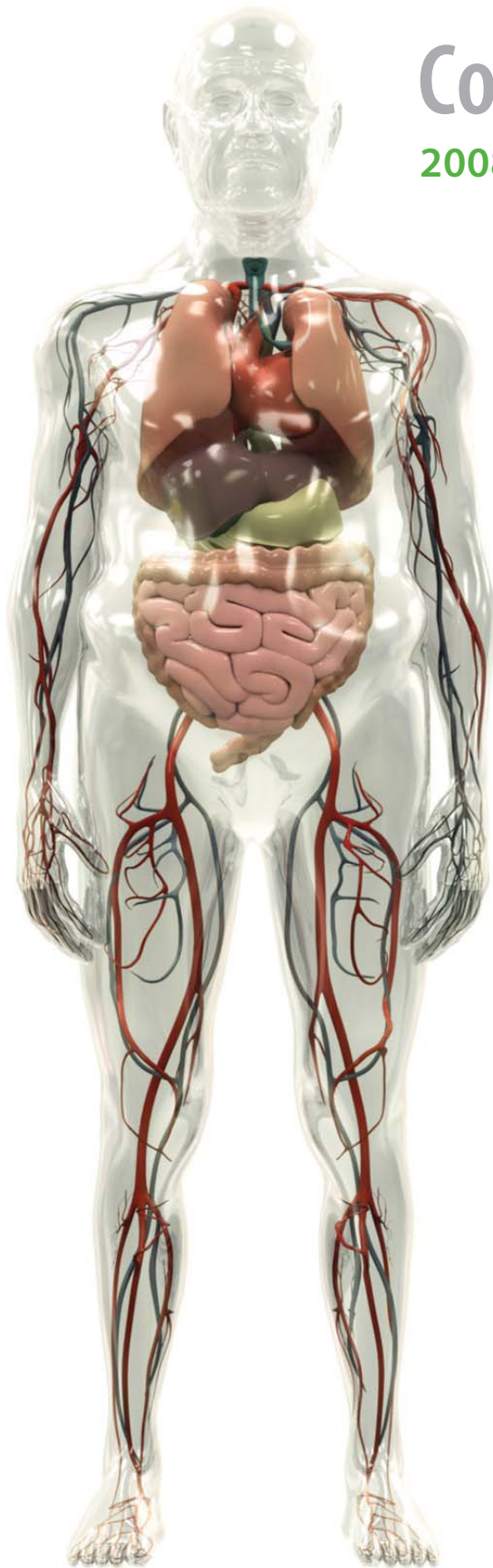


Colon Cancer Check

2008 Program Report



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2008 Program Report

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Members of the ColonCancerCheck Expert Panel included:

- Linda Rabeneck, MD, Medical Director, ColonCancerCheck
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The following Cancer Care Ontario departments/units also contributed significantly to these processes:

- Policy and Planning
- Cancer Informatics
- Information Technology
- Population Studies and Surveillance

Message from Cancer Care Ontario

to the Ministry of Health
and Long-Term Care and
our screening partners

Colorectal cancer represents a significant health concern in Ontario. It is our second leading cause of cancer death and the third most common cancer diagnosed. Screening can detect colorectal cancer at its earliest stage and significantly reduce mortality. Individuals with colorectal cancer have an estimated 90% chance of being cured if the cancer is detected early, compared with only 10% if detected at an advanced stage.

Despite this, screening rates in the province have historically been very low. Ontario's Cancer System Quality Index shows overall fecal occult blood test uptake among eligible Ontarians was only 24% in 2006–2007.

In January 2007, the Ministry of Health and Long-Term Care, in partnership with Cancer Care Ontario, announced funding for Canada's first province-wide, population-based colorectal cancer screening program (branded ColonCancerCheck). The program's dual goals are to reduce colorectal cancer mortality and improve the capacity of primary care providers to participate in an organized screening program.

ColonCancerCheck launched in April 2008. The multi-faceted education campaign was designed to raise both public and healthcare provider awareness of the importance of colorectal cancer screening.

In this inaugural *ColonCancerCheck 2008 Program Report*, we summarize these activities and highlight the significant progress realized in making colorectal cancer screening more accessible for more Ontarians in 2008. Of note, screening rates for colorectal cancer using the fecal occult blood test have doubled from 14.8% in 2003–2004 to 29.7% in 2007–2008.

As we take stock of our progress to date, our focus going forward is the continued roll-out of the program including additional public and provider education and awareness initiatives. With our partners at the Ministry of Health and Long-Term Care and our colleagues in cancer research, prevention, treatment and palliation, we are working to achieve the screening targets set out in the Ontario Cancer Plan.



A handwritten signature in black ink that reads "George Pasut".

George Pasut, MD, MHSc, FRCPC, FACPM

Vice President, Prevention and Screening, *Cancer Care Ontario*



A handwritten signature in black ink that reads "Linda Rabeneck".

Linda Rabeneck, MD, MPH, FRCPC

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Executive Summary

COLORECTAL CANCER IN ONTARIO

Colorectal cancer is the second leading cause of cancer deaths in Ontario – an estimated 3,200 deaths in 2008. It is the third most common cancer diagnosed in Ontario and its incidence rises rapidly with age, especially after age 50 years. With regular screening using the fecal occult blood test (FOBT), colorectal cancer can be detected early. With early detection, the chance of a cure is 90%, compared with only 10% if the disease is detected at an advanced stage.

COLORECTAL CANCER SCREENING PROGRAM LAUNCH

ColonCancerCheck builds on the results and lessons learned from the Ontario FOBT pilot. The 2006 report on this pilot recommended implementation of an organized colorectal cancer screening program.

In early 2007 the Ministry of Health and Long-Term Care announced funding for a province-wide, population-based colorectal cancer screening program. Its dual goals are to reduce colorectal cancer mortality through a comprehensive colorectal cancer screening program and to improve the capacity of primary care providers to participate in an organized screening program.

The ColonCancerCheck Program (the “program”) launched publicly in April 2008. Building on the defined goals and supported by an intensive education and awareness campaign, ColonCancerCheck was Canada’s first organized colorectal cancer screening program. The ColonCancerCheck Program employs two strategies for initial screening. For those at *average risk* for colorectal cancer, FOBT is advised. For those at *increased risk* because of a family history of one or more first-degree relatives with a diagnosis of colorectal cancer, colonoscopy is advised. Primary care providers play a central role in the program.

PROGRAM EVALUATION

The program developed an evaluation framework and indicators. The indicator results in this report include: participation, screening, diagnostic follow-up and outcomes (as defined on the next page). Results for additional indicators will be included in the next report.

Participation:**Population Fecal Occult Blood Test (FOBT) Participation Rate**

Participation rate is the percentage of Ontario men and women of screen-eligible age (50–74 years), who have completed at least one FOBT in the prior two years.

Screening:**FOBT-Positive Rate of those Screened in ColonCancerCheck**

The percentage of individuals who have had a positive result with a ColonCancerCheck FOBT during the prior two years.

Diagnostic follow-up:**Follow-up Colonoscopy Rate among Program Participants**

The percentage of people with a positive FOBT who undergo a colonoscopy within six months.

Outcomes:**Program Invasive-Cancer Detection Rate**

The number of individuals in whom colorectal cancer is detected within six months of FOBT or family history (FH) colonoscopy screening, as a proportion of the individuals screened.

PROGRAM RESULTS

This inaugural *ColonCancerCheck Program Report* is based on data for calendar year 2008.

The program indicator results are:

1. **Participation:** FOBT rates doubled among men and women from 14.8% for 2003–2004 to 29.7% in 2007–2008. Significant increases in participation were apparent across all geographical regions of Ontario.
2. **Screening:** Overall, men had a higher FOBT-positive rate (5.3%) than did women (3.5%). This finding was observed across all geographic regions in Ontario.
3. **Diagnostic follow-up:** Overall, 62.1% of program participants with a positive FOBT had a follow-up colonoscopy within six months of the abnormal test. People 50–54 years of age were more likely than were older groups to have a follow-up colonoscopy within this time.

4. **Outcomes:** The overall invasive-cancer detection rate for all ages combined was 2.3 per 1000 screened for those who had either a FOBT or FH colonoscopy. The rate was almost twice as high among men as women. For those who had FOBT alone, the cancer detection rate was 1.7 per 1000 screened; for FH colonoscopy it was 5.8 cancers per 1000 screened. The cancer detection rate for those who had a FOBT or FH colonoscopy increased with age.

SUMMARY

The early ColonCancerCheck Program results are promising. Both before and after the program launch, much was learned. Although there has been a significant increase in colorectal cancer screening rates, they are still below the target of the Ontario Cancer Plan and the rates for breast and cervical cancer screening. A major opportunity exists to increase colorectal cancer screening rates markedly and thereby have a positive impact on the health of Ontarians.

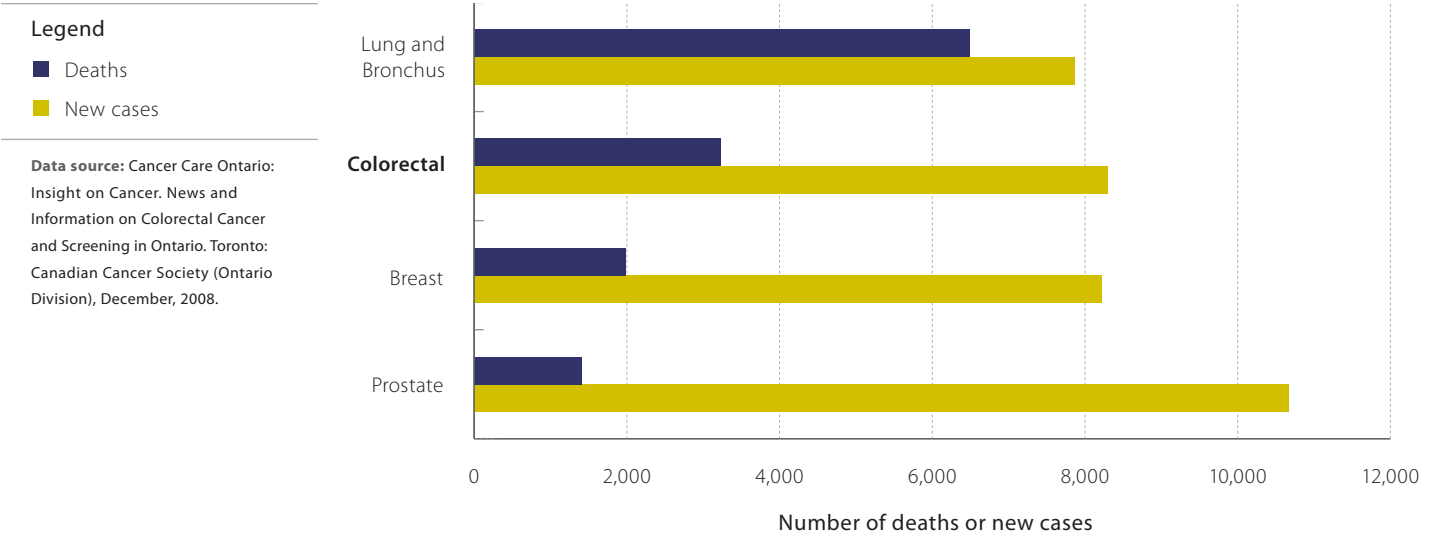
To ensure eligible Ontarians have access to screening and that healthcare providers participate, education and awareness initiatives will continue to play a pivotal role. Through ongoing performance-monitoring and evaluation, this program will ensure that the highest quality colorectal cancer screening services are delivered to Ontarians.

Burden of Disease

Colorectal cancer is the second leading cause of death from cancer in Ontario (Figure 1) and the incidence in Canada is among the highest in the world.¹

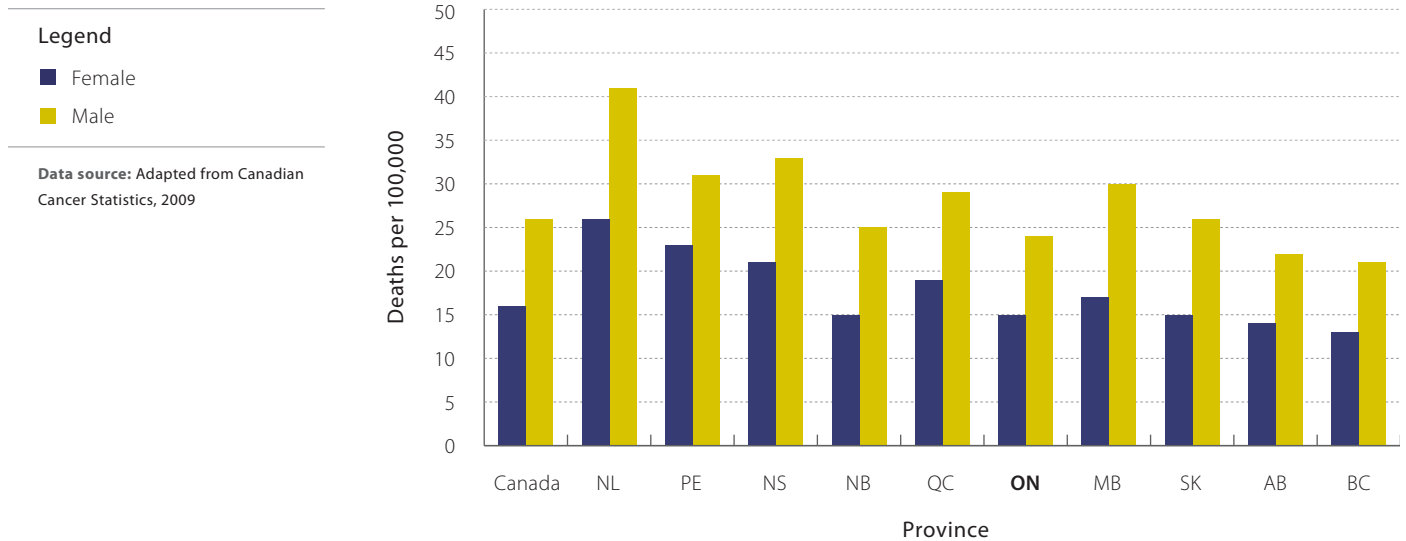
Ontario's colorectal cancer mortality rates are lower than those of the Atlantic Provinces but are higher than the rates in Alberta and British Columbia (Figure 2).²

FIGURE 1 | Annual number of deaths and new cases for the most common cancers in Ontario, 2008



In 2008 an estimated 8,300 Ontarians were diagnosed with colorectal cancer and 3,200 died of the disease. With an estimated age-standardized mortality rate of 24 cases per 100,000 for men and 15 cases per 100,000 for women, colorectal cancer is the leading cause of Ontario cancer deaths unrelated to tobacco.²

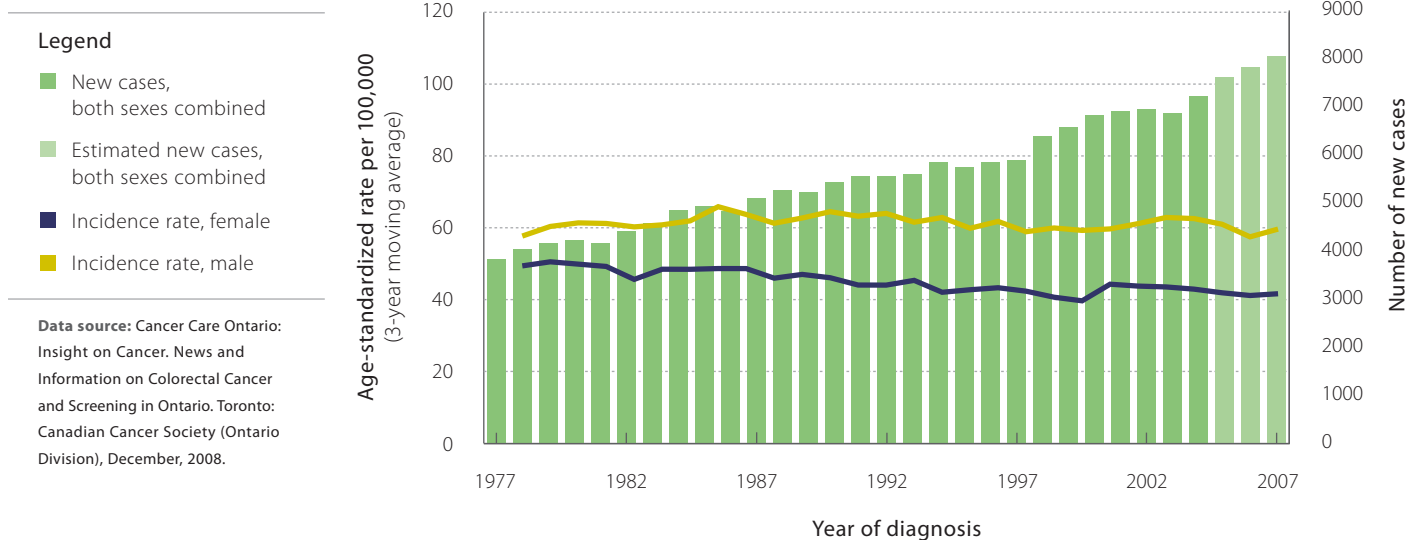
FIGURE 2 | Estimated colorectal cancer mortality rates across Canada by sex and province, 2008



The increase in the number of new cases diagnosed each year in Ontario results mainly from aging of the population (Figure 3). Falling mortality rates may reflect earlier diagnosis and improvements in treatment.

Recent experience in Ontario has shown that colorectal cancer screening has not been optimized. In 2006–2007, 24% of Ontarians (22.8% of men and 25.4% of women) age 50–74 years had at least one FOBT in the prior two years (Figure 5).³ Individuals with colorectal cancer have an estimated 90% chance of being cured if the cancer is detected early, compared with only 10% if it is detected at an advanced stage.⁴

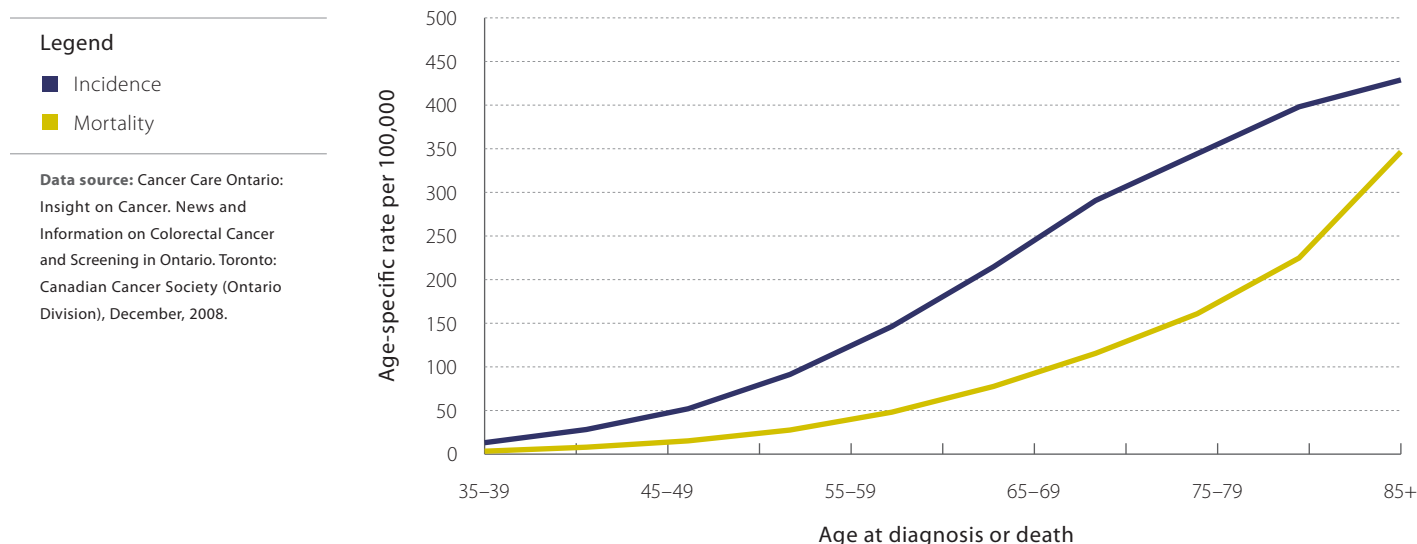
FIGURE 3 | Number of new cases and incidence rates of colorectal cancer, Ontario, 1977–2007



The risk of colorectal cancer increases with age, especially after age 50 years (Figure 4). Approximately 93% of cases are diagnosed in people 50 years or older.⁵ The incidence of disease in women lags behind that of men by about a decade.⁵ However, the lifetime risk for developing colorectal cancer in men is only slightly higher than it is for women (1 in 16 compared to 1 in 18) because overall, women live longer than men.²

About 75% of those newly diagnosed have no known family history of the disease, while 15–20% have one or more first-degree family relatives (parent, sibling or child) with the disease. About 5% have a hereditary genetic syndrome such as familial adenomatous polyposis (FAP) or hereditary non-polyposis colorectal cancer (HNPCC).⁵

FIGURE 4 | Colorectal cancer incidence and mortality rates by age, Ontario, 2000–2004



The Evidence for Screening

As there are no symptoms in the early stages of colorectal cancer, regular screening is the best way to detect the disease early. It has been demonstrated clearly using randomized control trials (RCTs) that annual or biennial screening with the fecal occult blood test (FOBT) is associated with a reduction in colorectal cancer mortality compared with no screening. FOBT is therefore supported by level A (i.e. RCT) evidence.⁶

Meta-analysis of colorectal cancer mortality results from three landmark trials – Minnesota, Nottingham and Funen – showed that screening with FOBT every one to two years coupled with colonoscopy in those with a positive FOBT is associated with a reduction in colorectal cancer mortality of at least 16%.⁷

In 2001, the Canadian Task Force on Preventive Health Care endorsed colorectal cancer screening with FOBT for men and women aged 50 years and older with no symptoms (Grade A recommendation).⁸ The task force concluded that there was insufficient evidence to include or exclude colonoscopy as the initial screening test in those 50 years and older with no symptoms (Grade C recommendation).

Colorectal Cancer Screening in Ontario Prior to the Launch of ColonCancerCheck

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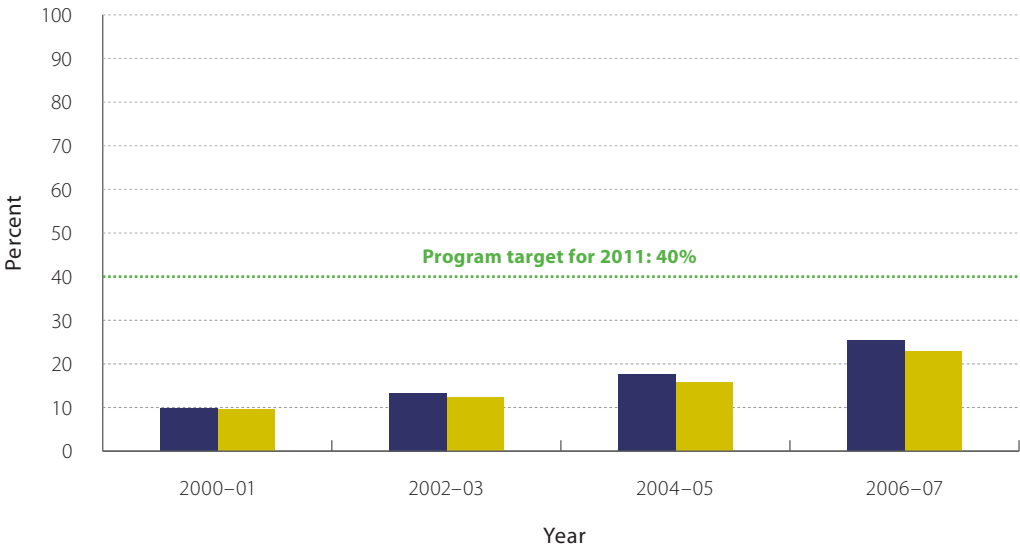
- Female
- Male

Data source: CSQI, 2009

FOBT Use in Ontario Prior to ColonCancerCheck Program

In 2006–2007, 24% of Ontarians (22.8% of men and 25.4% of women) age 50–74 years had at least one FOBT in the prior two years (Figure 5).³

FIGURE 5 | Biennial FOBT participation (ages 50–74), 2000–2007, by sex



Organized versus Opportunistic Screening

It is important to distinguish an organized screening program from opportunistic screening. The results depicted in Figure 5 were achieved through opportunistic screening.

Opportunistic screening occurs through fee-for-service reimbursement, which pays physicians for the delivery of specific services. While this can lead to increased screening participation, it can also lead to inappropriate screening. In addition, quality assurance is not a focus of opportunistic screening.

Because they maximize screening benefits and minimize harms, organized screening programs have the potential to achieve higher participation and a greater impact than opportunistic screening.

The International Agency for Research on Cancer has defined the elements of an organized screening program. These include: 1) an explicit policy with specified age categories, method and interval for screening; 2) a defined target population; 3) a management team responsible for implementation; 4) a healthcare team for decisions and care; 5) a quality assurance structure; and 6) a method for identifying cancer occurrence in the target population.⁹

Ontario's Colorectal Cancer Screening Program – ColonCancerCheck

THE PILOT

As part of planning for a colorectal cancer screening program, Cancer Care Ontario (CCO), in collaboration with the Ministry of Health and Long-Term Care (MOHLTC), the Institute for Clinical and Evaluative Sciences (ICES) in Toronto and the Ontario Association of Medical Laboratories (OAML), conducted a pilot study of opportunistic FOBT screening from 2003 to 2005. The report on the Ontario FOBT pilot was released in 2006.¹⁰

Concurrent with the pilot, Cancer Care Ontario collaborated with the Canadian Cancer Society and patient advocacy groups to promote the need for a colorectal cancer screening program.

The pilot study was intended to inform colorectal cancer screening policy by comparing the effectiveness of two methods of opportunistic screening. Its main finding was that opportunistic screening alone did not achieve the population screening rates required to reduce colorectal cancer mortality. Additionally, those who participated were more likely than non-participants to have a primary care provider. Based on the pilot, CCO recommended that Ontario institute an organized, population-based screening program.

THE FUNDING ANNOUNCEMENT

In January 2007, the MOHLTC, in collaboration with CCO, announced funding for Canada's first province-wide population-based colorectal cancer screening program.

The announcement outlined the program features. The central feature was its distinction between *average* versus *increased risk* for colorectal cancer. Biennial FOBT screening was recommended for those at average risk – most of the population. Colonoscopy was recommended for those at increased risk, defined by having one or more first-degree relatives with a history of the disease. Other program elements included:

- The use of a single program FOBT kit to facilitate consistent quality
- A central role for primary care providers, who would distribute the FOBT kits
- Provision for those without a primary care provider (“unattached patients”) to get a kit from a pharmacy or by calling a 1-800 number
- Creation of a registry to send invitations to be screened, result letters and recall letters, and to track and evaluate overall program progress
- A comprehensive five-year campaign to educate the public and healthcare providers on the benefits of colorectal cancer screening and early detection.

THE DEVELOPMENTAL YEAR

The initial 15-month period following the announcement was a period of significant planning and development activity leading up to the formal public launch in April 2008.

FOBT and Colonoscopy Standards

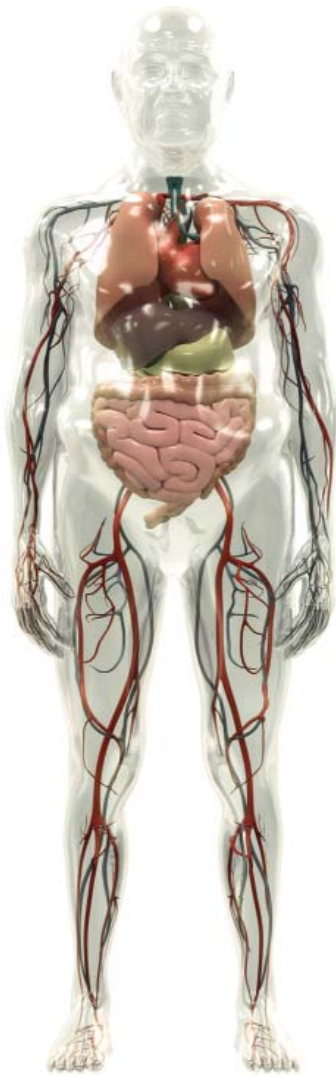
To ensure the implementation of a high-quality screening program, the program commissioned two sets of standards from CCO's Program in Evidence Based Care: "Cancer Care Ontario colonoscopy standards: Standards and evidentiary base"¹¹ and "Cancer Care Ontario guaiac fecal occult blood test (FOBT) laboratory standards: Evidentiary base and recommendations".¹² (The role of Cancer Care Ontario's internationally recognized Program in Evidence-Based Care (PEBC) is to improve the quality of cancer care by helping to apply the best scientific evidence in practice and decisions.)

The CCO FOBT laboratory standards recommended selection of a single kit with a sensitivity $\geq 40\%$ and specificity $\geq 95\%$ for the detection of colorectal cancer in repeated testing. As well, the standards supported the removal of all medication and dietary restrictions with the exception of vitamin C. A positive FOBT result was defined as having one or more positive windows on the FOBT card and an indeterminate result as having one or more windows with an uncertain result and no positive windows.

The CCO colonoscopy standards set out performance standards for the endoscopist, the facility and the procedure. Endoscopists providing colonoscopies had to agree to perform at least 200 colonoscopies annually. Facilities at which the colonoscopies were being done had to ensure pre-procedure patient assessment, infection control, monitoring during and after administration of conscious sedation, and they had to have resuscitation capabilities. Colonoscopy-associated perforation rates could not be greater than 1/1000 for all colonoscopies and 1/2000 for screening colonoscopies.

Addressing Colonoscopy Capacity: Allocation of Additional Colonoscopy Volumes

To expand colonoscopy capacity to meet anticipated program demands, funding for additional colonoscopies was provided to participating public hospitals beginning in April 2007. As a condition of funding, hospitals were required to follow the CCO colonoscopy standards and to provide data to CCO on all hospital-performed colonoscopies. The data elements reported included: indication for procedure (classified using five mutually exclusive categories), wait times and performance (e.g. cecal intubation, perforation). These data were instrumental in measuring performance against the CCO colonoscopy standards. Prior to this there were no data on how many Ontarians had undergone colonoscopy for the various indications for the procedure.



Public awareness campaign

"If you were see-through it would be easier to spot colorectal cancer" campaign

Contractual Agreement with the Laboratories

Significant planning and development was required to launch the ColonCancerCheck FOBT kit. The MOHLTC and the Ontario Association of Medical Laboratories (OAML) signed an agreement. The OAML procured a vendor for the new program-branded FOBT kits. The laboratories developed policies and procedures to implement the CCO FOBT laboratory standards and implemented system changes to support the collection of program data (such as FOBT results) for CCO. As with the colonoscopies, these data were used to measure performance against the CCO FOBT laboratory standards.

Easier-to-read patient instructions were developed and translated into 27 languages. A new laboratory requisition was developed and regulatory changes made to allow nurse practitioners to order ColonCancerCheck FOBTs for their patients. Prior to the launch, an initial supply of kits was sent to almost 10,000 family physician and nurse-practitioner offices and to about 3,000 community pharmacies.

Public and Healthcare Provider Awareness Campaigns

Public awareness and healthcare provider education campaigns were developed for the launch of ColonCancerCheck. The cornerstone of the public awareness campaign was the innovative television advertising – *"If you were see-through it would be easier to spot colorectal cancer"*. Other materials and approaches included an informative website, print advertisements, posters, information pamphlets and street teams that distributed program literature at various public events.

A multifaceted healthcare provider education campaign was developed in partnership with the Ontario College of Family Physicians. It included information kits, patient counselling materials, journal articles, regional forums and continuing medical education events. Several information packages were sent to primary care providers prior to the public launch to support their participation.

Role of the Primary Care Provider

Primary care providers are central to the program. As the first point of contact with the target population, the primary care provider performs a patient risk assessment and recommends the most appropriate screening method. Research has demonstrated that a recommendation from a primary care provider is the single most important factor in cancer screening participation.¹³ This was strongly supported by the Ontario FOBT pilot, which had shown that participants were more likely than non-participants to have a primary care provider.

The program also leveraged the substantial investment by the MOHLTC in primary care, a separate initiative that was underway prior to the public launch of ColonCancerCheck. The primary care initiative focuses on improved patient access, enrolment or rostering of patients to family physicians, and a focus on chronic disease management, disease prevention and health promotion that is linked to payment incentives.

THE LAUNCH OF COLONCANCERCHECK

The Minister of Health and Long-Term Care launched ColonCancerCheck to the public on March 14, 2008. As set out in the funding announcement a year earlier, the program's publicized goals were both to reduce colorectal cancer mortality and improve the capacity of primary care providers to participate in comprehensive colorectal cancer screening.

ColonCancerCheck comprised two strategies for the initial screening test differentiating between those who were at *average* risk for colorectal cancer and those who were at *increased* risk because of a family history of one or more first-degree relatives with a diagnosis of colorectal cancer.

For the first group, an FOBT was advised. For the second group, colonoscopy was advised.

Primary care providers were to play a central role in both educating patients and encouraging participation in the program.

As recommended, a single program-branded FOBT kit was used by all laboratories. The kits came with a postage-paid return envelope and simplified instructions. The only dietary restriction was to avoid taking vitamin C or ingesting citrus fruits and juices for three days prior to and during the stool sampling.

In October 2008, Cancer Care Ontario launched its Primary Care Strategy to help increase colorectal cancer screening rates by engaging primary care providers. The strategy includes the Provincial Primary Care and Cancer Network, as well as a provincial primary care lead along with 13 regional primary care leads who work with primary care providers to improve cancer screening rates.

Program Evaluation Framework

Initial program evaluation work included a review of existing frameworks and indicators from other jurisdictions. The decision was made to align the program evaluation with national and international frameworks and indicators to facilitate comparison.

ColonCancerCheck adapted the Canadian Partnership against Cancer's (CPAC) quality determinants framework for the program evaluation. Indicators were defined to align with those established by the European Union.¹⁴

The evaluation framework groups indicators into five domains: participation, screening, diagnostic follow-up, case management and outcomes.

In this inaugural program report, results for the following indicators are included:

- **Participation:** Population fecal occult blood test participation rate
- **Screening:** FOBT-positive rate of those screened in ColonCancerCheck
- **Diagnostic follow-up:** Follow-up colonoscopy rate among program participants
- **Outcomes:** Program invasive-cancer detection rate

Future reports will include results for additional indicators.

Program Indicators

The results reported here are based on calendar year 2008. The analysis focuses on the target population for screening: Ontarians aged 50–74 years. Appendix B provides methodology details. Appendix C provides additional results by age group and Ontario health region, called a Local Health Integration Network or LHIN. (LHINs are Ontario’s regional health authorities. These not-for-profit corporations work with local health providers and community members to determine regional health service priorities. LHINs are responsible for planning, funding and managing health services in their communities.)

I. PARTICIPATION: POPULATION FECAL OCCULT BLOOD TEST PARTICIPATION RATE

Participation rate is the percentage of Ontario men and women of screen-eligible age (50–74 years), who have completed at least one FOBT in the prior two years.

FIGURE 6 | Age-standardized population FOBT participation rate (per 100)

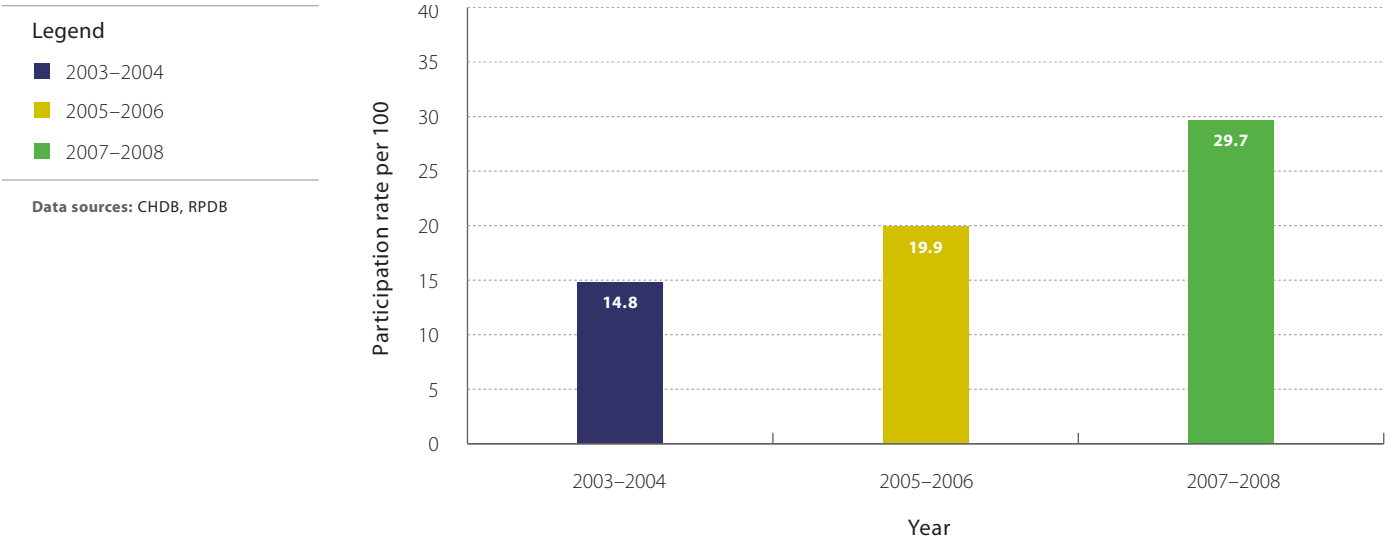
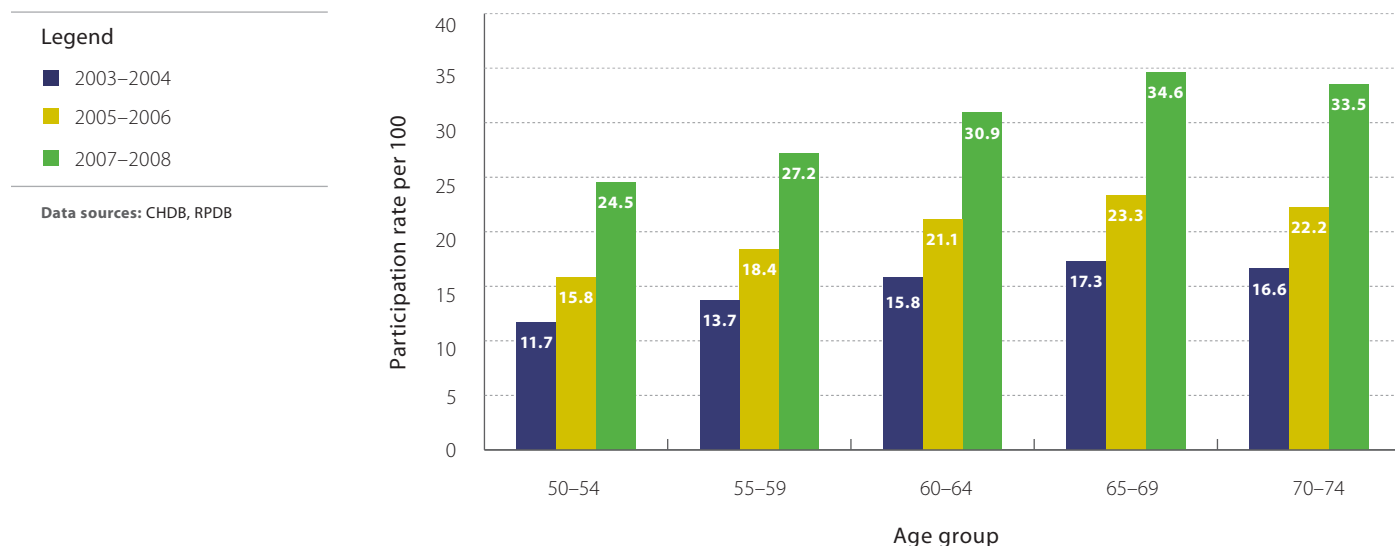


Figure 6 shows participation rates by two year periods. During the most recent period (2007–2008), 29.7% of the 3,257,757 eligible Ontarians had a FOBT. This was double the 2003–2004 rate of 14.8%.

This doubling of the participation rate in 2007–2008 was apparent for both men and women (Table 6) and for all age groups (Figure 7). Overall, the age-standardized FOBT participation rate was higher for women (31.1%) than for men (28.2%) (Table 7). Men in all but the oldest groups had lower participation rates (Table 6).

When FOBT participation rates for 2007–2008 are compared by region, there were increases across all geographical regions in Ontario (Figure 14 and Table 7). There was some variability across regions, ranging from 22.2% participation in North Simcoe Muskoka to 36.0% in the Champlain LHIN.

FIGURE 7 | Population FOBT participation rate (per 100), by age group



II. SCREENING:

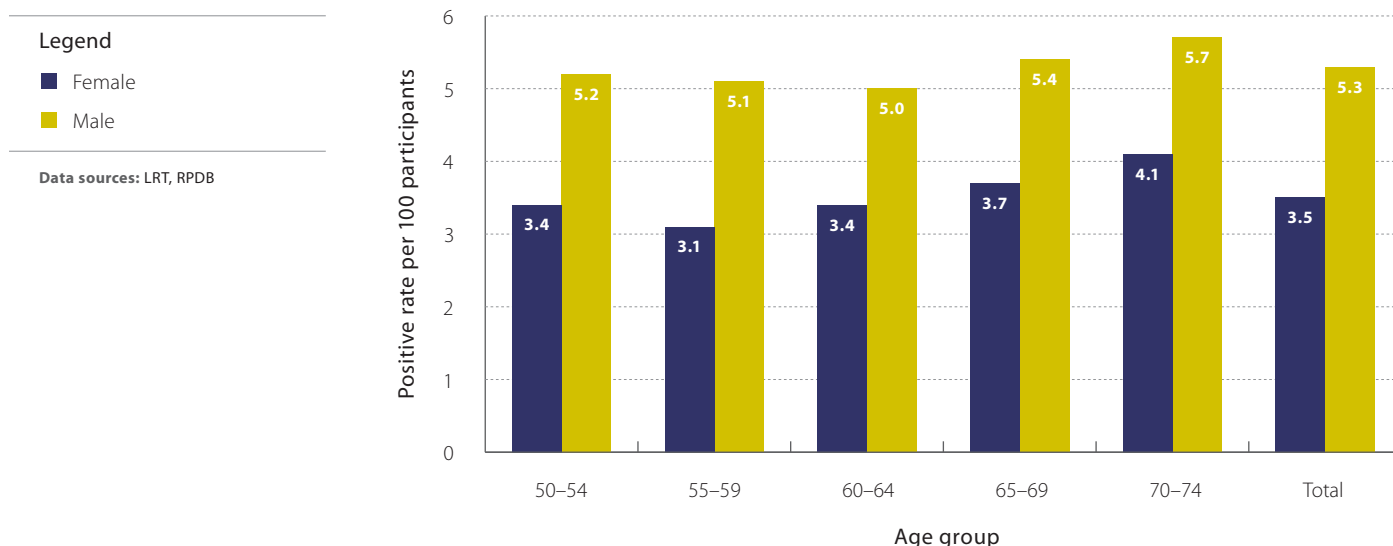
FOBT-POSITIVE RATE OF THOSE SCREENED IN COLONCANCERCHECK

The FOBT-positive rate is the percentage of individuals who have had a positive result with a ColonCancerCheck FOBT during the prior two years.

Overall, men (5.3%) had a higher FOBT-positive rate than did women (3.5%) (Figure 8 and Table 8). Across age groups, those 70–74 years of age had higher positive rates; 5.7% of men and 4.1% of women in this age group screened positive on the FOBT.

The higher positive rate for men compared with women is evident across all LHINs (Figure 15 and Table 9). The lowest FOBT-positive rate was in Champlain LHIN (3.6%), while the two highest were in the Central (4.9%) and Toronto Central (5.0%) LHINs.

FIGURE 8 | FOBT-positive rate of those screened in ColonCancerCheck (per100), by age group (2008)



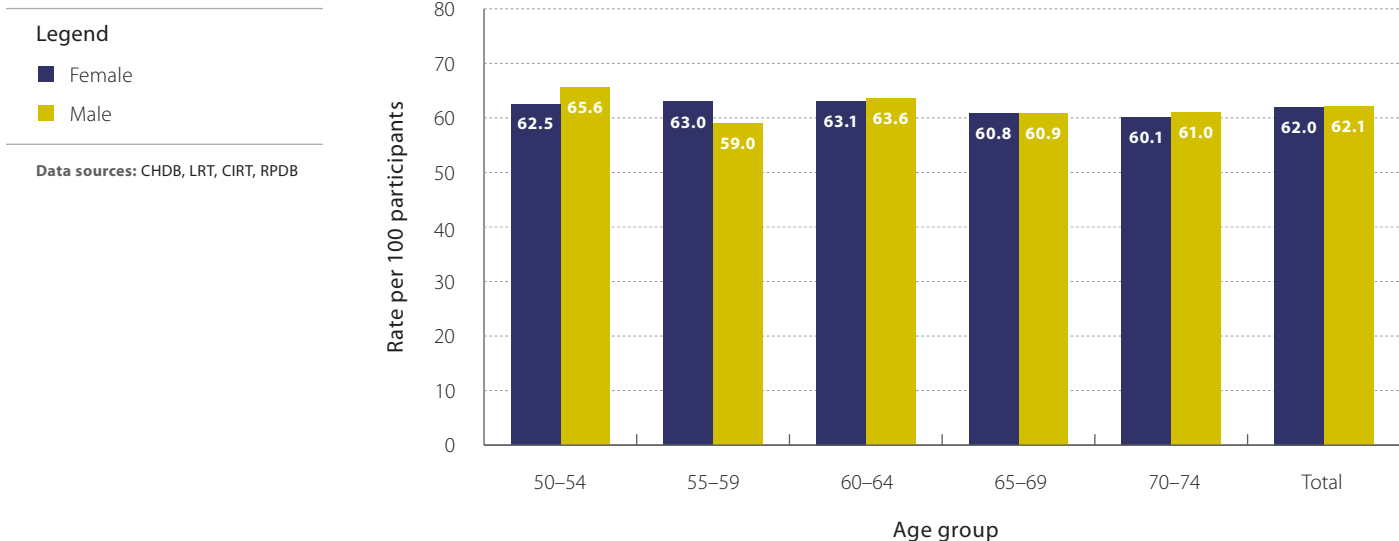
III. DIAGNOSTIC FOLLOW-UP: FOLLOW-UP COLONOSCOPY RATE AMONG PROGRAM PARTICIPANTS

Follow-up colonoscopy rate is the percentage of people with a positive FOBT who undergo a colonoscopy within six months.

Overall, 62.1% of people with a positive FOBT had a colonoscopy within six months; and there was no difference between men and women of all ages (Figure 9 and Table 10). People 50–54 years of age were more likely to have a follow-up colonoscopy (64.1%) within 6 months. In particular, men in this age group were more likely than women to have a follow-up colonoscopy (65.6% vs. 62.5%).

Men aged 55–59 years old were least likely to have a follow-up colonoscopy (59.0%). Those living in the North Simcoe Muskoka LHIN were most likely to have a follow-up colonoscopy (74.8%), compared with other LHINs (Figure 16 and Table 11). The lowest follow-up rate was reported in the Champlain LHIN (52.2%).

FIGURE 9 | Follow-up colonoscopy rate among program participants (per 100), by age group (2008)



IV. OUTCOMES: PROGRAM INVASIVE-CANCER DETECTION RATE

Program invasive-cancer detection rate is the number of individuals in whom colorectal cancer is detected within six months of FOBT or family history (FH) colonoscopy screening, as a proportion of the individuals screened.

The overall cancer detection rate (all ages combined) was 2.3 per 1000 for those screened with either FOBT or FH colonoscopy (Table 12). This rate was higher among men (3.1/1000) than among women (1.7/1000) (Figure 10 and Table 12). The cancer detection rate for FOBT and FH colonoscopy combined increased with age and was highest among those 70 to 74 years of age (4.1/1000).

Men from Erie St. Clair (5.6/1000) and North Simcoe Muskoka (5.8/1000) (Figure 17 and Table 15) had the highest cancer detection rates in the province.

The overall cancer detection rate by FOBT alone was 1.7/1000 with rates increasing by age group (Figure 11 and Table 13). The cancer detection rate was higher for FH colonoscopy (5.8/1000 overall: 4.3 per 1000 for women and 7.9 per 1000 for men) (Figure 12 and Table 14). By age group, those who were 70 to 74 years of age had the highest cancer detection rate for FH colonoscopy at 12.1/1000 (women 9.1/1000 and men 16.2/1000).

FIGURE 10 | Program invasive-cancer detection rate (per 1000)
(FOBT and FH colonoscopy), by age group (2008)

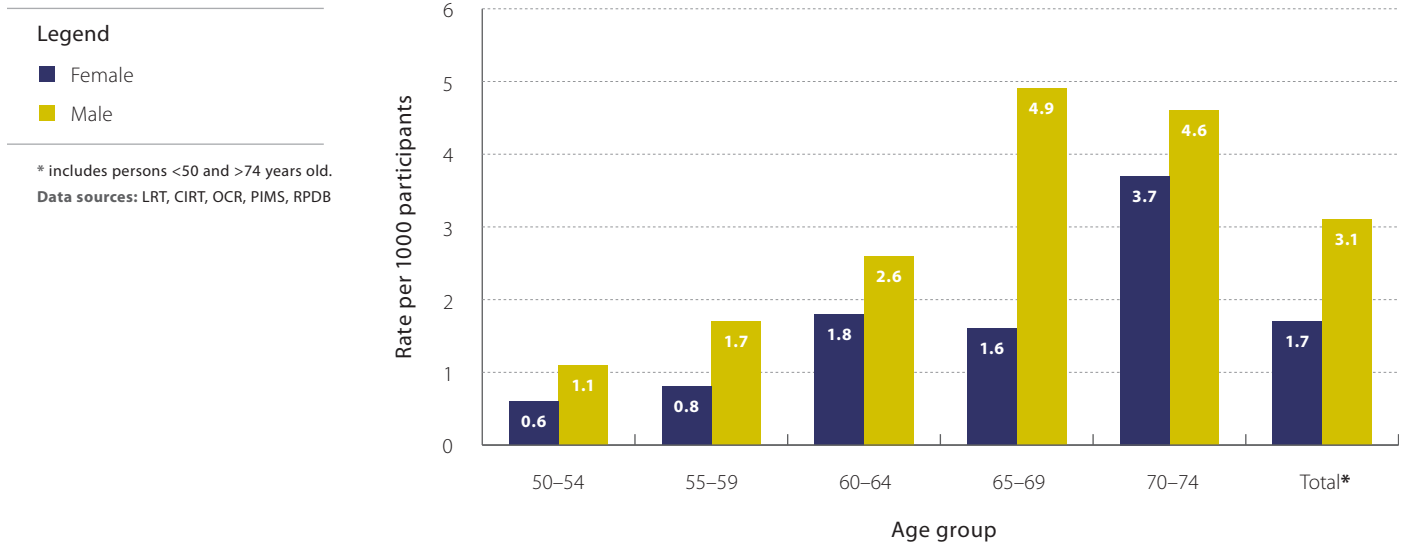


FIGURE 11 | Program invasive-cancer detection rate (per 1000)
(FOBT only), by age group (2008)

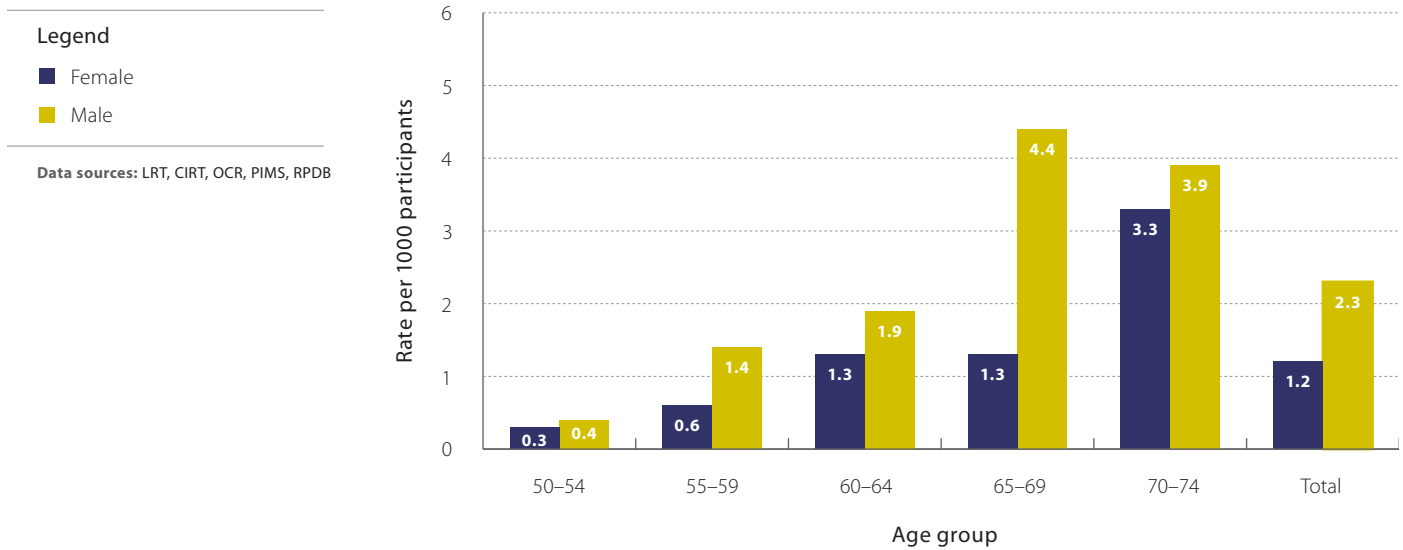
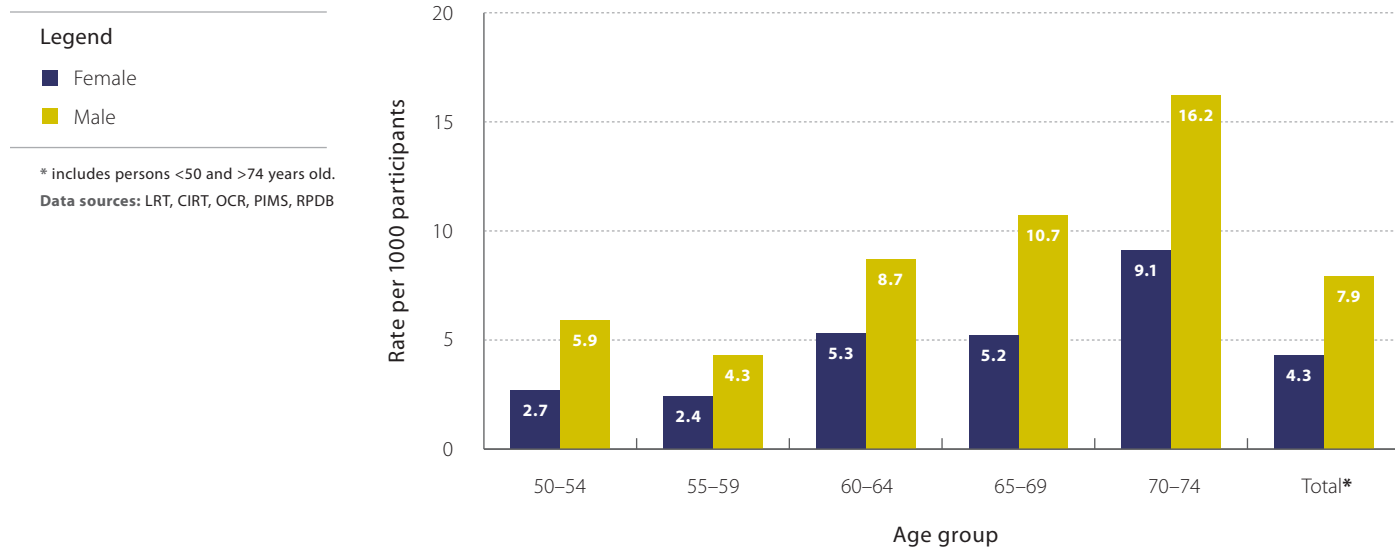


FIGURE 12 | Program invasive-cancer detection rate (per 1000)
(FH colonoscopy only), by age group (2008)



Summary

The early ColonCancerCheck program results are consistent with the experience of other jurisdictions. The results are promising, especially in view of the significant increase in FOBT participation.

The success of a population-based screening program depends on high participation rates. After the first year of Ontario's ColonCancerCheck program, FOBT rates doubled from 14.8% in 2003–2004 to 29.7% in 2007–2008. However, ColonCancerCheck program FOBT participation rates remain below the target identified in the Ontario Cancer Plan, which is 40% FOBT participation by 2011–2012.

Overall, men had a higher FOBT-positive rate (5.3%) than women (3.5%). The higher FOBT-positive rate among men is consistent with the finding observed in the first round of Scotland's FOBT pilot, in which 304,245 persons aged 50 to 69 years participated during 2000–2002. The Scottish pilot used the same FOBT kit as the ColonCancerCheck Program.¹⁵

Overall, 62.1% of ColonCancerCheck Program participants with a positive FOBT had a follow-up colonoscopy within six months. By comparison, in the Scottish FOBT pilot, 85.5% of those with a positive FOBT had a follow-up colonoscopy.¹⁵ Clearly, the Ontario result is too low and efforts are underway to address this key aspect of program performance.

The overall cancer detection rate was 2.3 per 1000 for persons screened with either FOBT or FH colonoscopy. This rate was higher among men (3.1/1000) than among women (1.7/1000). The cancer detection rate for FOBT alone was 1.7/1000. By comparison, the cancer detection rate for the first round of the Scottish FOBT pilot was 2.1/1000, although the definition of a positive FOBT was not the same as that used in the Ontario program.¹⁵

The cancer detection rate for those who underwent a FH colonoscopy was 5.8/1000 in ColonCancerCheck. This is higher than the cancer detection rate for FOBT alone, as expected. By comparison, a recent meta-analysis report found a cancer detection rate of 3/1000 among average-risk persons in North America who underwent colonoscopy.¹⁶ Of note, a meta-analysis of relative risk of colorectal cancer for individuals with a family history of at least one first-degree relative with a history of the disease was 2.24.¹⁷ Our findings are therefore consistent with published evidence.

To achieve the current state of program implementation is a significant accomplishment, given the geography of Ontario, in which 3.3 million persons in the target population (50–74 years) live in an area two times the size of France.

Ongoing performance monitoring, quality assurance and program evaluation are essential to ensuring the benefits of screening in the ColonCancerCheck program are maximized.

Future Directions

The ColonCancerCheck Program focus will be continued roll-out and implementation, including additional public and healthcare provider education and awareness initiatives, along with ongoing monitoring, evaluation and quality assurance.

An information management system is being developed, including a Colorectal Cancer Screening Registry. Making use of this information system, a pilot study will be conducted involving approximately 100 family physicians, who will send screening invitations to their patients and who will receive customized screening performance reports.

The program will also focus on the needs of other populations, including Aboriginal community members.

Appendix A

ColonCancerCheck Goals and Objectives Framework

The ColonCancerCheck Program's goals and objectives framework was established during the fall of 2007 through consultations with ColonCancerCheck program staff, clinical leadership, business leadership and other relevant stakeholders. The framework was developed using a program-logic-model approach, and represents the expected outcomes to be achieved through program implementation over the short, medium and long terms.

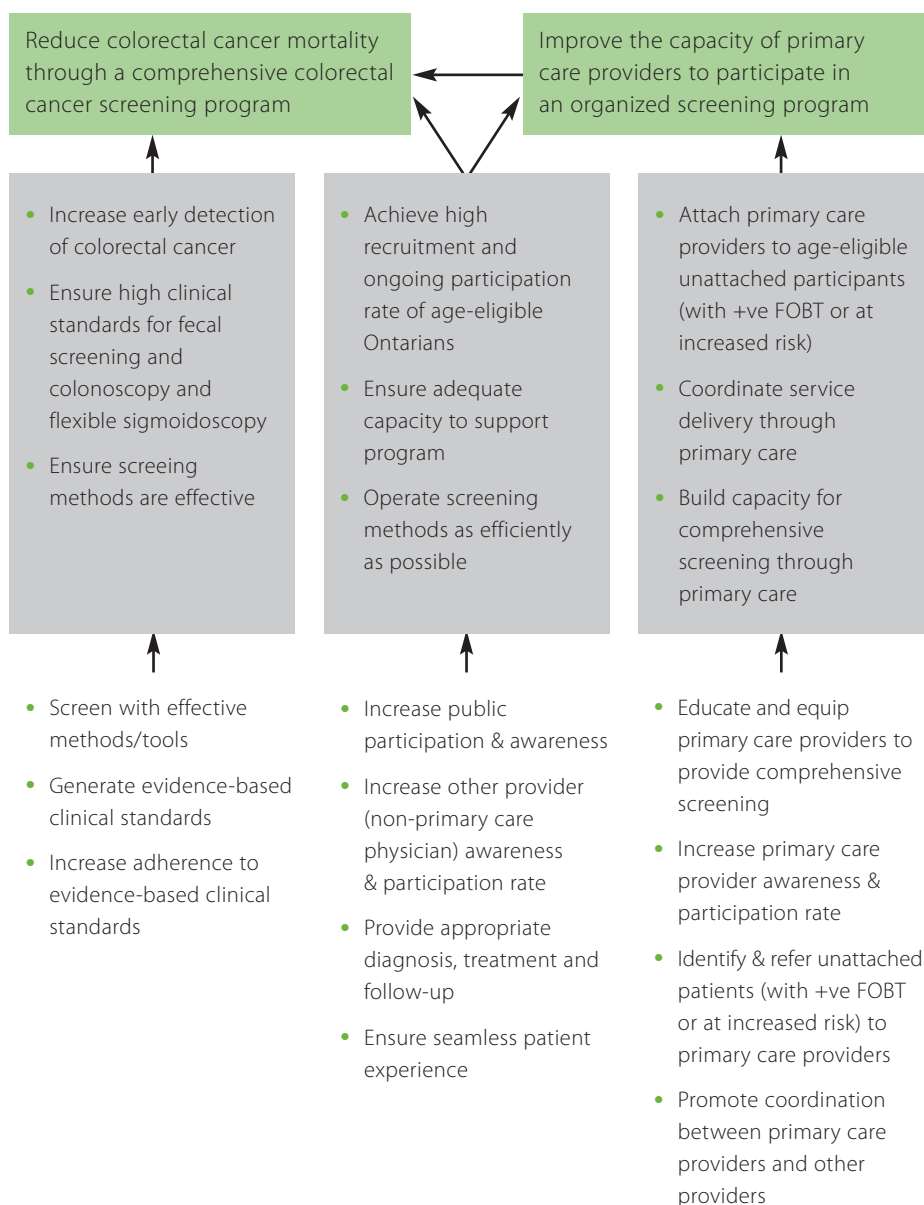
The left-hand side of the framework represents the screening objectives and goals. The right-hand side represents the primary care objectives and goals. The centre represents other provider and public participation objectives and goals.

Figure 13 | ColonCancerCheck Goals and Objectives Framework

LONG-TERM GOALS

SHORT- & MEDIUM-TERM GOALS

OBJECTIVES



Appendix B

Methodology for Program Indicators

This program report focuses on the 2008 calendar year. However some data such as results for FOBT-positive rate were only available from April 1, 2008, onward (following the launch of ColonCancerCheck).

The results are stratified by age, sex and geographic region (LHIN).

The initial analysis includes the entire age-eligible target group.

Sex and age at screening were determined by using health card numbers through linkage with the Registered Persons Data Base (RPDB).

Participant residence was determined by linking postal code with MOHLTC LHIN tables.

Wherever feasible and appropriate, indicators were calculated at the population and program level. Indicators cannot currently be adjusted to reflect individual risk level for colorectal cancer, such as family history status.

Tables 1 through 4 specify the detailed methods used to calculate the indicators included in this report. The *ColonCancerCheck 2008 Program Report* utilizes information from the MOHLTC administrative databases and Cancer Care Ontario's clinical datasets. Table 5 describes these databases and any data limitations.

TABLE 1 | Participation: Population FOBT participation rate methodology

Indicator	I. Participation: Population FOBT participation rate
Definition	The percentage of Ontario men and women of screen-eligible age (50-74 years), who have completed at least one FOBT in the prior two years
Calculations	$\frac{\text{Number of individuals completing at least one FOBT in the prior 2 years}}{\text{Target population (populations averaged over a period of time)}} \times 100 = \text{Population FOBT Participation Rate (\%)}$
Analysis	- For calendar years 2003 to 2008 (03–04, 05–06, 07–08) - Age-standardized % of women, men, total aged 50-74 with ≥ 1 FOBT by LHIN
Considerations	- Include only FOBT as a primary screening test; the target population at increased risk (1st degree relative with previous colorectal cancer) cannot be accurately identified, and the provincial number of primary screening colonoscopies cannot be captured - Indicator currently published in Cancer System Quality Index (CSQI) - International comparisons are most reliable without complex exclusion criteria (i.e., previous colorectal cancer or those who have had a colonoscopy)
Technical Specifications	- Individuals with an FOBT are identified by OHIP fee codes: - G004 Lab.med.in office – occult blood - L179 ColonCancerCheck Fecal Occult Blood Testing (new in 2008) - L181 Lab Med – Biochem – Occult Blood - Multiple claims with unique Health Insurance Number (HIN), service date and fee code assumed to be a single claim - Registered Persons Data Base (RPDB) is used as the definitive source for date of birth, sex, and postal code - Local Health Integration Network (LHIN) assignment is based on postal code conversion file (PCCF+), version 5e Exclusions: - Individuals not residing in Ontario or with an unknown place of residence - Individuals aged 49 and under or 75 and over or of indeterminate age - Individuals with missing date of birth, sex or postal code in both OHIP and RPDB
Numerator	- Total number of age-eligible individuals who used and returned a FOBT kit irrespective of result - Note that each individual is counted once regardless of the number of tests performed
Denominator	- Total number of age-eligible individuals residing in Ontario within a given period adjusted to the 1991 Canadian population using the direct method - Calculated as the average of the two years included in the period
Other Jurisdictions	- CPAC: Participation rate = (Number tested/Number in target) - EU: Participation rate = (Number tested/Number in target)
Data Sources	- CHDB – FOBT volume (January 2002 – December 2008) - RPDB – patient demographics (January 2002 – December 2008)
Data Availability & Limitations	- Population level analysis requires OHIP lab claims data, currently received by CCO through a data sharing agreement with MOHLTC - Most recent period = Jan–Dec 2008 Limitations: - Small proportion of FOBTs performed as a diagnostic test cannot be excluded from the analysis - Any FOBT analyzed in hospital labs will not be captured (very minimal)

TABLE 2 | Screening: FOBT-positive rate of those screened in ColonCancerCheck methodology

Indicator	II. Screening: FOBT-Positive Rate of those Screened in ColonCancerCheck
Definition	The percentage of individuals who have had a positive result with a ColonCancerCheck FOBT during the prior two years
Calculations	$\frac{\text{Number of individuals with a positive FOBT result}}{\text{Number of individuals with a positive or negative FOBT result}} \times 100 = \text{Positive Rate (\%)}$
Analysis	- For April – December 2008 % of women, men, total aged 50-74 with ≥1 positive FOBT result by LHIN
Considerations	- Can only be calculated for program FOBT kits - Currently this is calculated at the test level for monthly reporting; this is still appropriate for internal program management/lab quality control - Definition of a positive result for a kit may not be consistent across jurisdictions: Ontario uses one or more positive windows, regardless of the number of windows containing a stool sample
Technical Specifications	- Individuals with more than one FOBT during the specified period are included based on the following hierarchy: positive and then negative - RPDB is used as the definitive source for date of birth, sex, and postal code - LHIN assignment is based on PCCF+5e - provider's postal code is used as a proxy for participant LHIN, if postal code is missing Exclusions: - FOBT kits with missing or invalid HIN - Records with missing date of birth, sex, or postal code in both LRT and RPDB - Those who were diagnosed with colorectal cancer prior to the screening date
Numerator	Total number of individuals who have a positive result from a program-branded FOBT
Denominator	- Total number of individuals who had a positive or negative result from a program FOBT kit - Note that each individual is counted once regardless of the number of tests performed
Other Jurisdictions	- CPAC: Positivity rate = (Number with positive FOBT/Number with an adequate test) - EU: Positivity rate = (Number with positive FOBT/Number with an adequate test)
Data Sources	- LRT – FOBT volumes (Apr 2008 – Dec 2008) - RPDB – patient demographics (Apr 2008 – December 2008)
Data Availability & Limitations	- Result information on program-branded kits available to CCO through LRT, for participating community labs only - Calculated for most recent period available: April–Dec 2008

TABLE 3 | Diagnostic Follow-up: Follow-up colonoscopy rate among program participants methodology

Indicator	III. Diagnostic Follow-up: Follow-up colonoscopy rate among program participants
Definition	The percentage of people with a positive FOBT who undergo colonoscopy within six months
Calculations	$\frac{\text{Number of individuals with positive FOBT result undergoing colonoscopy within 6 months}}{\text{Number of individuals with positive FOBT result}} \times 100 = \text{Follow-up Rate (\%)}$
Analysis	- For April – December 2008 % of women, men, total aged 50–74 with colonoscopy within 6 months of positive FOBT by LHIN
Considerations	All colonoscopies (program, non-program in-hospital, and non-hospital) will need to be included to create a true measure of how many individuals undergo a follow-up colonoscopy
Technical Specifications	- Time to colonoscopy is calculated from the first positive FOBT to the first colonoscopy - Colonoscopy is defined as Z555A in OHIP and all indications from CIRT - Multiple claims with unique HIN, service date and fee code assumed to be a single claim - RPDB is used as the definitive source for date of birth, sex, and postal code - LHIN assignment is based on PCCF+5e Exclusions: - Those who had missing/invalid HIN in LRT and CIRT - Those with missing date of birth, sex, or postal code in both LRT/CIRT and RPDB - Those who were diagnosed with colorectal cancer prior to the screening date
Numerator	Total number of individuals who have a positive result with a program-branded FOBT kit and undergo a colonoscopy within 6 months, regardless of whether the colonoscopy was complete
Denominator	- Total number of individuals who have a positive result with a program-branded FOBT kit - Note that each individual is counted once regardless of the number of tests performed
Other Jurisdictions	- CPAC: Follow-up completion = (Number who undergo colonoscopy/Number with a positive FOBT) - EU: Colonoscopy compliance = (Number who undergo colonoscopy/Number with a positive FOBT)
Data Sources	- CHDB – colonoscopy volume (April 2008 – June 2009) - LRT – FOBT volume (April 2008 – December 2008) - CIRT – colonoscopy volume (April 2008 – June 2009) - RPDB – patient demographic information
Data Availability & Limitations	- Individuals with a positive FOBT result (using a program branded kit) are available from LRT as of April 2008 - Colonoscopy activity data can be identified in several ways: 1) through CIRT; 2) through NACRS; or 3) through OHIP claims; a combination of these data sets will be required to capture all colonoscopy activity

TABLE 4 | Outcomes: Program invasive-cancer detection rate methodology

Indicator	IV. Outcomes: Program invasive-cancer detection rate
Definition	The number of individuals in whom colorectal cancer is detected within 6 months of a FOBT or family history (FH) colonoscopy screening, as a proportion of individuals screened
Calculations	$\frac{\text{Number of invasive cancers detected}}{\text{Number of individuals completing an FOBT kit or FH colonoscopy at risk of disease (time weighted)}} \times 1000 = \text{Invasive-Cancer Detection Rate (per 1000)}$
Analysis	- For April – September 2008, to ensure adequate information is available from Ontario Cancer Registry (OCR) % of women, men, total aged 50–74 with FOBT (all ages included for FH Colonoscopy) with ≥1 invasive cancer detected by LHIN
Considerations	- Stratify into two indicators: completion of a program-branded FOBT as the primary screen; and completion of a FH colonoscopy as the primary screen - Cancer detection will be considered to be related to the FOBT or FH colonoscopy if identified in the OCR within 6 months after reporting of FOBT result or colonoscopy
Technical Specifications	- Individuals who have completed both an FOBT and a FH colonoscopy within the analysis period will be counted in the FOBT group - For those who had more than one FOBT or FH colonoscopy, the screening date is defined as the earliest FOBT date or FH colonoscopy date - RPDB is used as the definitive source for date of birth, sex, and postal code - LHIN assignment is based on PCCF+5e - provider's postal code is used as a proxy for participant LHIN, if postal code is missing Exclusions: - Those who had missing/invalid HIN in LRT and CIRT - Those with missing date of birth, sex, or postal code in both LRT/CIRT and RPDB - Those who were diagnosed with colorectal cancer prior to the screening date
Numerator	- Number of individuals diagnosed with invasive colorectal cancer within 6 months as a direct result of the screening program - Cancer detected after an FOBT is only counted if result was positive
Denominator	- Total number of individuals who used and returned a program FOBT kit irrespective of result or had an FH colonoscopy - Note that each individual is counted once regardless of the number of tests performed - Individuals are weighted based on the date of cancer detection, e.g. an individual detected with cancer 2 months after screen is included in the denominator as 2/6 - Individuals who have completed both a FOBT and a FH colonoscopy within the analysis period will be counted in the FOBT group
Other Jurisdictions	- CPAC: Program cancer detection rate = (Number of participants diagnosed with cancer by screening process (%)) - EU: Cancer detection rate = (Number with at least one detected cancer/Number adequately tested)
Data Sources	- LRT – FOBT volumes (Apr 2008 – Sept 2008) - CIRT – FH colonoscopy volumes (Apr 2008 – Sep 2008) - OCR – resolved cancer cases (Apr 2008 – Mar 2009) - PIMS – pathology reports (Apr 2008 – Mar 2009) - RPDB – patient demographics (Apr 2008 – Sept 2008)
Data Availability & Limitations	- Invasive cancers detected are available from the Ontario Cancer Registry. Due to lag time in completion of the OCR, cancers may be confirmed using pathology reports from the ePath system - Number of individuals completing a program FOBT kit within the period is available through LRT as of April 1, 2008

TABLE 5 | Data Sources

Data Source	Type of Data	Notes
Registered Persons Database (RPDB) (MOHLTC)	Demographic information such as name, date of birth, date of death if applicable, address and LHIN	Data may be inaccurate if a person has recently moved or died; information about persons under age 50 and over 74 is not available to CCC
OHIP Claims History Database (CHDB) (MOHLTC)	Colonoscopy and FOBT service history	As claims may be submitted up to 6 months after the service date, some recent services may not be identified
Colonoscopy Interim Reporting Tool (CIRT) (CCO)	Colonoscopy procedure information from CCC participating hospitals	Data are available from April 2007 onwards; contains information from all participating hospitals performing about 90 percent of all hospital-based colonoscopies in Ontario; does not include colonoscopies performed outside of hospitals
Laboratory Reporting Tool (LRT) (CCO)	CCC program FOBT kit distribution, dispensing, and results from eight CCC partner laboratories, including the CPSO number of the ordering physician	Data are available on CCC FOBT kits processed from April 2008 onwards
Ontario Cancer Registry (OCR) Information System (CCO)	Information on all Ontario residents who have been newly diagnosed with cancer ("incidence") or who have died of cancer ("mortality"); all new cases of cancer are registered, except non-melanoma skin cancer. For this report, OCR identifies colorectal cancer diagnoses	Contains data on colorectal cancer diagnoses from 1964 onwards
Pathology Information Management System (PIMS) (CCO)	Pathological information from hospitals and private labs on all Ontario residents as the foundation data source for initial identification of a patient into the cancer system	Contains pathological and diagnostic information for colorectal cancer from 1998; for this report, PIMS identifies persons with colorectal cancer who have not been registered in the OCR yet

CCC = ColonCancerCheck

Appendix C

Additional Program Indicator Tables and Figures

I. PARTICIPATION

TABLE 6 | Population FOBT participation rate (per 100), by age group

Age Group	2003–2004			2005–2006			2007–2008		
	Female	Male	All	Female	Male	All	Female	Male	All
50-54	12.6	10.6	11.7	17.1	14.4	15.8	26.7	22.3	24.5
55-59	14.6	12.8	13.7	19.7	17.0	18.4	29.0	25.3	27.2
60-64	16.6	14.9	15.8	22.2	20.0	21.1	32.5	29.3	30.9
65-69	17.6	16.8	17.3	24.0	22.6	23.3	35.8	33.2	34.6
70-74	16.5	16.8	16.6	22.1	22.4	22.2	33.5	33.5	33.5

Data sources: OHIP Claims History Database (CHDB), Registered Person Database (RPDB)

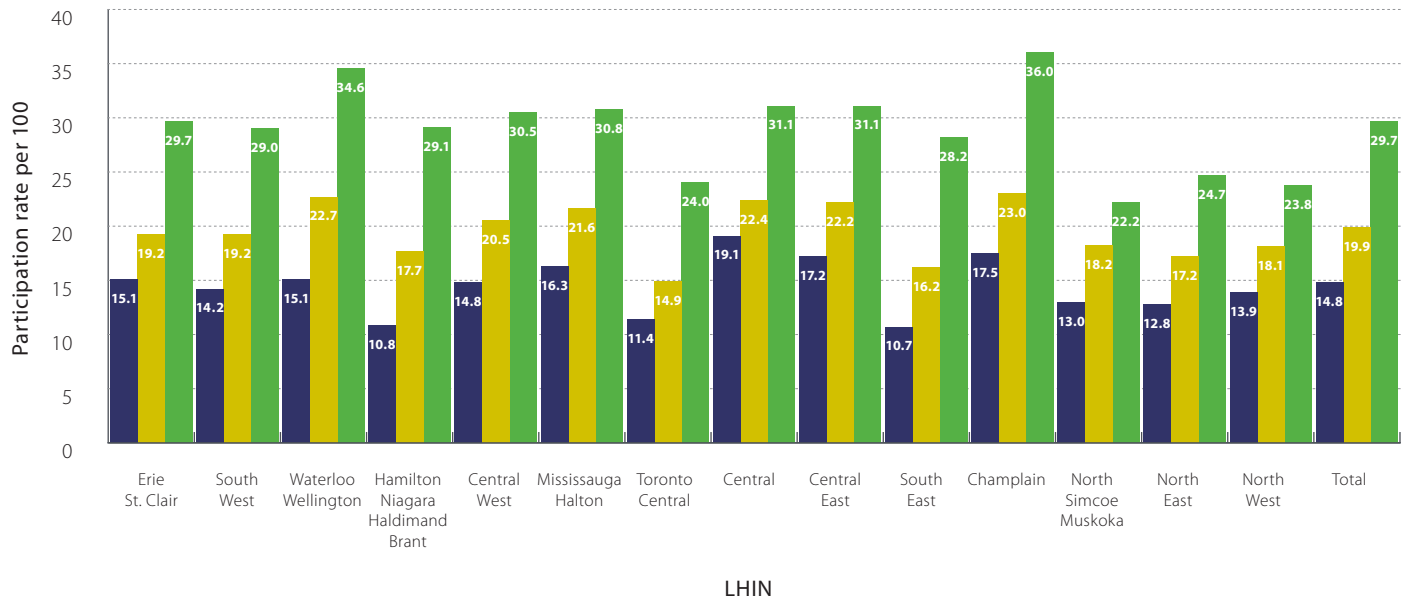
TABLE 7 | Age-standardized population FOBT participation rate (per 100), by LHIN

LHIN	2003–2004				2005–2006				2007–2008			
	Female	Male	All	CI	Female	Male	All	CI	Female	Male	All	CI
Erie St. Clair	15.7	14.6	15.1	15.0–15.3	19.5	18.8	19.2	19.0–19.4	31.0	28.5	29.7	29.5–30.0
South West	14.9	13.4	14.2	14.0–14.3	20.3	18.1	19.2	19.0–19.4	30.7	27.2	29.0	28.8–29.2
Waterloo Wellington	15.9	14.2	15.1	14.9–15.3	23.9	21.4	22.7	22.4–22.9	36.3	32.9	34.6	34.3–34.9
Hamilton Niagara Haldimand Brant	11.0	10.6	10.8	10.7–10.9	18.3	17.0	17.7	17.5–17.8	30.3	27.9	29.1	29.0–29.3
Central West	15.0	14.7	14.8	14.6–15.0	20.9	20.1	20.5	20.3–20.7	31.4	29.6	30.5	30.2–30.8
Mississauga Halton	16.9	15.6	16.3	16.1–16.4	22.5	20.6	21.6	21.4–21.8	32.1	29.5	30.8	30.6–31.0
Toronto Central	11.9	10.9	11.4	11.3–11.6	15.7	13.9	14.9	14.7–15.0	25.4	22.4	24.0	23.8–24.2
Central	19.8	18.3	19.1	18.9–19.2	23.4	21.4	22.4	22.3–22.6	32.6	29.4	31.1	30.9–31.2
Central East	17.9	16.5	17.2	17.1–17.4	23.2	21.2	22.2	22.1–22.4	32.6	29.4	31.1	30.9–31.3
South East	11.5	10.0	10.7	10.6–10.9	17.4	15.1	16.2	16.0–16.5	30.0	26.4	28.2	28.0–28.5
Champlain	18.7	16.2	17.5	17.3–17.7	24.6	21.3	23.0	22.8–23.2	37.9	34.1	36.0	35.8–36.3
North Simcoe Muskoka	13.3	12.7	13.0	12.8–13.2	18.8	17.6	18.2	18.0–18.5	23.3	21.2	22.2	22.0–22.5
North East	13.6	12.1	12.8	12.7–13.0	18.3	16.0	17.2	17.0–17.4	26.2	23.2	24.7	24.5–25.0
North West	14.8	13.1	13.9	13.6–14.2	19.2	17.0	18.1	17.7–18.4	25.6	22.0	23.8	23.4–24.2
Total	15.4	14.1	14.8	14.7–14.8	20.8	18.9	19.9	19.8–19.9	31.1	28.2	29.7	29.6–29.7

CI = confidence interval

Data sources: OHIP Claims History Database (CHDB), Registered Person Database (RPDB)

FIGURE 14 | Age-standardized population FOBT participation rate (per 100), by LHIN



Legend: ■ 2003-2004 ■ 2005-2006 ■ 2007-2008
Data sources: OHIP Claims History Database (CHDB), Registered Persons Database (RPDB)

II. SCREENING

TABLE 8 | FOBT-positive rate of those screened in ColonCancerCheck (per 100), by age group (2008)

Age Group	Female			Male			All		
	+ FOBT	Total	% Positive	+ FOBT	Total	% Positive	+ FOBT	Total	% Positive
50-54	949	27,565	3.4	1,036	19,750	5.2	1,985	47,315	4.2
55-59	812	25,905	3.1	991	19,248	5.1	1,803	45,153	4.0
60-64	852	25,212	3.4	980	19,420	5.0	1,832	44,632	4.1
65-69	811	21,755	3.7	914	16,973	5.4	1,725	38,728	4.5
70-74	706	17,324	4.1	816	14,309	5.7	1,522	31,633	4.8
Total	4,130	117,761	3.5	4,737	89,700	5.3	8,867	207,461	4.3

+FOBT = positive FOBT
Data sources: CCO Laboratory Reporting Tool (LRT), Registered Persons Database (RPDB)

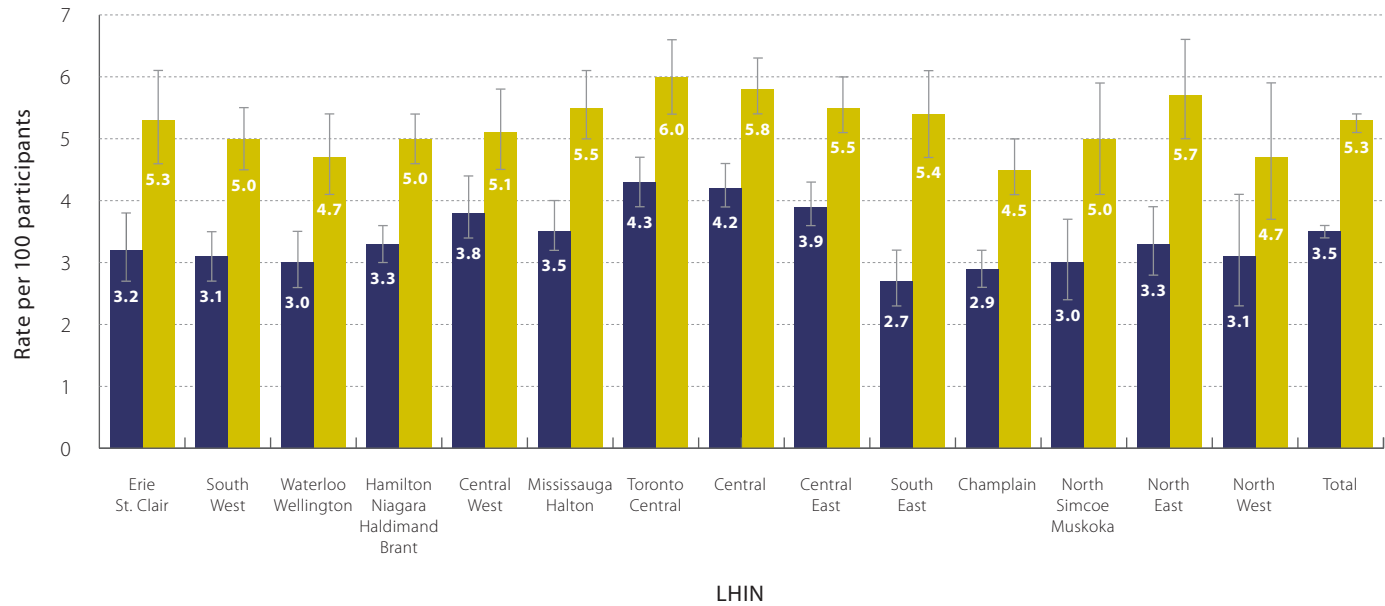
TABLE 9 | FOBT-positive rate of those screened in ColonCancerCheck (per 100), by LHIN (2008)

LHIN	Female				Male				All			
	+ FOBT	Total	% Positive	CI	+ FOBT	Total	% Positive	CI	+ FOBT	Total	% Positive	CI
Erie St. Clair	154	4,767	3.2	2.7–3.8	207	3,870	5.3	4.6–6.1	361	8,637	4.2	3.8–4.6
South West	284	9,238	3.1	2.7–3.5	349	7,009	5.0	4.5–5.5	633	16,247	3.9	3.6–4.2
Waterloo Wellington	179	5,916	3.0	2.6–3.5	216	4,594	4.7	4.1–5.4	395	10,510	3.8	3.4–4.2
Hamilton Niagara Haldimand Brant	469	14,403	3.3	3.0–3.6	576	11,480	5.0	4.6–5.4	1,045	25,883	4.0	3.8–4.3
Central West	228	5,928	3.8	3.4–4.4	241	4,687	5.1	4.5–5.8	469	10,615	4.4	4.0–4.8
Mississauga Halton	336	9,476	3.5	3.2–4.0	402	7,293	5.5	5.0–6.1	738	16,769	4.4	4.1–4.7
Toronto Central	393	9,190	4.3	3.9–4.7	391	6,539	6.0	5.4–6.6	784	15,729	5.0	4.6–5.4
Central	685	16,193	4.2	3.9–4.6	691	11,881	5.8	5.4–6.3	1,376	28,074	4.9	4.7–5.2
Central East	578	14,709	3.9	3.6–4.3	621	11,276	5.5	5.1–6.0	1,199	25,985	4.6	4.4–4.9
South East	156	5,763	2.7	2.3–3.2	227	4,228	5.4	4.7–6.1	383	9,991	3.8	3.5–4.2
Champlain	377	12,961	2.9	2.6–3.2	416	9,243	4.5	4.1–5.0	793	22,204	3.6	3.3–3.8
North Simcoe Muskoka	96	3,196	3.0	2.4–3.7	124	2,505	5.0	4.1–5.9	220	5,701	3.9	3.4–4.4
North East	142	4,307	3.3	2.8–3.9	201	3,511	5.7	5.0–6.6	343	7,818	4.4	3.9–4.9
North West	53	1,713	3.1	2.3–4.1	75	1,584	4.7	3.7–5.9	128	3,297	3.9	3.2–4.6
Total	4,130	117,760	3.5	3.4–3.6	4,737	89,700	5.3	5.1–5.4	8,867	207,460	4.3	4.2–4.4

CI = confidence interval

Data sources: CCO Laboratory Reporting Tool (LRT), Registered Persons Database (RPDB)

FIGURE 15 | FOBT-positive rate for those screened in ColonCancerCheck (per 100), by LHIN (2008)



Legend: ■ Female ■ Male

Data sources: CCO Laboratory Reporting Tool (LRT), Registered Persons Database (RPDB)

III. DIAGNOSTIC FOLLOW-UP

TABLE 10 | Follow-up colonoscopy rate among program participants (per 100), by age group (2008)

Age Group	Female			Male			All		
	Those with Follow up	Total	% Follow up	Those with Follow up	Total	% Follow up	Those with Follow up	Total	% Follow up
50-54	593	949	62.5	680	1,036	65.6	1,273	1,985	64.1
55-59	510	810	63.0	584	989	59.0	1,094	1,799	60.8
60-64	538	853	63.1	623	980	63.6	1,161	1,833	63.3
65-69	494	812	60.8	558	916	60.9	1,052	1,728	60.9
70-74	424	706	60.1	498	816	61.0	922	1,522	60.6
Total	2,559	4,130	62.0	2,943	4,737	62.1	5,502	8,867	62.1

Data sources: OHIP Claims History Database (CHDB), Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Registered Persons Database (RPDB)

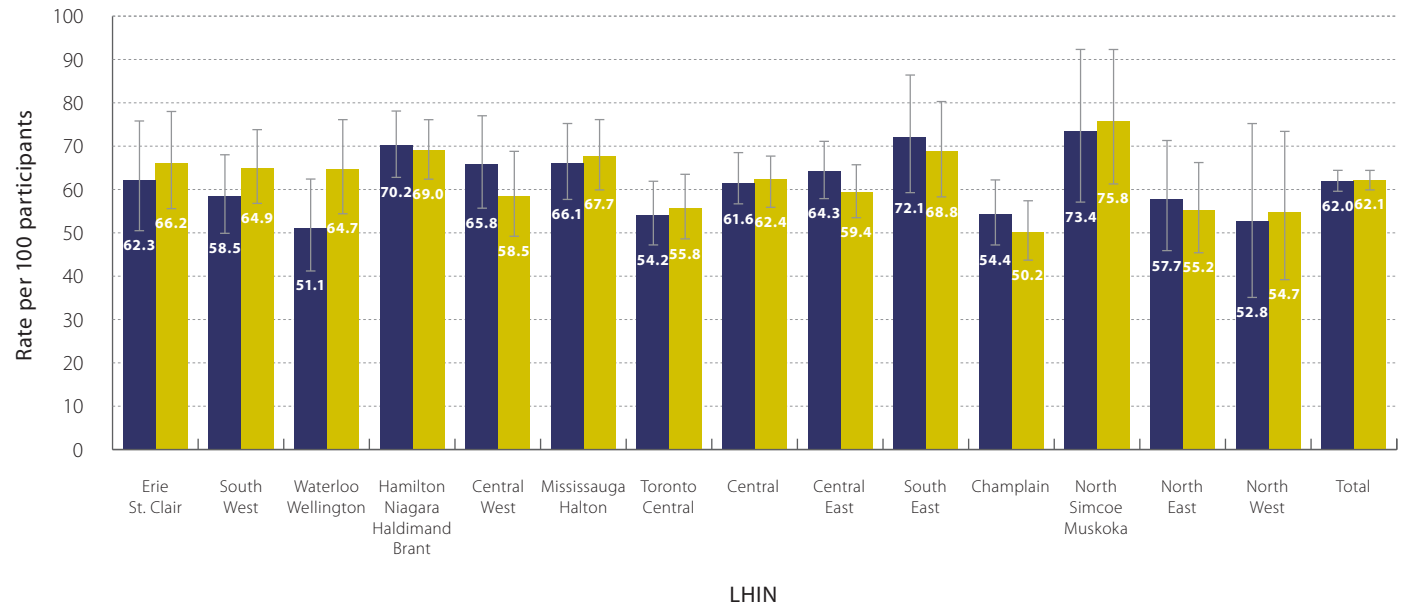
TABLE 11 | Follow-up colonoscopy rate among program participants (per 100), by LHIN (2008)

LHIN	Female				Male				All			
	Those with Follow up	Total	% Follow up	CI	Those with Follow up	Total	% Follow up	CI	Those with Follow up	Total	% Follow up	CI
Erie St. Clair	96	154	62.3	50.5–75.8	137	207	66.2	50.5–75.8	233	361	64.5	56.5–73.4
South West	165	282	58.5	49.9–68.0	226	348	64.9	49.9–68.0	391	630	62.1	56.1–68.5
Waterloo Wellington	92	180	51.1	41.2–62.4	139	215	64.7	41.2–62.4	231	395	58.5	51.2–66.5
Hamilton Niagara Haldimand Brant	330	470	70.2	62.8–78.1	399	578	69.0	62.8–78.1	729	1,048	69.6	64.6–74.8
Central West	150	228	65.8	55.7–77.0	141	241	58.5	55.7–77.0	291	469	62.1	55.1–69.6
Mississauga Halton	222	336	66.1	57.7–75.2	272	402	67.7	57.7–75.2	494	738	66.9	61.2–73.1
Toronto Central	213	393	54.2	47.2–61.9	218	391	55.8	47.2–61.9	431	784	55.0	49.9–60.4
Central	422	685	61.6	55.9–67.7	432	692	62.4	55.9–67.7	854	1,377	62.0	57.9–66.3
Central East	373	580	64.3	57.9–71.1	369	621	59.4	57.9–71.1	742	1,201	61.8	57.4–66.4
South East	111	154	72.1	59.3–86.4	154	224	68.8	59.3–86.4	265	378	70.1	61.9–79.1
Champlain	206	379	54.4	47.2–62.2	210	418	50.2	47.2–62.2	416	797	52.2	47.3–57.5
North Simcoe Muskoka	69	94	73.4	45.9–71.3	94	124	75.8	45.9–71.3	163	218	74.8	63.7–87.2
North East	82	142	57.7	57.1–92.3	111	201	55.2	57.1–92.3	193	343	56.3	48.6–64.8
North West	28	53	52.8	35.1–75.2	41	75	54.7	35.1–75.2	69	128	53.9	41.9–68.2
Total	2,559	4,130	62.0	59.6–64.4	2,943	4,737	62.1	59.6–64.4	5,502	8,867	62.1	60.4 –63.7

CI = confidence interval

Data sources: OHIP Claims History Database (CHDB), Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Registered Persons Database (RPDB)

FIGURE 16 | Follow-up colonoscopy rate among program participants (per 100), by LHIN (2008)



Legend: ■ Female ■ Male

Data sources: OHIP Claims History Database (CHDB), Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Registered Persons Database (RPDB)

IV. OUTCOMES

TABLE 12 | Program invasive-cancer detection rate (per 1000) (FOBT and FH colonoscopy), by age and sex (2008)

Age Group	Female			Male			All		
	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000
50-54	10	17,586	0.6	13	12,279	1.1	23	29,865	0.8
55-59	13	16,606	0.8	21	12,018	1.7	34	28,624	1.2
60-64	28	15,975	1.8	31	12,033	2.6	59	28,008	2.1
65-69	22	13,706	1.6	51	10,460	4.9	73	24,166	3.0
70-74	40	10,825	3.7	41	8,841	4.6	81	19,666	4.1
Total *	131	78,724	1.7	179	58,410	3.1	310	137,134	2.3

* includes persons <50 and >74 years old.

CI = confidence interval

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

TABLE 13 | Program invasive-cancer detection rate (per 1000) (FOBT only), by age and sex (2008)

Age Group	Female			Male			All		
	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000
50-54	4	15,383	0.3	4	10,755	0.4	8	26,138	0.3
55-59	8	14,544	0.6	15	10,635	1.4	23	25,179	0.9
60-64	19	14,275	1.3	21	10,887	1.9	40	25,162	1.6
65-69	16	12,540	1.3	42	9,614	4.4	58	22,154	2.6
70-74	33	10,054	3.3	32	8,286	3.9	65	18,340	3.5
Total	80	66,796	1.2	114	50,177	2.3	194	116,973	1.7

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

TABLE 14 | Program invasive-cancer detection rate (per 1000) (FH colonoscopy only), by age and sex (2008)

Age Group	Female			Male			All		
	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000	Cancers detected	Screenees	Per 1000
50-54	6	2,203	2.7	9	1,524	5.9	15	3,727	4.0
55-59	5	2,062	2.4	6	1,383	4.3	11	3,445	3.2
60-64	9	1,700	5.3	10	1,146	8.7	19	2,846	6.7
65-69	6	1,166	5.2	9	846	10.7	15	2,012	7.5
70-74	7	771	9.1	9	555	16.2	16	1,326	12.1
Total *	51	11,928	4.3	65	8,233	7.9	116	20,161	5.8

* includes persons <50 and >74 years old.

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

TABLE 15 | Program invasive-cancer detection rate (per 1000) (FOBT and FH Colonoscopy), by LHIN (2008)

LHIN	Female				Male				All			
	Cancers detected	Screenees	Per 1000	CI	Cancers detected	Screenees	Per 1000	CI	Cancers detected	Screenees	Per 1000	CI
Erie St. Clair	7	3,886	1.8	0.7–3.7	17	3,041	5.6	3.3–9.0	24	6,926	3.5	2.2–5.2
South West	15	6,511	2.3	1.3–3.8	12	4,740	2.5	1.3–4.4	27	11,250	2.4	1.6–3.5
Waterloo Wellington	2	3,986	0.5	0.1–1.8	11	2,861	3.8	1.9–6.9	13	6,848	1.9	1.0–3.2
Hamilton Niagara Haldimand Brant	23	9,697	2.4	1.5–3.6	22	7,707	2.9	1.8–4.3	45	17,404	2.6	1.9–3.5
Central West	9	3,897	2.3	1.1–4.4	7	2,968	2.4	0.9–4.9	16	6,865	2.3	1.3–3.8
Mississauga Halton	11	6,227	1.8	0.9–3.2	12	4,732	2.5	1.3–4.4	23	10,959	2.1	1.3–3.1
Toronto Central	6	5,684	1.1	0.4–2.3	7	3,928	1.8	0.7–3.7	13	9,612	1.4	0.7–2.3
Central	12	10,442	1.1	0.6–2.0	25	7,511	3.3	2.2–4.9	37	17,952	2.1	1.5–2.8
Central East	15	9,663	1.6	0.9–2.6	23	7,337	3.1	2.0–4.7	38	17,000	2.2	1.6–3.1
South East	6	3,839	1.6	0.6–3.4	9	2,681	3.4	1.5–6.4	15	6,520	2.3	1.3–3.8
Champlain	15	8,511	1.8	1.0–2.9	16	5,833	2.7	1.6–4.5	31	14,344	2.2	1.5–3.1
North Simcoe Muskoka	1	2,254	0.4	0.0–2.5	10	1,712	5.8	2.8–10.7	11	3,967	2.8	1.4–5.0
North East	7	2,843	2.5	1.0–5.1	5	2,197	2.3	0.7–5.3	12	5,039	2.4	1.2–4.2
North West	2	1,286	1.6	0.2–5.6	3	1,164	2.6	0.5–7.5	5	2,450	2.0	0.7–4.8
Total *	131	78,726	1.7	1.4–2.0	179	58,412	3.1	2.6–3.5	310	137,136	2.3	2.0–2.5

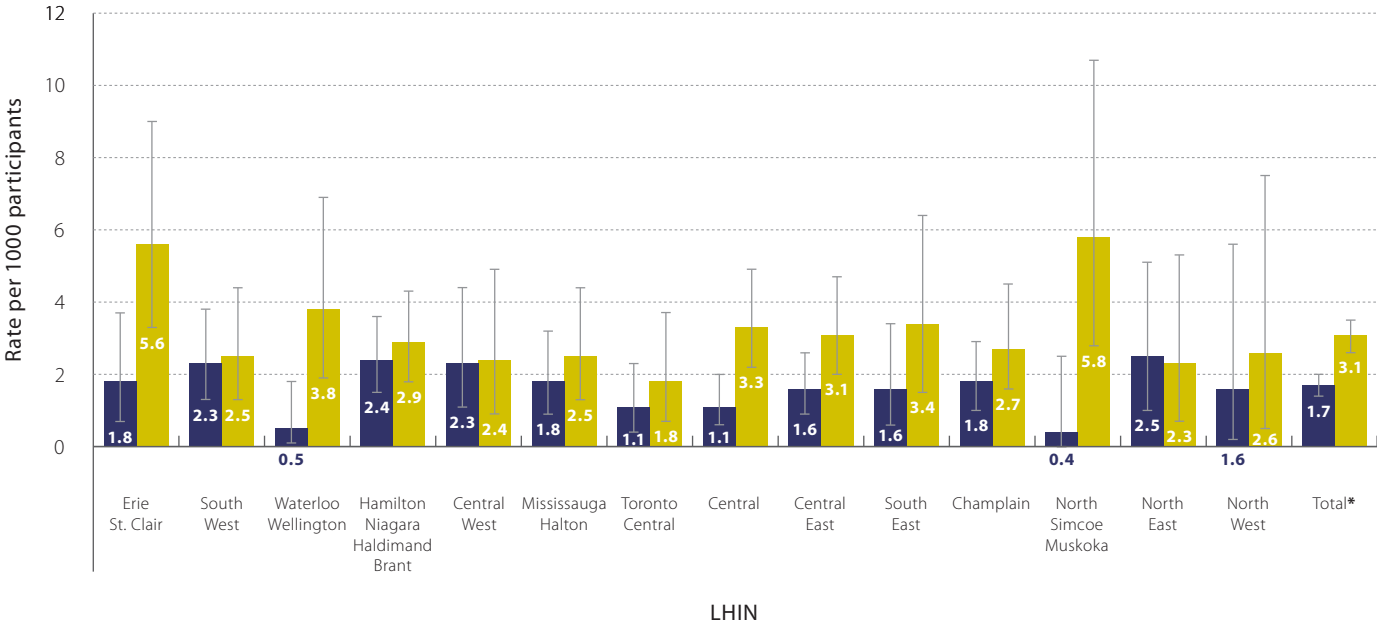
* includes persons <50 and >74 years old.

CI = confidence interval

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

FIGURE 17 | Program-invasive cancer detection rate (per 1000) (FOBT and FH Colonoscopy), by LHIN (2008)



Legend: ■ Female ■ Male

* includes persons <50 and >74 years old.

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

TABLE 16 | Program invasive-cancer detection rate (per 1000) (FOBT only), by LHIN (2008)

LHIN	Cancers detected	Screenees	Per 1000	CI
Erie St. Clair	11	5,156	2.1	1.1–3.8
South West	16	9,382	1.7	1.0–2.8
Waterloo Wellington	8	5,560	1.4	0.6–2.8
Hamilton Niagara Haldimand Brant	29	14,689	2.0	1.3–2.8
Central West	11	5,986	1.8	0.9–3.3
Mississauga Halton	11	9,289	1.2	0.6–2.1
Toronto Central	10	8,687	1.2	0.6–2.1
Central	29	16,047	1.8	1.2–2.6
Central East	26	14,800	1.8	1.1–2.6
South East	7	5,564	1.3	0.5–2.6
Champlain	18	12,444	1.4	0.9–2.3
North Simcoe Muskoka	7	3,149	2.2	0.9–4.6
North East	8	4,258	1.9	0.8–3.7
North West	3	1,962	1.5	0.3–4.5
Total	194	116,973	1.7	1.4–1.9

CI: confidence interval

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

TABLE 17 | Program invasive-cancer detection rate (per 1000) (FH Colonoscopy only), by LHIN (2008)

LHIN	Cancers detected	Screenees	Per 1000	CI
Erie St. Clair	13	1,770	7.3	3.9–12.6
South West	11	1,868	5.9	2.9–10.5
Waterloo Wellington	5	1,288	3.9	1.3–9.1
Hamilton Niagara Haldimand Brant	16	2,714	5.9	3.4–9.6
Central West	5	879	5.7	1.8–13.3
Mississauga Halton	12	1,670	7.2	3.7–12.6
Toronto Central	3	925	3.2	0.7–9.5
Central	8	1,905	4.2	1.8–8.3
Central East	12	2,200	5.5	2.8–9.5
South East	8	955	8.4	3.6–16.5
Champlain	13	1,900	6.8	3.6–11.7
North Simcoe Muskoka	4	818	4.9	1.3–12.5
North East	4	781	5.1	1.4–13.1
North West	2	488	4.1	0.5–14.8
Total *	116	20,161	5.8	4.8 – 6.9

* includes patients <50 and >74 years old.

CI = confidence interval

Note: the totals in this table may not add up exactly or be the same from table to table (12–17) due to rounding (see Appendix B, Table 4)

Data sources: Laboratory Reporting Tool (LRT), Colonoscopy Interim Reporting Tool (CIRT), Ontario Cancer Registry (OCR), Pathology Information Management System (PIMS), Registered Persons Database (RPDB)

Appendix D

List of Abbreviations

CCC:	ColonCancerCheck
CCO:	Cancer Care Ontario
CHDB:	OHIP claims history database
CI:	Confidence interval
CIRT:	Colonoscopy interim reporting tool
CPAC:	Canadian Partnership Against Cancer
CRC:	Colorectal cancer
CSQI:	Cancer System Quality Index
EU:	European Guidelines for Quality Assurance in Colorectal Screening
FAP:	Familial adenomatous polyposis
FH:	Family history
FIT:	Fecal immunochemical test
FOBT:	Fecal occult blood test
gFOBT:	Guaiac-based fecal occult blood test
HIN:	Health insurance number
HNPPC:	Hereditary non-polyposis colorectal cancer
ICES:	Institute for Clinical Evaluative Sciences
LHIN:	Local Health Integration Network
LRT:	Laboratory reporting tool
MOHLTC:	Ministry of Health and Long-Term Care
NACRS:	National Ambulatory Care Reporting System
OAML:	Ontario Association of Medical Laboratories
OCFP:	Ontario College of Family Physicians
OCR:	Ontario Cancer Registry
OHIP:	Ontario Health Insurance Plan
OMA:	Ontario Medical Association
OPA:	Ontario Pharmacists' Association
PCCF:	Postal code conversion file
PCP:	Primary care provider
PIMS:	Pathology Information Management System
PPCCN:	Provincial Primary Care and Cancer Network
RCT:	Randomized controlled trials
RNAO:	Registered Nurses' Association of Ontario
RPCL:	Regional Primary Care Lead
RPCN:	Regional Primary Care Network
RPDB:	Registered Persons Data Base
SEAMO:	Southeastern Ontario Academic Medical Organization

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Notes



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