs in jurisdictions where they do not exist, including promoting opportunities to learn and benefit from other jurisdictions that have organized cervical screening programs

1.3 – Develop evidence-based messaging to communicate the benefits of HPV primary screening

- Develop and disseminate evidence-based messaging for the public on the safety and efficacy of HPV primary screening
- Promote a smooth transition to HPV screening by educating clinicians and laboratory administrators on its value and providing education on managing the screening test

ACTION 2: ENSURE EQUITY IN CERVICAL SCREENING PARTICIPATION

2.1 – Implement evidence-based interventions to increase screening participation in underscreened groups

- Collaborate with underscreened groups to co-develop, adapt and implement appropriate interventions to facilitate screening participation
- Enhance cervical screening as a priority within comprehensive care and preventative health services

2.2 – Offer screening and supporting information to eligible individuals so that they can make an informed decision whether to participate

- Investigate effective screening recruitment strategies to maximize the probability of reaching every eligible individual
- Ensure that primary care providers are aware of cervical screening and have the necessary information to discuss screening with their patients to facilitate making a well-informed choice

ACTION 3: IMPLEMENT HPV SELF-SAMPLING IN CERVICAL SCREENING PROGRAMS

3.1 – Invest in the implementation of HPV self-sampling within organized cervical screening programs and implement the necessary processes and infrastructure

- Review lessons learned from other countries that have implemented HPV self-sampling (e.g., the Netherlands, Australia, the UK, Denmark) to inform planning activities in Canada
- Invest in the widespread implementation of HPV self-sampling within organized screening programs and the necessary system infrastructure, prioritizing rural and remote communities and those with other access barriers
- Learn from and assess how existing systems established in Canada can be leveraged to support HPV self-sampling for cervical screening

KEY IMPLEMENTATION PARTNERS

Successful implementation will require the collaborative effort of a wide range of partners, including the following:

- Federal health departments and relevant pan-Canadian organizations/agencies (e.g., Statistics Canada, Canadian Institute for Health Information, Canada Health Infoway)
- Canadian Task Force on Preventive Health Care
- Provincial/territorial ministries of health
- Provincial/territorial departments/agencies responsible for cancer care, including screening programs
- Provincial/territorial public health departments and/or agencies
- First Nations, Inuit and Métis governments, organizations and communities
- College of Family Physicians of Canada and other primary care provider associations
- Society of Obstetricians and Gynaecologists of Canada, Society of Gynecologic Oncology of Canada and other professional associations
- Laboratory administrators
- Cytopathologists and cytotechnologists
- Researchers
- Non-governmental organizations working in cancer, health equity or women's health
- Patient and family advisors
- Canadian Partnership Against Cancer

ACTION 4: COLLECT AND REPORT ON AGGREGATE DATA ON CERVICAL SCREENING AND USE DATA FOR PROGRAM IMPROVEMENT

4.1 – Collect standardized data and report on cervical screening programs

- Promote the collection and reporting of data on cervical screening program participation, screening results, underscreened groups and HPV vaccination status

4.2 – Use surveillance data to inform program improvement and share best practices with other cervical screening programs

- Promote opportunities to share knowledge about successes and lessons learned across cervical screening programs

PRIORITY 3



Improve follow-up of abnormal screening results

When cervical screening detects abnormal or pre-cancerous cells, timely and appropriate follow-up is critical to treat these pre-cancers and prevent the development of cervical cancer. Within existing cervical screening programs, there are opportunities to identify pre-cancers and cancers earlier to ensure referral to appropriate care. The introduction of HPV primary screening provides additional opportunities to review and improve systems for follow-up tests and care.

Developing standardized pathways

As Canada moves forward with HPV primary screening, standardized care pathways will be required to ensure that all individuals with an abnormal screening result (positive HPV test) receive clear information and appropriate follow-up.

Establishing standardized pathways will also help to address current inequities. For example, despite similar screening rates across Canada, the incidence rate for cervical cancer is higher in rural and remote areas compared to urban areas (8.5 per 100,000 women vs. 6.4 per 100,000 women^k).⁴⁹ Similarly, some studies show that although cervical screening rates among First Nations, Inuit and Métis are similar to other people in Canada,^{43,44,45,46,47,48} cervical cancer incidence rates are higher.^{11,12,13,14,17} These variations suggest not everyone with an abnormal screening result has the same access to timely and appropriate follow-up.

Standardized pathways also contribute to improved efficiency, an important consideration when access to colposcopy varies across the country and long wait times are common. Colposcopy is the primary follow-up test to confirm the presence of pre-cancerous and cancerous cells and determine appropriate care. In Canada, the most recent data available (2013) shows that individuals with a positive Pap test wait between five to nine months to receive a colposcopy, and 10% of individuals wait even longer.³⁷ As HPV primary screening is introduced, colposcopy volumes are expected to rise initially, given the test's ability to detect abnormalities at an earlier stage. However, over time and as immunization increases, these volumes will stabilize and drop below current levels.^{4,50,51}

The Action Plan calls for clear follow-up plans for those with positive HPV tests and timely access to colposcopy for those at higher risk.

^k Age-standardized to the world population.



By 2030, 90% of all individuals identified as being at elevated risk for significant cervical abnormalities have colposcopy in a timely manner

Providing equitable access to follow-up

The Action Plan also calls for action to ensure that groups that are currently underserved receive equitable access to follow-up services. In particular, steps must be taken to ensure coordinated, timely and appropriate follow-up closer to home for First Nations, Inuit and Métis and all people in Canada who must travel significant distances from their home and family to receive care. This will require the cancer system to work in partnership with First Nations, Inuit and Métis governments, organizations and communities to build on existing systems of care so that any new referral and care pathways are supportive, responsive and reflect the priorities of First Nations, Inuit and Métis.

Gathering data to improve quality

Across Canada, no standardized approach to collecting and monitoring data on follow-up care currently exists. As a result, information that could improve care is not readily available—for example, the number of people referred for colposcopy who receive the test and the number of people who are lost to follow-up altogether. The Action Plan calls for better measurement and reporting of follow-up services to help people complete follow-up, identify underserved groups and determine areas for quality and program improvement. This type of data collection and reporting will be easier to implement in organized screening programs, which have the necessary systems already in place.



PRIORITY 3

FOLLOW-UP OF ABNORMAL SCREENING RESULTS TARGET AND ACTIONS

By 2030,

- **90% of all individuals with an abnormal screening result (positive HPV test) should have a clear plan of appropriate follow-up designed and communicated to them within three months of the test that generated the positive result**
- **90% of all individuals identified as being at elevated risk for significant cervical abnormalities have colposcopy in a timely manner**
- **No less than 90% of individuals in any identifiable group receive follow-up**

Achieving this target will allow Canada to reach the goal of eliminating cervical cancer by 2040.

“From the time that I went to see my doctor, to doing some tests, figuring things out, waiting, and actually getting in to see a gynecologist, to deciding on what was going to happen, to having the hysterectomy...it was a year and a half. This was a very long process.”

Katherine, Cervical cancer survivor

ACTION 1: STANDARDIZE TIMELY AND APPROPRIATE FOLLOW-UP OF ABNORMAL SCREENING RESULTS (POSITIVE HPV TESTS)

1.1 – Develop, implement and evaluate standardized care pathways for timely and appropriate follow-up of positive HPV tests

- Develop evidence-based standardized care pathways for timely and appropriate follow-up of positive HPV tests
- Implement and evaluate standardized care pathways for timely and appropriate follow-up of positive HPV tests

1.2 – Operate information systems within organized screening programs to facilitate referral to timely and appropriate follow-up and identify those who have not completed follow-up

- Develop the core elements required to implement systems that facilitate referral to appropriate follow-up
- Implement and maintain systems to facilitate referral to timely and appropriate follow-up
- Investigate, implement and evaluate strategies to reach those who have not completed follow-up

1.3 – Educate patients and health-care providers to understand screening test results and appropriate follow-up

- Develop and implement evidence-based materials and technologies to assist health care providers to interpret screening test results for appropriate triage and management
- Build awareness with partners of their role in educating patients about the benefits of timely and appropriate follow-up when they have an abnormal screening result

“Timely follow-up is vital for women who have abnormal results when screened for cervical cancer. Unfortunately, inconsistency in follow up practices and lack of safeguards, can result in women slipping through the cracks. This needs to change. Systems must be put in place to give all women, regardless of who they are or where they live, the opportunity to understand their risks and seek appropriate care following an abnormal screening result. The time is right, and I believe Canada has the necessary people and skills to make these improvements that will contribute to eliminating cervical cancer in the next 20 years.”

Dr. Meg McLachlin, Program Head, Pathology at Western University

ACTION 2: PROVIDE EQUITABLE ACCESS TO, AND UPTAKE OF, FOLLOW-UP SERVICES FOR ABNORMAL SCREENING RESULTS

2.1 – Identify individuals who require extra support to access follow-up services for abnormal screening results

- Identify individuals in need of support to access follow-up services
- Collaborate with underserved groups to co-create solutions that facilitate access to follow-up for individuals living in remote areas or who are in need of extra support
- Implement solutions to enable individuals living in remote areas or in need of extra support to access follow-up
- Review lessons learned from other jurisdictions that have addressed the needs of underserved populations
- Adapt and/or develop, implement and evaluate services/ programs that address the needs of underserved individuals

ACTION 3: COLLECT AND REPORT AGGREGATE DATA ON PATIENT FOLLOW-UP AND USE IT TO INFORM PROGRAM IMPROVEMENT

3.1 – Establish, collect and report on core data components for colposcopy, pathology and treatment data

- Develop and implement core data elements for standardized collection and reporting of colposcopy, pathology and treatment data
- Enable pan-Canadian sharing of aggregate data on abnormal screen follow-up services and intervals to allow identification of best practices
- Support implementation of data-driven quality improvement initiatives to achieve cancer control goals

3.2 – Share data, evaluation approaches and best practices on follow-up for abnormal screening results to support quality improvement

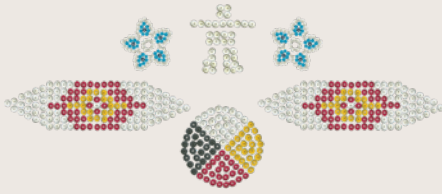
- Leverage evaluation approaches used in other countries to determine indicators that can be used in Canada to identify areas of success and opportunities for improvement
- Build local capacity to generate data and report on relevant indicators in order to share knowledge about best practices and lessons learned
- Cultivate a culture of quality improvement by implementing mechanisms that will promote learning and implementation of data-driven quality improvement initiatives



KEY IMPLEMENTATION PARTNERS

Successful implementation will require the collaborative effort of a wide range of partners, including the following:

- Federal health departments and relevant pan-Canadian organizations/agencies (e.g., Statistics Canada, Canadian Institute for Health Information, Canada Health Infoway)
- Provincial/territorial ministries of health
- Provincial/territorial departments/agencies responsible for cancer care, including screening programs
- Provincial/territorial public health departments and/or agencies
- First Nations, Inuit and Métis governments, organizations and communities
- Society of Obstetricians and Gynaecologists of Canada
- Society of Gynecologic Oncology of Canada
- College of Family Physicians of Canada and other primary care provider associations
- Laboratory administrators
- Cytopathologists and cytotechnologists
- Researchers
- Digital health organizations
- Non-governmental organizations working in cancer, health equity or women's health
- Patient and family advisors
- Canadian Foundation for Health Improvement
- Canadian Partnership Against Cancer



First Nations, Inuit and Métis priorities and Peoples-specific actions related to cervical cancer prevention and care

The Action Plan identifies priorities, targets and actions to improve HPV immunization, implement HPV primary screening and improve follow-up of abnormal screening results for everyone in Canada, including First Nations, Inuit and Métis. In addition, First Nations, Inuit and Métis partners identified the following Peoples-specific priorities and actions to address geographic barriers and the specific inequities First Nations, Inuit and Métis may experience as a result of historic and ongoing colonization.

It is important to note that First Nations, Inuit and Métis communities are already leading efforts to address these longstanding barriers and inequities and improve cervical cancer prevention and care. Peoples-specific programs and services are creating innovative, culturally appropriate solutions at the community level. These approaches offer insights that may help other communities experiencing inequities and all people receiving cancer services across Canada.

First Nations priorities and actions



PRIORITY 1

Culturally appropriate care closer to home

- Recognize and eliminate the impacts of racism within the health system
- Deliver culturally safe cervical cancer prevention and care¹
- Establish national guidelines to promote consistent cervical cancer care
- Provide health services closer to home and improve the journey for First Nations who must travel to access cervical cancer prevention and care
- Ensure consistency in access to publicly funded HPV immunization programs and services in on- and off-reserve schools
- Implement HPV primary screening, including self-sampling
- Identify First Nations community champions to deliver cervical cancer health education and health promotion

¹ “Cervical cancer prevention and care” refers to HPV immunization, cervical screening, follow-up of abnormal screening results, diagnosis, and treatment.

“In Canada, First Nations women are disproportionately impacted by cervical cancer. One reason is the impacts of historical trauma on First Nations women when participating in cervical cancer screening and clinical care. The Action Plan has shone a light on the need to deconstruct the current method in which we approach care for this type of cancer for First Nations women. By heralding innovative prevention practices and screening methods, such as self-screening for HPV, the Action Plan provides a path to culturally safe and trauma aware management of cervical cancer for First Nations women in all parts of the country.”

Dr. Unjali Malhotra, First Nations Health Authority, Medical Director, Women's Health



PRIORITY 2

Peoples-specific, self-determined cancer care

- Develop cervical cancer prevention and care strategies based on priorities identified by First Nations communities and disparities faced by First Nations
- Improve communication and coordination of health coverage for First Nations
- Use respectful gender and two-spirit inclusive language and inclusivity in cervical cancer prevention and care
- Acknowledge and respect traditional healing and cultural practices



PRIORITY 3

First Nations-governed research and data systems

- Identify First Nations-specific cervical cancer prevention and care data that is community-led and community-specific
- Ensure that cervical cancer prevention and care data collection respects OCAP® principles and communities' consent to data collection and sharing
- Increase First Nations access to health coverage data
- Create safe spaces for voluntary self-identification of First Nation status to collect First Nations-specific cervical cancer prevention and care data
- Use culturally appropriate standards for First Nations-specific cervical cancer prevention and care data collection, aggregation and linkages to other data sets

Inuit priorities and actions



PRIORITY 1

Culturally appropriate care closer to home

- Recognize and eliminate racism within the health system
- Deliver culturally safe cervical cancer prevention and care^m
- Establish national guidelines to promote consistent cervical cancer care
- Provide health services closer to home and improve the journey for Inuit who must travel to access cervical cancer prevention and care
- Implement primary HPV primary screening, including self-sampling

^m “Cervical cancer prevention and care” refers to HPV immunization, cervical screening, follow-up of abnormal screening results, diagnosis, and treatment.

“The Action Plan is important for Inuit women as it aims to strengthen education on vaccination and organized screening for cervical cancer. Inuit across Canada and urban Inuit in Ottawa need to know what cervical cancer is, what causes it and that it that can be prevented through screening and vaccines. This will play a big role in reducing rates of the disease for those in our communities and Inuit in other parts of the country.”

Malaya Zehr, Manager, Employment Services and Research, Tungasuvvingat Inuit



PRIORITY 2

Peoples-specific, self-determined cancer care

- Implement Inuit-specific and equitable approaches to cervical cancer prevention and care, based on priorities identified by Inuit
- Improve communication and coordination of health coverage for Inuit and service providers
- Use respectful gender-inclusive language and inclusivity in cervical cancer prevention and care



PRIORITY 3

Inuit-governed research and data systems

- Collect Inuit-specific cervical cancer prevention and care data that is accessible and linked to local communities and is in accordance with Inuit research and data principles (including data on school-based HPV immunization uptake, cervical screening participation, screening results, HPV immunization status, and colposcopy, pathology and treatment)
- Improve systematic qualitative and quantitative data collection practices for gathering Inuit-specific cervical cancer prevention and care data
- Conduct Inuit-led research to support effective interventions to prevent, screen and treat cervical cancer

Métis priorities and actions



PRIORITY 1

Culturally appropriate care closer to home

- Recognize and eliminate racism within the health system
- Deliver culturally safe cervical cancer prevention and careⁿ
- Establish national guidelines to promote consistent cervical cancer care
- Provide more health services closer to home and improve the journey for Métis who must travel to access cervical cancer prevention and care
- Implement primary HPV primary screening, including self-sampling
- Métis deliver cervical cancer prevention, screening and treatment programs and services for Métis

ⁿ “Cervical cancer prevention and care” refers to HPV immunization, cervical screening, follow-up of abnormal screening results, diagnosis, and treatment.



PRIORITY 2

Peoples-specific, self-determined cancer care

- Implement Métis-specific and equitable approaches to cervical cancer prevention and care, based on priorities identified by Métis people
- Identify, implement and coordinate Métis-specific health benefits
- Use respectful gender-inclusive language and inclusivity in cervical cancer prevention and care



PRIORITY 3

Métis-governed research and data systems

- Collect Métis-specific cervical cancer prevention and care data that is accessible and linked to other data sets, and is in accordance with Métis research and data principles (such as OCAS principles)
- Create safe spaces for self-identification to effectively collect Métis-specific cervical cancer prevention and care data
- Use existing structures for Métis-specific cervical cancer prevention and care data collection



Accelerating impact

Canada has made great strides in reducing the rates of cervical cancer. But with focused action, the most important milestone can be reached. Cervical cancer can be eliminated.

The creation of the Action Plan for the Elimination of Cervical Cancer in Canada, 2020–2030 and the collaborative implementation efforts now underway position Canada as a world leader in the movement to eliminate this disease. The Canadian Partnership Against Cancer is working with partners across the country to drive this work forward.

The priorities are clear.

Moving quickly to implement HPV primary screening is critical if Canada is to reach the goal of eliminating cervical cancer by 2040. Immediate action must be taken to ensure timely and appropriate follow-up for individuals with abnormal screening results. HPV vaccination rates across the country must improve. First Nations, Inuit and Métis governments, organizations and communities will provide valuable leadership to advance the Action Plan and the Peoples-specific actions identified by First Nations, Inuit and Métis.

Furthermore, all of these efforts must focus on improving equity. Canada will reach its goal only if all people in Canada have equitable access to the highest quality cervical cancer prevention and care, no matter who they are or where they live.

The Partnership, together with its partners, is committed to taking action and measuring our progress in the years ahead. Through these efforts, Canada will reach its goal to eliminate cervical cancer—for today's children and all future generations.

APPENDIX A

ONCOSIM MODEL – ELIMINATION OF CERVICAL CANCER IN CANADA

INTRODUCTION

In 2018, the World Health Organization (WHO) called on countries around the world to take action to eliminate cervical cancer worldwide within the century. As a member of the Union for International Cancer Control (UICC), the Partnership is acting and leading the efforts to make Canada a global leader in this worldwide movement. The goal: to eliminate cervical cancer in Canada by 2040. In order to achieve this, the targets are as follows:

- By 2025, 90 per cent of individuals are fully vaccinated with the HPV vaccine by age 17 years.
- By 2030, 90 per cent of eligible individuals have been screened with an HPV test; 90 per cent of eligible individuals are up-to-date with cervical screening; and no less than 80 per cent of eligible individuals in any identifiable group are up-to-date with cervical screening.
- By 2030, 90 per cent of all individuals with a positive HPV test should have a clear plan of appropriate follow-up designed and communicated to them within three months of the test that generated the positive result; 90 per cent of all individuals identified as being at elevated risk for significant cervical abnormalities have colposcopy in a timely manner; and no less than 90 per cent of individuals in any identifiable group receive follow-up.

OBJECTIVES

The OncoSim microsimulation model was used to project the potential health impact of reaching the cervical cancer elimination targets in Canada by 2040 (less than 4 per 100,000, standardized to the world population), with implementation of coordinated HPV vaccination programs, HPV vaccination catch-up programs, and cervical cancer screening programs using HPV testing. It also helped to understand which of these strategies should be prioritized to achieve the goal. This analysis was conducted using OncoSim-Cervix version 3.3.4.0 and HPVMM version 1.9.1.0

SCOPE OF ANALYSIS

Primary objective:

- To assess the likelihood of meeting the 2040 goal to eliminate cervical cancer (less than 4/100,000, crude) in Canada with the implementation of coordinated HPV vaccination programs, HPV vaccination catch-up programs, and cervical cancer screening programs using HPV testing.

METHODS

OncoSim model

The OncoSim model, led and supported by the Canadian Partnership Against Cancer, with model development by Statistics Canada through funding from Health Canada, was designed to evaluate the impact of cancer care policy changes in the Canadian system.⁵² It is a free, web-based simulation tool that combines real-world data and the best available evidence to project the anticipated costs and health benefits of various prevention, screening and treatment interventions. OncoSim also projects attributable risk factors, such as smoking, environmental exposures and physical activity. It currently models four cancer sites (breast, colorectal, lung, and cervical) and related screening programs in detail, and provides high-level projections for 28 other cancer sites.

OncoSim-Cervix

The OncoSim HPV/Cervical cancer model consists of two complementary components: Human Papillomavirus Microsimulation Model (OncoSim-HPVMM) and Cervix Model (OncoSim-Cervix). The sub models are described in detail with calibration and evaluation results by Miller et al.⁵³

- The *OncoSim-HPVMM* component is an interacting agent model that simulates HPV transmission through sexual contact networks. Data from OncoSim-HPVMM are used as inputs into OncoSim-Cervix, including HPV incidence rates under various vaccination strategies. OncoSim-HPVMM was developed based on a published model by Van de Velde et al.⁵⁴

- The *OncoSim-Cervix* model simulates the natural history from HPV infection to cervical intraepithelial neoplasia to cancer, as well as infection to anogenital warts in women. It also simulates screening, treatment, progression, and case-fatality.

The model simulates human papillomavirus (HPV) infection and cervical cancer progression in two steps: First, it simulates infectious disease spread of HPV through sexual interactions and detailed HPV vaccination strategies using an interactive-agent model. Next, detailed HPV infection rates from the interactive-agent model are entered into a Monte-Carlo microsimulation model, which simulates the pathway from HPV infection to the onset of cervical cancer among infected individuals and subsequent disease progression.

The model includes a historical overview of cervical cancer screening in Canada and a default future screening scenario. To compare screening strategies, users can specify the eligibility criteria for screening, modality of screening (e.g. cytology vs. HPV test), participation and compliance rates, vaccination status, the frequency of screening, the effectiveness of screening, follow-up protocols, pre-cancers and wart treatments, and healthcare costs.

Six HPV serotype categories are currently modelled: 6, 11, 16, 18, “other non-carcinogenic”, and “other carcinogenic”. It includes three types of vaccines (bivalent, quadrivalent and nonavalent). To compare vaccination strategies, users can specify the vaccination program characteristics, such as target age, sex, program years, participation rate, vaccine type, vaccine efficacy, duration of protection, previous vaccination status in target population, and vaccination costs.

The model was built using Canadian data, whenever available, from a wide range of sources including Canadian vital statistics, community health surveys, cancer registries, screening program databases, administrative databases, and peer-reviewed literature^{55, 56}. The input which is mostly data based was supplemented with expert opinion when necessary. Users can change the model input to answer specific policy questions.

OncoSim-Cervical simulates disease progression and remission using the observed cervical cancer incidence rates and stage distribution in the Canadian Cancer Registry. The model assumes that individuals with cervical cancer have a lower health-related quality of life than the general population; health-related quality of life varies by stage and declines further during treatment. The health utility index (HUI) is used as weights for quality of life. The model includes health care costs associated with cervical cancer from the perspective of the public payer: physician visits, laboratory services, hospitalization, chemotherapy, radiotherapy, and drugs. The default treatment costs were estimated through a costing exercise by a pan-Canadian oncology expert panel. Users can modify costs to reflect treatment patterns and costs in specific jurisdictions.

The model projects outcomes, such as life-years and health care costs, at the provincial/ territorial- and national-level. Examples of outputs related to cervical cancer screening include the number of cervical cancer screens, the number of invasive follow-up tests (e.g. biopsies), and costs associated with screening and follow-up. Using *OncoSim-Cervical*, users can estimate the economic burden of cervical cancer and the impact of interventions on cervical cancer-related outcomes.

The model has been applied to compare cervical cancer screening and HPV vaccination strategies.^{57, 58, 59, 60} Please refer to <https://www.partnershipagainstcancer.ca/tools/oncosim/related-resources/> for the details on the publications.

SCENARIOS

For this analysis, 4 scenarios were considered:

Scenario 1

Status Quo: Primary Pap test with current HPV vaccination rates

Scenario 2

Target scenario: HPV primary screening followed-up by cytology for any positive HPV test result, with improved HPV vaccination rates and catch-up programs

Scenario 3

Pap primary screening with HPV triage, with improved HPV vaccination rates and catch-up programs

Scenario 4

Oncogenic HPV screening with partial genotyping, with improved HPV vaccination rates and catch-up programs

Details for input parameters are provided in the following tables:

- Table I. Screening program
- Table II. Vaccination program
- Table III. Additional inputs

I. INPUT TABLE FOR BASE CASE COMPARISON (SCREENING PROGRAMS)

SCENARIO INPUTS	SCREENING MODALITY PLAN			
	1. Status quo	2. Primary HPV with Pap follow-up	3. Primary Pap with HPV triage	4. Oncogenic HPV 16/18
Primary screening tool	Pap test	HPV test	Pap test	HPV test
Age start	21	25	25	25
Age end	69	69	69	69
Participation	76.6%	90%	90%	90%
Years to next screen	3	5	3	5

II. INPUT TABLE FOR BASE CASE COMPARISON (VACCINATION PROGRAMS)

SCENARIO INPUTS	VACCINATION MODALITY PLAN			
	1. Status quo	2. Primary HPV with Pap follow-up	3. Primary Pap with HPV triage	4. Oncogenic HPV 16/18
Age	12			
Sex	Male and female			
Deployment year	2007 - onwards			
Vaccine type	Quadrivalent Vaccine (Until 2017); Nonavalent Vaccine (2018 Onward)			
Vaccine cost	\$333 / 2-dose schedule			
Vaccine dosage	2 doses			
Vaccination coverage	70%	Increase to 90% (by 2025)		
Proportion protected	100%			
Degree of protection	100% efficacy, no waning			
Catch-up program	No catch-up program	50% of 15-26-year-old caught up by 2025		

III. ADDITIONAL INPUTS

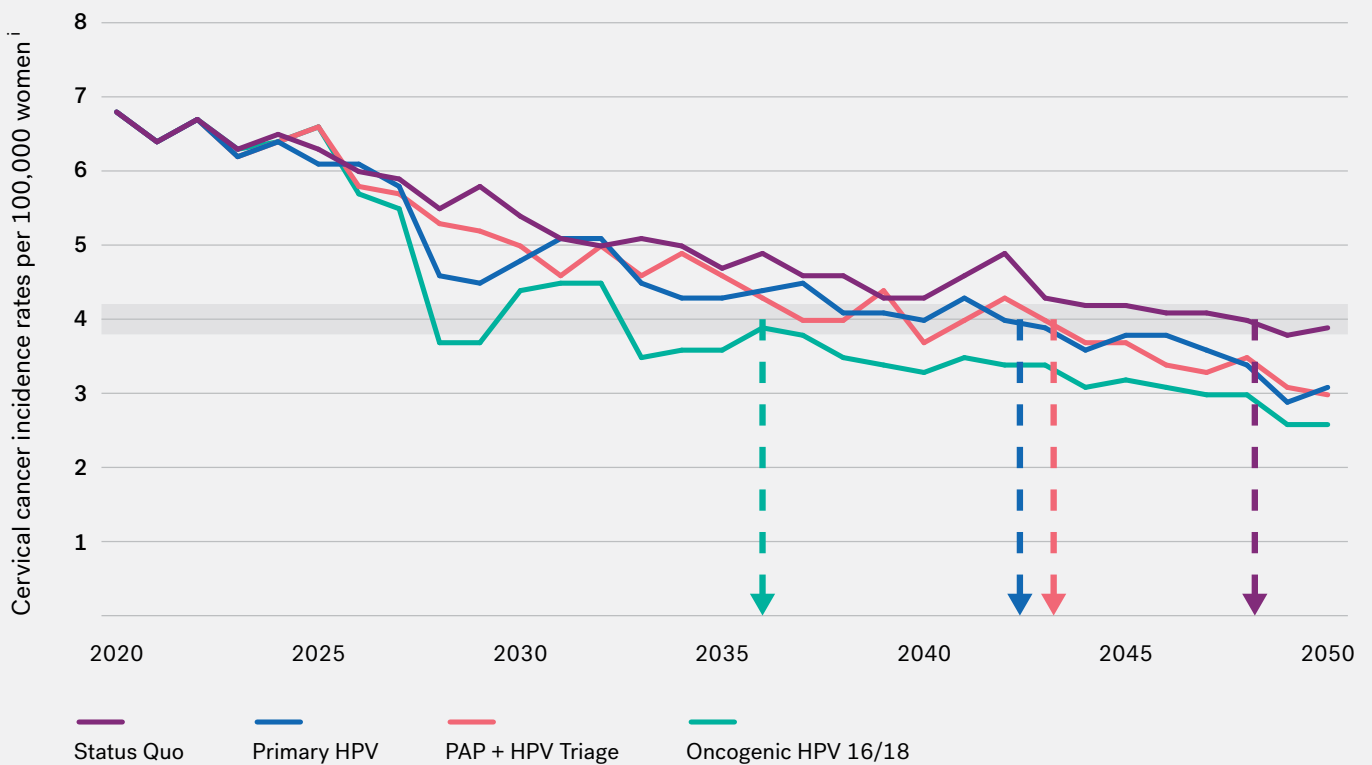
SCREENING PROGRAM SET-UP	
Historic screening	As defined in the base case, from 2008-2019
New screening regimen start	2020
Follow-up compliance	94.8%
Model version	OncoSim 3.3.4.0 - HPVMM 1.9.1.0
Screening year range	2020-9999
Screening age range	21 or 25-69
Definition of cohort/population	Population-based analysis

RESULTS

The results (graph 1) show that if Canada achieves the following targets: Vaccination participation reaches 90% by 2025 (PHAC target); screening participation reaches 90% by 2030 (CPAC target); and a switch from Pap testing to a new modality (e.g. HPV test) occurs in 2025 (mid-way point), then:

- Elimination can be reached by 2040
- The oncogenic HPV 16/18 test would help us to reach elimination even sooner
- Comparing oncogenic and status quo, by 2050, 6,810 cervical cancer cases will be avoided, and 1,750 lives will be saved

GRAPH 1: WHEN CAN CANADA ELIMINATE CERVICAL CANCER?



i. Age-standardized to world population

APPENDIX B

MEMBERS OF THE ELIMINATION OF CERVICAL CANCER ADVISORY COMMITTEE AND WORKING GROUPS

NAME	TITLE	MEMBERSHIP
Dr. James Bentley	President, Society of Gynecologic Oncology of Canada	Elimination of Cervical Cancer in Canada Advisory Committee Abnormal Screen Follow-up Working Group
Dr. Jennifer Blake	Chief Executive Officer, Society of Obstetricians and Gynaecologists of Canada	Elimination of Cervical Cancer in Canada Advisory Committee
Dr. Heather Bryant	Senior Scientific Lead, Canadian Partnership Against Cancer	Elimination of Cervical Cancer in Canada Advisory Committee
Lucie Marisa Bucci	Senior Manager, Immunize Canada	Elimination of Cervical Cancer in Canada Advisory Committee
Dr. Meena Dawar	Medical Health Officer, Vancouver Coastal Health Authority	HPV Immunization Working Group
Dr. Kathleen Decker	Chair, Pan-Canadian Cervical Screening Network, Canadian Partnership Against Cancer; Scientist, Research Institute in Oncology and Hematology, CancerCare Manitoba	Elimination of Cervical Cancer in Canada Advisory Committee HPV Screening Working Group
Dr. Shelley Deeks	Chief Health Protection Officer, Public Health Ontario	HPV Immunization Working Group
Dr. Lisa Del Giudice	Family Physician, Sunnybrook Health Sciences Centre; Regional Primary Care Lead, Cancer Care Ontario	Abnormal Screen Follow-up Working Group
Dr. Eileen de Villa	Medical Officer of Health, Toronto Public Health	Elimination of Cervical Cancer in Canada Advisory Committee
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