INBRIEF | Summarizing the Evidence

Human Papillomavirus Testing for Primary Cervical Cancer Screening

Key Messages

- Human papillomavirus (HPV) is the major risk factor for the development of cervical cancer; HPV testing directly detects the presence of the virus.
- The CADTH review found that HPV tests are better at detecting cancer precursors than cytology but less effective at identifying those who may not have cancer despite having HPV. Screening with HPV tests is also associated with increased referral to colposcopy compared with cytology.
- The economic evaluation found that switching the primary test from cytology to HPV testing and decreasing the screening frequency decreases the overall cost of cervical cancer screening in Canada with limited harms in terms of lifetime risk of developing cervical cancer.
- Screening involves balancing the benefits of disease detection with the harms and burdens of screening participation, including false-positives and overdiagnosis.
- A switch to HPV testing would be a large operational and cultural shift for clinicians, patients, and laboratories. Successful implementation would require appropriate planning, funding, and coordination.

Context

In 2017, it is estimated that there were 1,550 cervical cancer cases diagnosed and 380 deaths in Canada. However, the incidence of cervical cancer has been decreasing in the past three decades, largely due to routine screening with cytology testing.

The screening programs and approaches that have been adopted in Canada vary by province and all are currently based on cytology screening. Existing guidelines recommend that cervical cancer screening with cytology (commonly referred to as the "Pap test") be done every two to three years, starting at age 21 through to ages 65 to 70, depending on the jurisdiction.

Human papillomavirus (HPV) is the major risk factor for the development of cervical cancer, with 99% of cervical cancers being associated with the virus. HPV can be detected with diagnostic tests that identify the presence of the virus. To date, no Canadian jurisdiction has implemented routine HPV-based screening for cervical cancer, although a few are working toward it.

Technology

Cervical cytology involves the collection of cells from the surface of the cervix, which are then visually examined for abnormalities — the presence of which requires further testing to confirm whether the abnormal cells are cancerous.

HPV tests, on the other hand, detect the presence of HPV DNA or ribonucleic acid — RNA — in a sample of cervical cells and can indicate whether high-risk (cancer-causing) strains of the virus are present in the sample. Unlike cytology testing for which samples are collected solely by a health care provider, HPV-based tests can be collected either by a clinician or by the screening participants themselves.

HPV-based screening is expected to offer certain benefits over cytology, such as higher test sensitivity, the potential for increasing the time interval between screening visits, and the potential to initiate screening at an older age. However, while HPV tests are more sensitive at detecting the presence of the virus, they are also less specific and referrals to colposcopy may be more frequent when compared with cytology.

Issue

Currently, all Canadian provinces and territories provide access to cervical cancer screening with cytology, either at the patient's request or through organized screening programs. However, in view of the potential benefits of HPV-based screening, some experts and stakeholders have called for HPV testing to be used in Canada as the primary screening tool. A review of the evidence will help inform decision-making regarding whether HPV testing should replace cervical cytology in Canadian jurisdictions as the primary screening tool.

CADTH

Methods

CADTH undertook a Health Technology Assessment (HTA) to assess the clinical effectiveness and cost-effectiveness of HPV-based versus cytology-based testing for asymptomatic cervical cancer screening. A review of the evidence on patients' perspectives and experiences, ethical issues, and implementation issues was also included. Based on the evidence presented in the HTA, the Health Technology Expert Review Panel developed recommendations for Canadian decision-makers regarding screening programs for primary cervical cancer screening.

Results

A systematic review of the clinical evidence found consistent evidence that HPV-based tests were more sensitive and less specific than cytology-based tests, although there were few long-term clinical studies. The economic evaluation projected the lifetime cost and clinical impact of screening and found that changing the primary screening test from cytology to HPV testing and decreasing the screening frequency could decrease the cost of cervical cancer screening in Canada with limited harm in terms of the risk of developing cervical cancer.

The HTA also included a review of ethical and legal issues. Any potential screening harm such as increased colposcopy referrals, increased false-positives, and the burden of sexually transmitted infections — STI — findings should be weighed and justified when considering a switch in screening test. The balance of harms and benefits also depends on patients and providers following guidelines intended to delay screening start and extending the interval between screenings.

Some of the strongest patient preferences would not be affected by a change in screening modality from cytology to HPV testing — both require an invasive procedure to collect a cell sample. Therefore, the potential for embarrassment, pain, and logistical inconvenience of the procedure is unchanged.

The implementation review noted that a change to an HPV-based screening approach would represent a change for all jurisdictions and stakeholders throughout the screening process, including a large operational and cultural shift for clinicians, patients, and laboratories. Acceptance of a new screening strategy by patients and clinicians has the potential to be a challenge; therefore, the relationship between patient and health care provider will continue to be important.

Read more about CADTH and its review of the human papillomavirus testing for primary cervical cancer screening at:

https://cadth.info/HPV_cervical_cancer_screening

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