

# To eliminate cervical cancer in Canada, nationwide funding of self-sampling for human papillomavirus is needed

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■ Cite as: *CMAJ* 2024 June 3;196:E729-30. doi: 10.1503/cmaj.240722

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Cervical cancer is almost entirely preventable and is curable if detected early. In related research, Pataky and colleagues model strategies for the elimination of cervical cancer in British Columbia and find that the greatest gains would come from increasing self-sampling uptake among underscreened populations.<sup>1</sup> Increasing uptake in hard-to-reach populations could be achieved by reducing barriers to accessing self-testing, or self-sampling. Guidelines from the World Health Organization published in 2022 recommend that self-sampling for human papillomavirus (HPV) be included in cervical cancer screening.<sup>2</sup> The Canadian Partnership Against Cancer's 2019 action plan to eliminate cervical cancer in Canada stated this as an immediate goal.<sup>3</sup> British Columbia has led Canadian jurisdictions by integrating self-sampling as an option in its screening program as of January 2024. That cervical cancer accounts for 1.3% of all new female cancers and 1.1% of all female cancer deaths in Canada, yet is preventable, should prompt all health systems in Canada to fund self-sampling without delay.<sup>4</sup>

Although its incidence is relatively low, cervical cancer predominantly affects young people and contributes disproportionately to years of life lost to cancer.<sup>5</sup> Moreover, the incidence of cervical cancer has been rising in Canada and the United States, with diagnoses being made both in younger age groups and at later stages of disease.<sup>6,7</sup> Invasive cervical cancer disproportionately affects equity-seeking populations. Yet, those most at risk are the least likely to be screened, including 2SLGBTQI+ people, immigrants, those with a disability, Black and Indigenous people, and victims of sexual trauma.<sup>8-10</sup> It is the most common cancer among females living with HIV.<sup>11</sup>

Programs of HPV vaccination alone will not eradicate cervical cancer in the foreseeable future. Even if coverage and efficacy were 100%, the earliest vaccinated cohorts will not reach the average age of cervical cancer diagnosis for many years; uptake of HPV vaccination remains suboptimal, with most recent available data across Canadian jurisdictions (for school year 2017/18) demonstrating vaccine coverage of 57.1%–91.3% for girls and 57.5–91.3% for boys.<sup>11</sup>

Canada has been slow to move from traditional cytology (Pap smear) to universal HPV testing as first-line screening to support earlier detection of cervical cancer and lower the rate of invasive cervical cancer, despite implementation in countries with comparable health systems such as the United Kingdom, Australia, and the Netherlands.<sup>12-14</sup> Human papillomavirus testing for cervical intraepithelial neoplasia (CIN) grade 2 or 3 offers a sensitivity of 94.6% (95% confidence interval [CI] 84.2%–100.0%) compared with 55.4% (95% CI 33.6%–77.2%) for cytology.<sup>15</sup>

Human papillomavirus self-sampling can raise rates of screening by addressing privacy, convenience, avoidance of an invasive exam, cultural concerns, and the need to travel.<sup>16</sup> A vaginal swab is taken by the patient in the setting of their choice and returned by mail, similar to integrated programs for colon cancer screening. Human papillomavirus self-sampling may therefore increase reach among those most at risk for invasive cervical cancer: the underscreened and never-screened.

Accumulating evidence shows that self-collected samples analyzed by high-sensitivity polymerase chain reaction assay are as sensitive as physician-collected samples. A meta-analysis of 56 studies comparing self-sampling with clinician-based screening found the relative sensitivities of self-sampling were 0.96 (95% CI 0.90–1.03) and 0.99 (95% CI 0.91–1.08) for CIN 2+ and CIN 3+, respectively, and relative specificities were 1.00 (95% CI 0.99–1.01) and 1.00 (95% CI 0.99–1.01), respectively.<sup>17</sup>

Mailed HPV self-screening kits have been shown to be both acceptable and feasible and to increase sampling rates, particularly among underserved groups in Canada, including insecurely housed or otherwise marginalized women, people in rural communities, and people in Indigenous communities.<sup>18-20</sup> In the BC pilot program, never- and underscreened participants who were offered self-sampling returned samples 26% of the time.<sup>3</sup> A pilot study among underscreened patients in Manitoba showed significantly higher participation when patients were offered the option of self-sampling, compared with when they were not.<sup>18</sup> Australia implemented universal HPV self-sampling as an option

in July 2022, and early data have shown that 1 in 3 first-time screeners and 40% of overdue screeners chose self-collection, and an increase in sampling rates was observed in remote regions and among people identified as First Nations.<sup>21</sup>

Self-sampling is cost-effective compared with physician-collected samples. In Sweden, self-sampling for HPV led to 1633 more screened women and 107 more histologically diagnosed with CIN2+ at a substantially lower cost than with midwife-collected Pap smears.<sup>22</sup> An economic analysis of mailed self-sampling kits in the US among women enrolled in a health plan found that using kits was markedly less expensive than physician visits.<sup>23</sup>

If Canada is to eliminate cervical cancer, which is entirely possible, every health system across the country should integrate self-sampling into their cervical cancer screening program.

## References

- Pataky RE, Izadi-Najafabadi S, Smith LW, et al. Strategies to accelerate the elimination of cervical cancer in British Columbia, Canada: a modelling study. *CMAJ* 2024;196:E716-23.
- WHO guideline on self-care interventions for health and well-being. Geneva: World Health Organization (WHO); 2022:1-149. Available: [https://files.magicapp.org/guideline/411b5969-8716-4e88-99ae-7ee0be1416eb/published\\_guideline\\_5512-3\\_0.pdf](https://files.magicapp.org/guideline/411b5969-8716-4e88-99ae-7ee0be1416eb/published_guideline_5512-3_0.pdf) (accessed 2024 Apr. 30).
- Action plan for the elimination of cervical cancer in Canada 2020-2030. Toronto: Canadian Partnership Against Cancer; 2020:1-50. Available: <https://www.partnershipagainstcancer.ca/topics/elimination-cervical-cancer-action-plan/> (accessed 2024 May 15).
- Canadian Cancer Statistics 2023. Toronto: Canadian Cancer Society; 2023:1-104. Available: [https://cdn.cancer.ca/-/media/files/research/cancer-statistics/2023-statistics/2023\\_PDF\\_EN.pdf](https://cdn.cancer.ca/-/media/files/research/cancer-statistics/2023-statistics/2023_PDF_EN.pdf) (accessed 2024 May 15).
- Table 13-10-0392-01: Deaths and age-specific mortality rates, by selected grouped causes. Ottawa: Statistics Canada. Available: <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039201> (accessed 2024 May 13).
- Raveinthiranathan N, Simkin J, Donken R, et al. Age-specific trends of invasive cervical cancer incidence in British Columbia, Canada, 1971-2017. *Curr Oncol* 2023;30:7692-705.
- Francoeur AA, Liao C-I, Caesar MA, et al. The increasing incidence of stage IV cervical cancer in the USA: What factors are related? [published erratum in *Int J Gynecol Cancer* 2022;32:1635, *Int J Gynecol Cancer* 2023;33:317-8] *Int J Gynecol Cancer* 2022;32:1115-22.
- Andiwijaya FR, Davey C, Bessame K, et al. Disability and participation in breast and cervical cancer screening: a systematic review and meta-analysis. *Int J Environ Res Public Health* 2022;19:9465. doi:10.3390/ijerph19159465.
- Hutchinson P, Tobin P, Muirhead A, et al. Closing the gaps in cancer screening with First Nations, Inuit and Métis populations: a narrative literature review. *J Indig Wellbeing* 2018;3:3-17.
- Farley M, Golding JM, Minkoff JR. Is a history of trauma associated with a reduced likelihood of cervical cancer screening? *J Fam Pract* 2002;51:827-31.
- HPV immunization for the prevention of cervical cancer. Toronto: Canadian Partnership Against Cancer; 2021:1-38. Available: <https://s22457.pcdn.co/wp-content/uploads/2021/04/HPV-immunization-prevention-cervical-cancer-EN.pdf> (accessed 2024 May 15).
- Global strategy to accelerate the elimination of cervical cancer as a public health problem. Geneva: World Health Organization; 2020. Available: <https://www.who.int/publications/i/item/9789240014107> (accessed 2024 Jan. 19).
- Maver PJ, Poljak M. Primary HPV-based cervical cancer screening in Europe: implementation status, challenges, and future plans. *Clin Microbiol Infect* 2020;26:579-83.
- Melnikow J, Henderson JT, Burda BU, et al. Screening for cervical cancer with high-risk human papillomavirus sampling: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA* 2018;320:687-705.
- Mayrand MH, Duarte-Franco E, Rodrigues I, et al.; Canadian Cervical Cancer Screening Trial Study Group. Human papillomavirus DNA versus Papanicolaou screening tests for cervical cancer. *N Engl J Med* 2007;357:1579-88.
- Parker SL, Amboree TL, Bulsara S, et al. Self-sampling for human papillomavirus sampling: acceptability in a U.S. safety net health system. *Am J Prev Med* 2024;66:540-7.
- Polman NJ, Ebisch RMF, Heideman DAM, et al. Performance of human papillomavirus sampling on self-collected versus clinician-collected samples for the detection of cervical intraepithelial neoplasia of grade 2 or worse: a randomised, paired screen-positive, non-inferiority trial. *Lancet Oncol* 2019;20:229-38.
- Jalili F, O'Connell C, Templeton K, et al. Assessing the impact of mailing self-sampling kits for human papillomavirus sampling to unscreened non-responder women in Manitoba. *Curr Oncol* 2019;26:167-72.
- Ogilvie G, Krajden M, Maginley J, et al. Feasibility of self-collection of specimens for human papillomavirus sampling in hard-to-reach women. *CMAJ* 2007;177:480-3.
- Zehbe I, Moeller H, Severini A, et al. Feasibility of self-sampling and human papillomavirus sampling for cervical cancer screening in First Nation women from Northwest Ontario, Canada: a pilot study. *BMJ Open* 2011;1:e000030. doi:10.1136/bmjopen-2010-000030.
- Women opting for self-screening of cervical cancer, new data released [news release]. North Ryde (AU); 2024 Mar. 5. Available: <https://www.hospitalhealth.com.au/content/clinical-services/news/women-opting-for-self-screening-of-cervical-cancer-new-data-released-722814767> (accessed 2024 May 15).
- Aarnio R, Östensson E, Olovsson M, et al. Cost-effectiveness analysis of repeated self-sampling for HPV sampling in primary cervical screening: a randomized study. *BMC Cancer* 2020;20:645.
- Meenan RT, Troja C, Buist DSM, et al. Economic evaluation of mailed home-based human papillomavirus self-sampling kits for cervical cancer screening. *JAMA Netw Open* 2023;6:e234052. doi:10.1001/jamanetworkopen.2023.4052.

**Competing interests:** [www.cmaj.ca/staff](http://www.cmaj.ca/staff) (Charlebois). Sarah Kean reports travel and accommodation support from the Society for Gynecologic Oncology of Canada for speaking at continuing professional development meetings.

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