“When it Comes to Cancer, an ounce of prevention and screening is worth more than a pound of cure.”
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"To practice primary care well, we need to be experts in managing complexity." I heard a colleague say this recently, and remarked on how true it is. Our patients come to us with many different issues, often with multifactorial causes. These issues need to be managed in the context of our patients’ other illnesses, their world views on medicine and healing, and socioeconomic considerations such as whether they can afford or be motivated to consider a particular treatment.

We have some help managing this complexity.

For some time there have been excellent reference handbooks available on infectious disease protocols, immunization evidence, and multiple other areas of family medicine. At the Waterloo Wellington Regional Cancer Program, we decided it was time to add one further handbook. This one is an effort to assist you by reducing the complexity surrounding screening for cancer.

We know that screening saves lives. We know that when some cancers are caught early in the disease process, the outcome is dramatically altered. Treatment is simpler, and more effective. Screening is an essential part of every primary care practice, and should be carried out in a systematic way.

Nonetheless, cancer screening is not straightforward. It does not offer certainty. There are false positives, and false negatives. Evidence continues to accumulate and shift, regarding which screening method is most appropriate, for which age group, under which circumstances.

This handbook is a best effort to collate and interpret the standards of care for cancer screening, as they now stand. There are clear standards for breast, cervical, and colorectal cancer nad so we’re presenting those in this booklet. It is an evidence-based approach, taking latest statistics, research, and policy from Cancer Care Ontario and around the world.

We hope it helps to make your job simpler, and helps to make you a more effective clinician.

Sophie Wilson, MD, CCFP
Regional Primary Care Lead
Waterloo Wellington Regional Cancer Program
Cancer Care Ontario

Cancer Care Ontario (CCO) is the provincial government’s cancer advisor. CCO is the agency responsible for continually improving services to ensure that patients receive the right care, at the right time, from the right person, in the right place, at every step of their journey with cancer.

CCO’s Ontario Cancer Plan III outlines steps to provide Ontarians with the best cancer prevention, screening, and care. This plan is structured around six goals spanning the full range of cancer care:

1. Help Ontarians lessen their risk of developing cancer.
2. Reduce the impact of cancer through effective screening and earlier detection.
3. Ensure timely access to effective diagnosis and safe, high-quality care.
4. Improve the patient experience along every step of the cancer journey.
5. Improve the performance of Ontario’s cancer system.
6. Strengthen Ontario’s ability to improve cancer control through research.

CCO developed its Integrated Cancer Screening (ICS) strategy to facilitate the delivery of consistent and coordinated screening to primary care givers and patients.

The key elements of the ICS strategy are outlined below:

1. Increase patient participation in screening
   - patient invitations and reminders
   - patient supports and health-risk assessments
   - targeted community-based outreach programs

2. Increase primary care provider performance in screening
   - screening prompts and exception reports
   - feedback on screening performance and change management
   - change management tools and training

3. Establish a high-quality integrated screening strategy
   - information management and information technology infrastructure
   - system performance monitoring and evaluation
   - quality standards
The CCO has three distinct screening programs: the Ontario Breast Screening Program, the Ontario Cervical Screening Program, and ColonCancerCheck. The ICS strategy, together with these three screening programs, reflects CCO’s commitment to reduce the impact of breast, cervical, and colorectal cancers by facilitating effective screening and earlier detection.

The role of primary care

The pivotal role of primary care in reducing the incidence of cancer and improving cancer care across the cancer continuum is widely recognized.\(^1,2\)

CCO created the Primary Care and Cancer Engagement Strategy in 2008. Under this program, primary care leads are recruited from each of CCO’s regional cancer programs across the province. These leads give primary care providers a voice in the cancer care system and the cancer care system a closer connection to primary care providers.

Reducing the impact of cancer through effective screening and earlier detection is one of CCO’s key goals. Primary care providers oversee and influence the health and well-being of a significant portion of Ontario’s population. They can play an important role in screening intervention by:

- systematically conducting patient risk assessments and recommending appropriate screening based on evidence, guidelines, and patient history
- managing the follow-up of abnormal screening test results

Research shows that decisions to screen are strongly associated with recommendations from trusted primary care providers.\(^3,4\)
Primary care references


Screening

Evaluating screening procedures

“Screening” refers to the application of tests, examinations, or other procedures to asymptomatic target populations in order to distinguish between those who may have a disease and those who probably do not.1

In 1968, the World Health Organization published the following guidelines outlining the principles of screening:

1. The condition should be an important health problem.
2. There should be a treatment for the condition.
3. Facilities for diagnosis and treatment should be available.
4. There should be a latent stage of the disease.
5. There should be a test or examination for the condition.
6. The test should be acceptable to the population.
7. The natural history of the disease should be adequately understood.
8. There should be an agreed policy on whom to treat.
9. The total cost of finding a case should be economically balanced in relation to medical expenditure as a whole.
10. Case-finding should be a continuous process, not just a "once and for all" project.²

Screening can be employed through either population-based methods or case-finding methods:

- Population-based screening occurs when a test is offered systematically to all individuals in the defined target group within a framework of agreed upon policy, protocols, quality management, monitoring, and evaluation.

- Case-finding screening is more opportunistic and occurs when a test is offered to individuals without symptoms of the disease who present to a primary care giver for reasons unrelated to that disease.

It is important to assess the potential harms and benefits when determining whether to screen.

Just finding disease is not enough. If finding disease earlier does not positively affect the ultimate outcome (mortality, morbidity, or quality of life) then screening may be more harmful than beneficial. Harmful out-
comes include over-treatment, anxiety about screening tests, the occurrence of false positive and false negative test results, and complications from diagnostic investigation and treatment.3,4

The U.S. Preventive Services Task Force (USPSTF) uses the following grade definitions to assess the balance between the benefits and risks of treatment and screening5:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Suggestions to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The USPSTF recommends the service. There is high certainty that the net benefit is substantial.</td>
<td>Offer or provide this service.</td>
</tr>
<tr>
<td>B</td>
<td>The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.</td>
<td>Offer or provide this service.</td>
</tr>
<tr>
<td>C</td>
<td>The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small.</td>
<td>Offer or provide this service only if other considerations support offering or providing the service in an individual patient.</td>
</tr>
<tr>
<td>D</td>
<td>The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.</td>
<td>Discourage the use of this service.</td>
</tr>
<tr>
<td>I Statement</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.</td>
<td>Read the clinical considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.</td>
</tr>
</tbody>
</table>
It is also important to examine the accuracy of screening tests to look at how well they perform. Screening tests must demonstrate acceptable levels of sensitivity and specificity:

- Sensitivity refers to the proportion of people with disease who have a positive test result as an outcome of the screening.

- Specificity refers to the proportion of people without disease who have a negative test result as an outcome of the screening.

Test characteristics of sensitivity and specificity do not prove that a screening test is efficacious. This must be shown by a demonstrated reduction in the risk of dying from the cancer with screening. Assessing the benefit of a screening test is based on what the USPSTF considers the highest level of evidence — a randomized controlled trial. Submitting a screening test to rigorous randomized controlled trials is the best way to determine whether that test will make a positive contribution to a populations’ health.

**Screening for breast, cervical, and colorectal cancer**

The USPSTF and CCO’s Program in Evidence-Based Care (PEBC) have assessed the sensitivity and specificity of screening tests used in breast, cervical, and colorectal cancer screening:

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Proportion of people with disease who have a positive test result as an outcome of the screening.)</td>
<td>(Proportion of people without disease who have a negative test result as an outcome of the screening.)</td>
</tr>
<tr>
<td>Mammography6</td>
<td>77 to 95 per cent</td>
<td>94 to 97 per cent</td>
</tr>
<tr>
<td></td>
<td>Less sensitive in younger women and those with dense breasts</td>
<td></td>
</tr>
<tr>
<td>Clinical breast exam6</td>
<td>40 to 69 per cent</td>
<td>88 to 99 per cent</td>
</tr>
<tr>
<td>Pap: Liquid-Based Cytology7</td>
<td>53 to 96 per cent</td>
<td>45 to 100 per cent</td>
</tr>
<tr>
<td>Pap: Conventional Cytology7</td>
<td>35 to 94 per cent</td>
<td>17 to 100 per cent</td>
</tr>
<tr>
<td>gFOBT8</td>
<td>51 to 97 per cent</td>
<td>90 to 100 per cent</td>
</tr>
</tbody>
</table>
Note the similarity in sensitivity between the liquid-based cytology Pap and the FOBT. Yet there is much better uptake of liquid-based cytology Pap as a screening test.

The following table highlights the burden of disease for breast, cervical, and colorectal cancer in Ontario in 2010:

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of new cases</th>
<th>Number of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>8,900 (F)</td>
<td>2,100 (F)</td>
</tr>
<tr>
<td>Cervix</td>
<td>490 (F)</td>
<td>140 (F)</td>
</tr>
<tr>
<td>Colorectal</td>
<td>4,500 (M) 3,800 (F)</td>
<td>1,850 (M) 1,550 (F)</td>
</tr>
</tbody>
</table>

Cervical cancer historically had the highest mortality rate among these three cancers. This has changed dramatically in the developed world since the introduction of Pap tests.
The Ontario Breast Screening Program, the Ontario Cervical Screening Program, and ColonCancerCheck are saving lives in Ontario. However, screening rates for breast and cervical cancer have stalled and, although screening rates for colorectal screening are gaining some momentum, they are not reaching provincial targets.

New approaches are needed to increase the number of Ontarians participating in regular screening. Specific outreach approaches need to be developed to better engage under-screened populations. These include First Nation, Metis, Inuit, and other aboriginal populations; new immigrants; and low-income groups.

The effectiveness and corresponding evidence of screening can be seen in the following chart:

<table>
<thead>
<tr>
<th>Cancer site</th>
<th>Effectiveness of screening</th>
<th>Type of studies providing evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Mammography: 25 per cent reduction in mortality with regular screening in 50 to 69 year olds</td>
<td>Randomized controlled trials¹⁰</td>
</tr>
<tr>
<td>Cervical</td>
<td>Pap + colposcopy for abnormal results: Incidence reduced by up to 80 per cent with regular screening</td>
<td>Global incidence data¹¹</td>
</tr>
<tr>
<td>Colorectal</td>
<td>FOBT + colonoscopy for positive results: 16 per cent reduction in mortality with regular screening and 20 per cent reduction in incidence with regular screening</td>
<td>Randomized controlled trials¹²,¹³</td>
</tr>
</tbody>
</table>
Screening references


Spotlight on breast cancer screening

Risk of getting breast cancer

One in nine Canadian women will develop breast cancer in her lifetime.\(^1\)

As women get older, their risk of getting breast cancer increases. In Canada, 80 per cent of breast cancers are found in women over age 50 and 50 per cent of breast cancers occur in women aged 50 to 69.\(^1\)

Women with a first-degree relative (mother, sister, or daughter) who has had breast cancer are at a higher risk of developing the disease. Nearly four per cent of women who are free from breast cancer at age 20 and who have one first-degree relative with breast cancer will develop the disease by the age of 50 compared to two per cent of those with no such family history.\(^2\)

It is important to put the family history risk into perspective. Most women who develop breast cancer do not have a family history of the disease. About three per cent of women who develop breast cancer have one or more first-degree relatives with breast cancer, while only one per cent have two or more first-degree relatives with the disease.\(^1\)

Women aged 50 to 69 who have a breast density of 75 per cent or greater, documented pathology of a high-risk lesion, or personal history of ovarian cancer are also considered to be at a higher risk of developing breast cancer.

Breast cancer screening data

Approximately 66 per cent of Ontario women aged 50 to 69 years were screened for breast cancer in 2007/2008.

The provincial target is to increase screening rates to 70 per cent of the target population by 2011/2012.

In 2002, the International Agency for Research on Cancer reported that regular breast cancer screening with mammography in 50 to 69 year olds achieved an average mortality reduction of 25 per cent.\(^3\)
Ontario Breast Screening Program

Two thirds of Ontario women screened for breast cancer in 2007/2008 were screened within the Ontario Breast Screening Program (OBSP).

The OBSP is a province-wide organized screening program that ensures asymptomatic Ontario women aged 50 and over receive the benefits of regular mammography screening. This program is a significant contributor to earlier detection of cancer and better health outcomes.

Women aged 50 to 69 with an average risk of breast cancer are screened biennially. Women aged 50 to 69 who have a breast density of 75 per cent or greater, documented pathology of a high-risk lesion, personal history of ovarian cancer, or significant family history of breast cancer are considered to be at higher risk and may be screened annually.

OBSP features a variety of services, including:

- two-view mammography
- automatic client recall
- quality assurance for all components
- monitoring of follow-up and outcomes of clients
- program evaluation
- a comprehensive information system
- primary care provider referral or self-referral
- provision of result letters to women and their primary care provider, ensuring abnormal results go to the primary care provider first
- automatic booking of required diagnostic tests with primary care provider authorization
- generation of performance statistics for all practitioners — including radiologists, primary care providers, and affiliate sites

The Canadian Association of Radiologists Mammogram Accreditation Program (CAR-MAP) has developed accreditation standards for mammography, including: equipment, image quality, and the skills and qualifications of radiology staff.

In Ontario, there are approximately 300 mammography screening facilities. As of April 1, 2011, there were 152 OBSP sites. All OBSP sites are CAR-MAP accredited.
Challenges and opportunities

1. Recent data indicates that screening rates for breast cancer have stalled. Among the target population of women aged 50 to 69, screening rates were lowest in the 50 to 54 year age group. The provincial target is to increase screening rates to 70 per cent of the target population by 2011/2012.

2. It is necessary to better understand under-screened population groups and the needs of ethno-cultural groups. Different approaches may be required to engage these hard-to-reach groups.

3. There is controversy around screening women aged 40 to 49. CCO does not support population-based screening or widespread promotion of screening to women aged 40 to 49 for the following reasons:
   - The evidence of mortality benefit from routine mammography for women aged 40 to 49 is not as strong as for women aged 50 to 69.4
   - The potential harms of screening mammography for women aged 40 to 49 may outweigh the benefits.5

CCO recommends that women aged 40 to 49 talk to their health care provider to make a personal decision about mammography.

Clinical case study one

A 42-year-old asymptomatic woman asks to be screened for breast cancer. Her grandmother was diagnosed with breast cancer at the age of 65.

What is your response?

Answer:

Explain that evidence shows she is not at increased risk because a grandmother is not a first-degree relative. In addition, evidence shows that the harms of screening may outweigh the benefits for women in their forties.

Explain the role of healthy lifestyle choices in the prevention of breast cancer and suggest the patient wait until she is aged 50 to begin screening.
Breast cancer screening recommendations

There are four well-known screening methods for breast cancer:

1. Breast self-examination (BSE): BSE has recently been shown to cause many false alarms and does not make a significant difference in health outcomes. Recent evidence-based reviews do not recommend BSE.\(^7,8\) It is recommended that women of all ages learn what is normal for their breasts and immediately report any changes to their health care provider.

2. Clinical breast examination (CBE): Overall, there is insufficient evidence of the effectiveness of CBE, with or without mammography, in reducing mortality from breast cancer. CBE has higher false-positive results and low positive predictive value compared to mammography. This may lead to unnecessary visits, imaging, biopsies, and increased patient anxiety. A study by Chiarelli et al (2009) found that among OBSP centres offering both CBE and mammography, cancer detection rates and sensitivity were higher, as were referral rates and false-positive rates, compared to centres offering only mammography. Among centres offering both CBE and mammography, for each additional cancer detected by CBE per 10,000 women screened, there were an additional 55 false-positive results.\(^7,9-15\)

Clinical case study two

A 58-year-old average-risk asymptomatic patient in Erin asks if she should go for breast screening. Her options include:

- travelling to the Waterloo Wellington Breast Centre (Grand River Hospital Freeport Site) to a new digital mammography unit
- travelling to Guelph, which is closer, to a regular mammography unit

What is your response?

Answer:

Overall, the diagnostic accuracy of digital and film mammography as a means of screening for breast cancer is similar.\(^6\)

Explain the role of healthy lifestyle choices in the prevention of breast cancer and advise the patient to get screening at the most convenient location for her.
3. Mammography: Evidence has found that mammography screening reduces mortality by 25 per cent. For this reason, mammography is the best way to find breast cancer early in women aged 50 and older. Mammography is the only imaging modality that has been licensed by Health Canada for breast cancer screening of the general population. Overall, the diagnostic accuracy of digital and regular film mammography as a means of screening for breast cancer is similar. Digital mammography is more effective for women who are under the age of 50; who are premenopausal or perimenopausal; or who have radiographically dense breasts. Digital mammography also offers the added benefits of electronic data storage and ease of transmission.

4. MRI: MRI in addition to mammography has been shown to be effective for very high-risk women.16
### Patient characteristics

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Mammography screening recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average-risk women under 40</td>
<td>Screening not recommended.</td>
</tr>
<tr>
<td>Average-risk women aged 40 to 49</td>
<td>Current evidence does not support including or excluding mammography for average-risk women aged 40 to 49. On reaching the age of 40, average-risk women should be informed of the potential benefits and risks of screening mammography to make a personal decision on when to initiate screening. When screening does take place, digital mammography may be most effective for women under the age of 50.</td>
</tr>
<tr>
<td>Average-risk women aged 50 to 69</td>
<td>There is good evidence for screening average-risk women aged 50 to 69 with mammography. The best available data support screening every two years.</td>
</tr>
<tr>
<td>Average-risk women aged 75 +</td>
<td>Clinicians should help patients assess and understand the low benefit of mammography in this age group. Ultimately the decision to screen will be a personal decision for each woman.</td>
</tr>
<tr>
<td>Women with radiographically dense breasts, premenopausal, and perimenopausal women</td>
<td>Digital mammography is more effective than regular mammography for women with these characteristics.</td>
</tr>
<tr>
<td>Very high-risk women, such as women with a BRCA1 or BRCA2 gene</td>
<td>Consider MRI screening in addition to mammography. Further guidelines are pending to clarify who qualifies and with what frequency.</td>
</tr>
</tbody>
</table>
Further information

For more information visit:
http://www.cancercare.on.ca/pcs/screening/breastscreening/resources/

Breast cancer references


Spotlight on cervical cancer screening

Risk of getting cervical cancer

i) General risk:

Each year in Ontario, there are up to 90,000 abnormal Pap tests and approximately 500 women are diagnosed with cancer of the cervix. Approximately 150 women in Ontario die from this disease every year.¹

Approximately 37 per cent of invasive cervical cancers occur in women who have never been screened.² The median age at diagnosis is 47 years and the median age at death is 60 years.³

The incidence of cervical cancer is low for women under 25 years of age.⁴,⁵

(ii) The role of HPV as a necessary precursor

Human Papillomavirus (HPV) is an extremely common virus usually spread through sexual activity. There are over 120 types of HPV.⁶

Infection with certain types of HPV is a necessary, although not sufficient, cause of cervical cancer.⁷,⁸

There are more than 15,000 new cases of HPV infection in Ontario each year on average.⁷ HPV is found in both men and women. The infection usually goes away on its own, but women are less likely to clear HPV infections as they get older.⁹ There is minimal risk of significant lesions within three to five years of first HPV contact and abnormalities in young women usually regress.¹⁰ Up to 80 per cent of women will acquire an HPV infection in their lifetime.¹⁰-¹²

The risk of oncogenic HPV infection is high after the first sexual encounter (i.e., with or without intercourse involving skin-to-skin contact), and continues throughout a woman’s sexually active lifetime.¹³ Three years after her first sexual encounter, a woman with one sexual partner faces a 46 per cent risk of acquiring a cervical HPV infection.¹³

Cervical cancer and its precursors are caused by persistent infection with high-risk forms of HPV, especially type 16 and 18. A number of behaviours or exposures act as co-factors among women infected with high-risk HPV, increasing the likelihood that cervical cancer will develop. These include smoking, high parity, long-term use of hormonal contraception, and exposure to other sexually transmitted diseases, including...
Spotlight on cervical cancer screening

herpes simplex virus type 2 [HSV-2], Chlamydia trachomatis, or human immunodeficiency virus (HIV).

(iii) HPV Vaccination

Health Canada has authorized two types of HPV vaccines that can block HPV infections before they occur:

- Gardasil® is a quadrivalent vaccine that protects against infection from high-risk HPV types 16 and 18 (which cause approximately 70 per cent of cervical cancers), and low-risk types 6 and 11 (which cause approximately 90 per cent of ano-genital warts). In Canada it has been approved for use with females and males aged nine to 26.

- Cervarix® is a bivalent vaccine that protects against high-risk HPV types 16 and 18 only. In Canada it has been approved for use with females aged 10 to 25.

The vaccines are given as intramuscular injections in the arm in three doses (at 0, 2, and 6 months for Gardasil® and at 0, 1, and 6 months for Cervarix®). The duration of protection is unknown (evidence suggests protection for up to six years). Both vaccines also appear to be very effective in preventing changes in the cells of the cervix related to their targeted HPV types.

Studies have found both Gardasil® and Cervarix® to be safe. These vaccines contain only particles from the HPV virus and do not contain antibiotics or preservatives such as thimerosal and mercury. Other than some soreness around the injection site, there have been few side effects reported.

The National Advisory Committee on Immunization (NACI) recommends the use of Gardasil® for:

- females, prior to sexual intercourse, between nine and 13 years of age

- females, even after they are sexually active, who have had previous Pap abnormalities, or have had a previous HPV infection, between the ages of 14 and 26 years of age
The NACI does not recommend Gardasil® for females under the age of nine, pregnant women, or males. These recommendations are currently under review.

Ontario’s HPV vaccination program recognizes that vaccination offers the best protection against cervical cancer if it is received prior to HPV exposure. Since 2007, the government has provided publicly-funded voluntary school-based immunization programs for Grade 8 girls.

It is important to note that these vaccines do not protect against all cancer-causing HPV strains and should not replace regular cervical cancer screening with Pap tests.

More information on Ontario’s HPV program can be found at www.hpvontario.ca.

**Cervical cancer screening data**

Between 2006 and 2008, 72 per cent of Ontario women aged 20-69 were screened.

The provincial target is to increase screening rates to 85 per cent by 2011/2012.

In 2008, the World Cancer Report stated that regular cervical screening has been shown to reduce cervical cancer incidence by up to 80 per cent.21
Ontario Cervical Screening Program

Pap test screening is well integrated into primary care. CCO, in partnership with the Ministry of Health and Long-Term Care, is building on existing services and enhancing information systems to ensure a coordinated approach to:

- education and communication
- recruitment
- provincial cervical screening information systems
- recall and follow-up
- quality assurance and improvement
- evaluation and research

The 2005 Ontario cervical screening guidelines recommend that cervical cancer screening should be initiated within three years of first vaginal sexual activity. After three consecutive annual normal Pap tests, screening should continue every two to three years.

Screening may be discontinued after the age of 70 if there is an adequate negative screening history in the previous 10 years (i.e., three or more negative tests). The OCSP targets women aged 20 to 69 to participate in regular screening, but younger and older women are also screened, where appropriate, and in alignment with Ontario’s cervical screening guidelines.

Aggressive follow-up of young women with abnormal screening results is not encouraged and may be harmful. Research shows 90 per cent of young women will clear an HPV infection within 24 months.

Challenges and opportunities

1. Recent data indicates that screening rates for cervical cancer have stalled. The provincial target is to increase screening rates to 85 per cent by 2011/2012.

2. Some women are never, or rarely, screened for cervical cancer. Under-screened women include women over 50 years old and women who have low literacy levels; low income levels; belong to First Nations, Metis, Inuit, and other aboriginal groups; or are newcomers to Canada.
3. There is a need for better Pap test follow-up. A 2010 study found that 26 per cent of women with serious cervical lesions did not receive any follow-up management Paps.\textsuperscript{30}

4. HPV testing is not currently funded, but evidence increasingly recommends its use.

5. It is important to note that HPV vaccination is not a substitute for cervical cancer screening. Even if vaccinated, women still need regular screening tests because the vaccine does not protect against all cancer-causing HPV strains.

6. It is not known how vaccination programs will affect screening programs.

7. With regular Pap tests and the HPV vaccine, it is possible to prevent cervical cancer.

---

**Clinical case study one**

A 17-year-old girl sees you to initiate the birth control pill. She started having unprotected intercourse two months ago.

**Do you do a Pap test?**

**Answer:**

You may want to confirm when she became sexually active (i.e., with or without intercourse involving skin-to-skin contact). You do not need to do a Pap test at this time if the length of potential exposure to HPV is short. A Pap test should be done within three years of initiation of sexual activity according to the current clinical guidelines.

**Explain the role of healthy lifestyle choices in the prevention of cervical cancer.**
Clinical case study two

A 35-year-old woman has had two normal annual Pap tests.

What would your advice be to her regarding future cervical screening?

Answer:

Explain to the patient that the current guidelines call for three consecutive normal annual Pap tests. Thereafter, screening can be done every two to three years.

Explain the role of healthy lifestyle choices in the prevention of cervical cancer.

Clinical case study three

A 47-year-old woman is seen for her annual physical. She had a total hysterectomy two years ago for benign uterine fibroids.

Do you do a Pap test?

Answer:

As long as you know her cervix was removed, there is no need to do a Pap test. Guidelines advise to discontinue cervical screening in women who have undergone a total hysterectomy for benign causes.
**Cervical cancer screening recommendations**

All women who are or have ever been sexually active should be screened. Screening should be initiated within three years of first vaginal sexual activity.

Aggressive follow-up of young women with abnormal screening results may be harmful. Research shows 90 per cent of young women will clear an HPV infection within 24 months. Thus, it may be unnecessary to treat these young women aggressively when most will be able to clear the HPV infection on their own if given enough time (i.e., abnormal cervical cells may change back to normal).^{23-27}

In addition, there is evidence that screening young women and then treating those with cervical dysplasia is linked to adverse future pregnancy outcomes (e.g., preterm delivery, low birth weight). Thus, high colposcopy rates in this age cohort may be associated with future harm. The risk of developing and dying of cervical cancer increases with age. The colposcopy follow-up rates for older women need to dramatically increase in order for older women to optimally benefit from cervical cancer screening.^{23-27}
It is recommended that women of average risk be screened annually until there are three consecutive negative Pap tests and then continue to be screened every two to three years. The following chart outlines Pap screening recommendations for cervical cancer:

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Pap screening recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average-risk women with no previous abnormal Pap including women with subtotal hysterectomy (with an intact cervix), pregnant women, and women who have sex with women</td>
<td>Screen annually until three consecutive negative Paps and then continue to screen every two to three years.</td>
</tr>
<tr>
<td>Women who are immunocompromised (e.g., have received transplants, HIV positive)</td>
<td>Screen annually.</td>
</tr>
<tr>
<td>Women who have undergone total hysterectomy for benign causes with no history of cervical dysplasia</td>
<td>Discontinue screening.</td>
</tr>
<tr>
<td>Women over age 70</td>
<td>Discontinue screening if there has been an adequate negative screening history in the previous 10 years (i.e., three or more consecutive negative tests).</td>
</tr>
</tbody>
</table>

**Further information**

For more information visit:  
http://www.cancercare.on.ca/pcs/screening/cervscreening/hcpresources/
Cervical cancer references


Spotlight on colorectal cancer screening

Risk of getting colorectal cancer

(i) General risk:

In Ontario, colorectal cancer is the third most common cancer diagnosed and the second leading cause of cancer deaths. In 2010, an estimated 8,300 new cases were diagnosed and approximately 3,400 people died.\(^1\)

Approximately 93 per cent of cases are diagnosed in people aged 50 or older.\(^1\) Despite having a higher incidence of colorectal cancer, mortality rates tend to be lower in Canada than in regions of Europe for both men and women.\(^2\) The five-year survival rate for colorectal cancer has improved over the past decade in Canada.\(^3\)

Individuals with a first-degree relative (parent, sibling, or child) who has been diagnosed with colorectal cancer are at an increased risk for the disease. People who have conditions such as Crohn’s disease, polyps, or colitis also have a higher risk of developing colorectal cancer.\(^4\)

(ii) Adenoma-carcinoma sequence

Over 95 per cent of colorectal cancers arise from adenomatous polyps. The progression to invasive cancer takes an average of 10 years.\(^5\)

Approximately two-thirds of polyps are adenomas.\(^6\) One third are hyperplastic with no to minimal malignancy risk. Approximately one to five per cent of adenomatous polyps will progress to invasive cancer. This is more likely if the polyps have high-grade dysplasia or villous features and if they are greater than one cm.\(^7\)

(iii) The significance of colorectal cancer location (subsite)

Cancers arising from the left versus the right side of the colon have different epidemiological, histological, and molecular features.

Tumours that are flat in appearance are more commonly located in the right colon whereas polypoid-type tumours are more common in the left colon. The flatter tumours on the right side are harder to detect and remove. Therefore, survival rates are lower with right versus left-sided colon cancer. A higher proportion of right-sided colon cancers are diagnosed in
women. The incidence and mortality of left-sided colon cancer, but not right-sided colon cancer, is reduced through the use of flexible sigmoidoscopy and colonoscopy respectively as screening measures.

Colorectal cancer screening data

Fecal occult blood test (FOBT) screening rates across Ontario are currently 30 per cent. Rates vary by region with some as high as 36 per cent. The rate for Waterloo Wellington in 2009/2010 was 32 per cent.

The provincial target is to increase participation in biennial FOBT screening to 40 per cent of Ontarians between the ages of 50 and 74 by the year 2011/12.

Each year, more women are screened than men. In 2007/2008, 28 per cent of men and 31 per cent of women were screened by FOBT.

A Cochrane review reported a 16 per cent reduction in colorectal cancer mortality with regular screening using FOBT — combined with a colonoscopy for those with a positive FOBT. In 2002, the U.S. Preventive Services Task Force reported a 20 per cent reduction in colorectal cancer incidence with regular screening. In three randomized controlled trials, FOBT has been shown to reduce colorectal cancer mortality by 15 to 33 per cent. The five-year relative survival of patients diagnosed at an early stage is 90 per cent compared to only 11 per cent for those diagnosed at an advanced stage.
ColonCancerCheck (CCC) is the first province-wide colorectal screening program in Canada. The CCC program goals are to:

- reduce mortality from colorectal cancer through an organized screening program
- improve the capacity of primary care to participate in comprehensive colorectal cancer screening

Primary care providers play a central role in promoting CCC and distributing FOBT kits. The provincial target is to screen 40 per cent of eligible Ontarians by 2011/2012.

Key features of the CCC program include:

- colonoscopy and FOBT quality standards
- increased colonoscopy capacity across province
- primary care provider awareness
- program branded FOBT kits
- financial incentives for primary care providers
- patient correspondence

CCC patient correspondence as of 2010:

- Recall letters are sent to past participants who are due for repeat biennial FOBT screening. Four months after the recall letter, a reminder letter is sent to any participant who has not completed screening.

- FOBT result letters are sent to all participants (FOBT normal, indeterminate, and positive). FOBT positive letters are sent to advise participants to contact their primary care providers to discuss their test results.

- Invitation letters are sent to Ontarians turning 50 to invite them to discuss colorectal cancer screening with their primary care provider. Invitation letters are not sent to those who have had FOBT activity within the past five years or a colonoscopy within the past 10 years.

Going forward, if 50 per cent of the eligible population participates in ColonCancerCheck, it is estimated that 1,500 lives will be saved by 2020 and 5,500 lives will be saved by 2030.10
Challenges and opportunities

1. Screening rates need to be increased. The provincial target is to increase participation in biennial FOBT screening to 40 per cent of Ontarians between the ages of 50 and 74 by 2011/2012.

2. Many patients do not complete their FOBT kit. This indicates an issue with program compliance.

3. Approximately 30 per cent of patients with positive FOBT results do not follow-up with colonoscopy.

4. There is an ongoing debate about whether FOBT or colonoscopy is the best tool for population-based screening.11

Clinical case study one

A 54-year-old asymptomatic male comes in for his annual physical.

What screening test would you suggest to him?

Answer:

Take his personal history to ensure he does not have a first-degree relative with colorectal cancer or another condition such as Crohn’s or colitis. You would also have to check that he is not symptomatic. Colorectal cancer symptoms include:

- unexplained changes in bowel patterns
- rectal bleeding
- unexplained weight loss
- urgent feeling to empty bowel
- unexplained stool incontinence

If there is a family history or concerning symptoms, you should refer him for a colonoscopy. Otherwise, explain the importance of screening for colorectal cancer and the use of the FOBT kit as a screening tool.

Also explain to the patient the role of a healthy lifestyle in colorectal cancer prevention.
Colorectal cancer screening recommendations

There are three main screening methods for colorectal cancer: FOBT, flexible sigmoidoscopy, and colonoscopy. More evidence is evolving on CT colonoscopy and DNA testing.

It is recommended that people at average risk from ages 50 to 74 have an FOBT every two years. A positive FOBT does not necessarily mean that a person has cancer, but does indicate that a follow-up colonoscopy is needed.

Individuals at increased risk for the disease due to a first-degree relative with colorectal cancer should undergo an initial colonoscopy at age 40\(^{12}\), or 50\(^{13}\), or 10 years earlier than the age of diagnosis of their first-degree relative.

The CCC has adopted Canadian Association of Gastroenterology benchmarks for colonoscopy wait times:

- eight weeks after a positive FOBT result
- twenty-six weeks for people with a family history of colorectal cancer\(^{14}\)

CCO collects data on colonoscopies carried out at participating hospitals. Regular performance reports are sent out to these hospitals.

Clinical case study two

A 47-year-old woman inquires about colorectal cancer screening. On inquiry you find her only risk factor is that her mother was diagnosed at age 65 with colorectal cancer.

What would you suggest?

Answer:

Explain to patient that since her mother was 65 when diagnosed, she can wait to be screened until 50 years of age. The recommendation is that individuals at increased risk because of a family history of colorectal cancer are screened using colonoscopy at age 40\(^{12}\), or 50\(^{13}\), or 10 years earlier than the age of diagnosis of their first-degree relative.

Tell the patient that she may reduce her risk of getting colorectal cancer by leading a healthy lifestyle.
<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>FOBT screening recommendations</th>
<th>Flexible sigmoidoscopy screening recommendations</th>
<th>Colonoscopy screening recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under age 50</td>
<td>Screening not recommended.</td>
<td>Screening not recommended.</td>
<td>Screening not recommended, except for some high-risk cases.</td>
</tr>
<tr>
<td>Average-risk aged 50 to 74</td>
<td>FOBT screening should be carried out every two years.</td>
<td>Benefits may outweigh the potential risks. Clinicians should discuss the service with eligible patients. The incidence and mortality of left-sided colon cancer, but not right-sided colon cancer, is reduced through the use of flexible sigmoidoscopy and colonoscopy respectively as screening measures. There is insufficient evidence to make recommendations about whether only FOBT or flexible sigmoidoscopy or both tests should be performed.</td>
<td>There is insufficient evidence to include or exclude colonoscopy as an initial screening test. Issues with population-based screening via colonoscopy include poor compliance, quality of non-hospital scopes, available capacity, potential harms of screening, and potential costs.</td>
</tr>
<tr>
<td>Increased risk (colorectal cancer history, a first-degree family history of colorectal cancer)</td>
<td>Not recommended. People at increased risk should be screened using colonoscopy starting at age 40 or 50, or 10 years earlier than the age of any first-degree relatives at the time of their colorectal cancer diagnosis.</td>
<td>There is fair evidence to include flexible sigmoidoscopy in the periodic health examination of people with a history of familial adenomatous polyposis. The incidence and mortality of left-sided colon cancer, but not right-sided colon cancer, is reduced through the use of flexible sigmoidoscopy and colonoscopy respectively as screening measures.</td>
<td>People at increased risk should be referred directly for a colonoscopy. There is fair evidence to include colonoscopy screening in patients with a history of hereditary nonpolyposis Colon cancer. The incidence and mortality of left-sided colon cancer, but not right-sided colon cancer, is reduced through the use of flexible sigmoidoscopy and colonoscopy respectively as screening measures. There is insufficient evidence to recommend colonoscopy for people who have a family history of colorectal polyps or cancer but who do not meet the criteria for hereditary nonpolyposis colon cancer.</td>
</tr>
</tbody>
</table>
Further information

For more information visit:
www.ontario.ca/coloncancer.ca

Colorectal cancer references


For more information,
Contact:

519-749-4370 ext. 2671