

Colorectal Cancer Screening in Canada

PROGRAM PERFORMANCE RESULTS REPORT

JANUARY 2009 – DECEMBER 2011

CANADIAN PARTNERSHIP
AGAINST CANCER



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CONTRE LE CANCER

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Introduction

COLORECTAL CANCER IN CANADA

Colorectal cancer is a significant health problem in Canada.

Colorectal cancer (CRC) has a significant impact on Canadians: it is the third most common cancer and the second leading cause of cancer death in the country.¹ In 2013, an estimated 23,800 Canadians will be diagnosed with CRC and 9,200 people will likely die from the disease. Approximately 94% of newly diagnosed CRC cases will occur among people aged 50 or older.

There is strong evidence that regular screening using fecal tests (FTs) enables early detection of CRC and allows for more successful treatment, leading to a reduction in CRC mortality. Screening can also lower the incidence of CRC through the early detection of precancerous polyps, which can be removed before they become cancerous.²⁻⁴

Screening is performed on presumably asymptomatic people and therefore comprehensive quality assurance is required to maintain a balance between benefit and harm in the population targeted for screening. This balance can be achieved by implementing organized population-based programs because they include an administrative structure responsible for service delivery, quality assurance and evaluation.⁵

COLORECTAL CANCER SCREENING PATHWAY

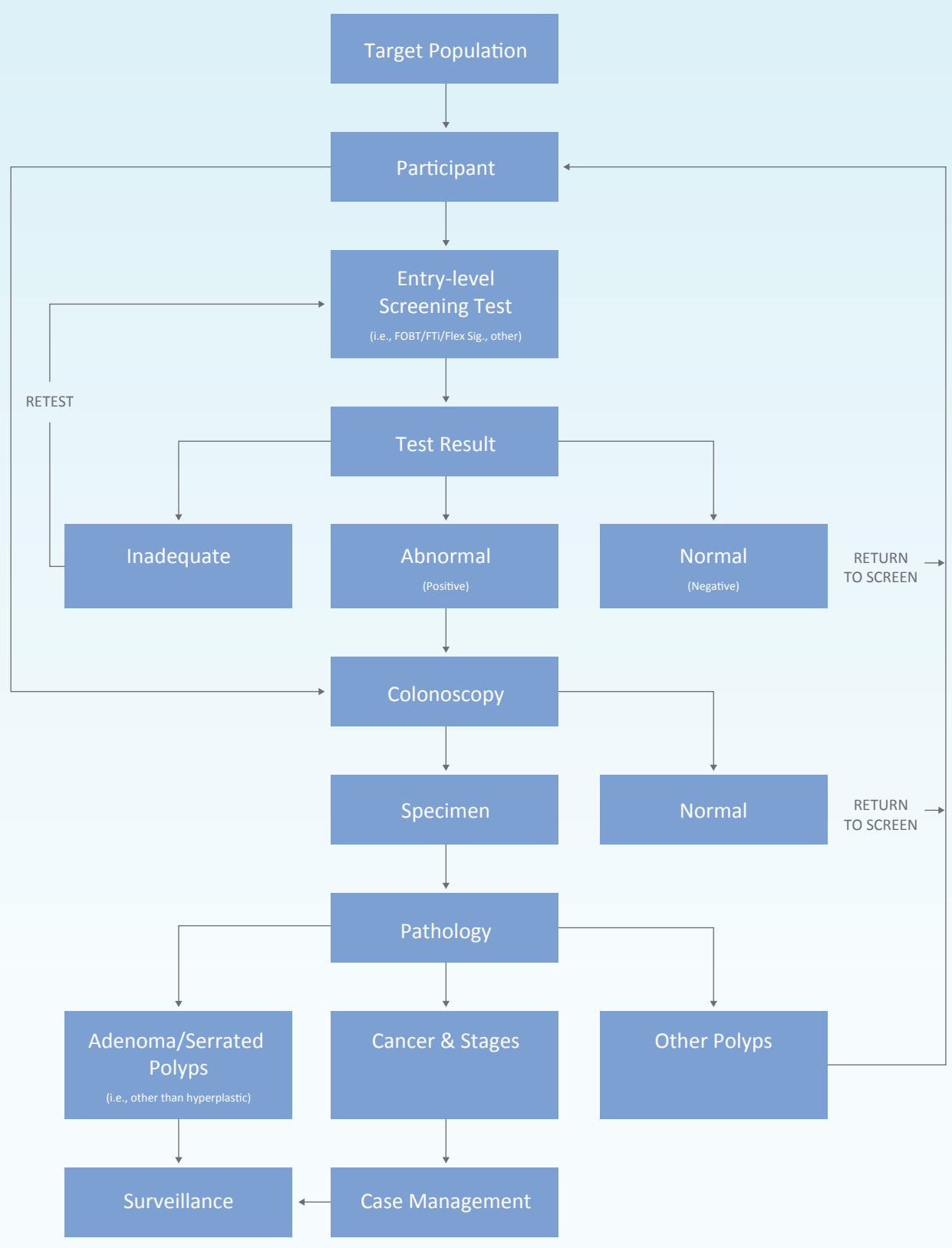
Fecal tests are the central step in the CRC screening process.

Organized screening for cancer involves four steps:

- Identification and invitation of the target population
- Provision of a screening test to the target population
- Follow-up of abnormalities detected by the screening test
- Recall after a normal or non-malignant screening outcome

Currently, Canadian provinces providing CRC screening programs use either guaiac (FTg) or immunochemical (FTi) FTs as the screening test and target people aged 50 to 74 of average risk (i.e., those with no personal or family risk factors for colon cancer other than being 50 or older). Individuals with an abnormal FT result are then referred for a colonoscopy. Figure 1 outlines the CRC screening pathway. Colonoscopy is recommended as the screening test for individuals at high risk of colorectal cancer.⁶

FIGURE 1
Colorectal Cancer Screening Pathway⁶



FOBT = fecal occult blood test; Flex Sig = flexible sigmoidoscopy

NATIONAL COLORECTAL CANCER SCREENING NETWORK

Throughout Canada, greater attention has been dedicated to organized CRC screening.

In 2007, the National Colorectal Cancer Screening Network (NCCSN) was convened through the Canadian Partnership Against Cancer (the Partnership). Creation of the NCCSN resulted in increased attention to and focus on providing organized CRC screening to Canadians. The NCCSN brings together representatives from the following areas:

- Provincial screening program staff
- Provincial and territorial governments
- Canadian Cancer Society
- Public Health Agency of Canada
- Canadian Cancer Action Network
- Canadian Medical Association
- Colorectal Cancer Association of Canada
- Canadian Association of Gastroenterology

The mandate of the NCCSN is to develop a shared approach to planning and implementing CRC screening across the country. When the NCCSN was formed, three provinces had announced the establishment of CRC screening programs. Since then, CRC screening has expanded so that all 10 provinces have announced screening programs and development work has started in the territories.

Reporting on program performance nationally and setting targets for performance for the purpose of quality improvement are priorities for the NCCSN. An NCCSN working group is dedicated to the ongoing development of these priorities in four distinct categories:

1. Developing quality determinants for CRC screening in Canada
2. Monitoring program performance through the identification of quality indicators (based on the quality determinants)
3. Reporting results at regular intervals
4. Setting national targets

A set of quality indicators for CRC screening was developed in 2009 for reporting at the national level. Subsequent work in 2011 resulted in the definition of targets for six of the indicators. In 2013, the Partnership released an updated version of the publication “Quality Determinants and Indicators for Measuring Colorectal Cancer Screening Program Performance in Canada.”⁷ Table 1 provides a description of the quality indicators included in this report.

TABLE 1
Selected Quality Indicators and Targets

INDICATOR	DEFINITION	TARGET
PARTICIPATION	Percentage of target population who successfully complete an FTg or FTi	≥ 60%
FT INADEQUACY RATE	Percentage of individuals whose FT was inadequate and who have not repeated the test to get a successful result	≤ 5%
POSITIVITY RATE	Percentage of individuals with abnormal FT result	N/D
FOLLOW UP COLONOSCOPY UPTAKE	Percentage of individuals with abnormal FT result having follow-up colonoscopy within 180 days	≥ 85% within 180 days
WAIT TIME TO COLONOSCOPY	Time from abnormal FT result to follow-up colonoscopy	≤ 60 days from abnormal FT for ≥ 90% of individuals
PPV ADENOMA	Percentage of individuals with abnormal FT result diagnosed with adenoma(s)	≥ 35% for FTg; ≥ 50% for FTi
ADENOMA DETECTION RATE	Number of individuals with one or more adenoma(s) confirmed by pathology from follow-up colonoscopy (performed within 180 days of abnormal screening FT) per 1,000 screened	N/D
WAIT TIME TO PATHOLOGICAL DIAGNOSIS	Time from follow-up colonoscopy to definitive pathological diagnosis	N/D
PPV CRC	Percentage of individuals with abnormal FT result diagnosed with CRC	N/D
CRC DETECTION RATE	Number of individuals with CRC confirmed by pathology from follow-up colonoscopy (performed within 180 days of abnormal screening FT) per 1,000 screened	≥ 2 per 1,000 screened
INVASIVE CRC STAGE DISTRIBUTION	Distribution of screen-detected invasive CRC by stage within specific period	N/D

FTg = guaiac fecal-occult blood test; FTi = immunochemical fecal-occult blood test; FT = fecal test; N/D = not yet determined; PPV = positive predictive value; CRC = colorectal cancer

Intent of this Report

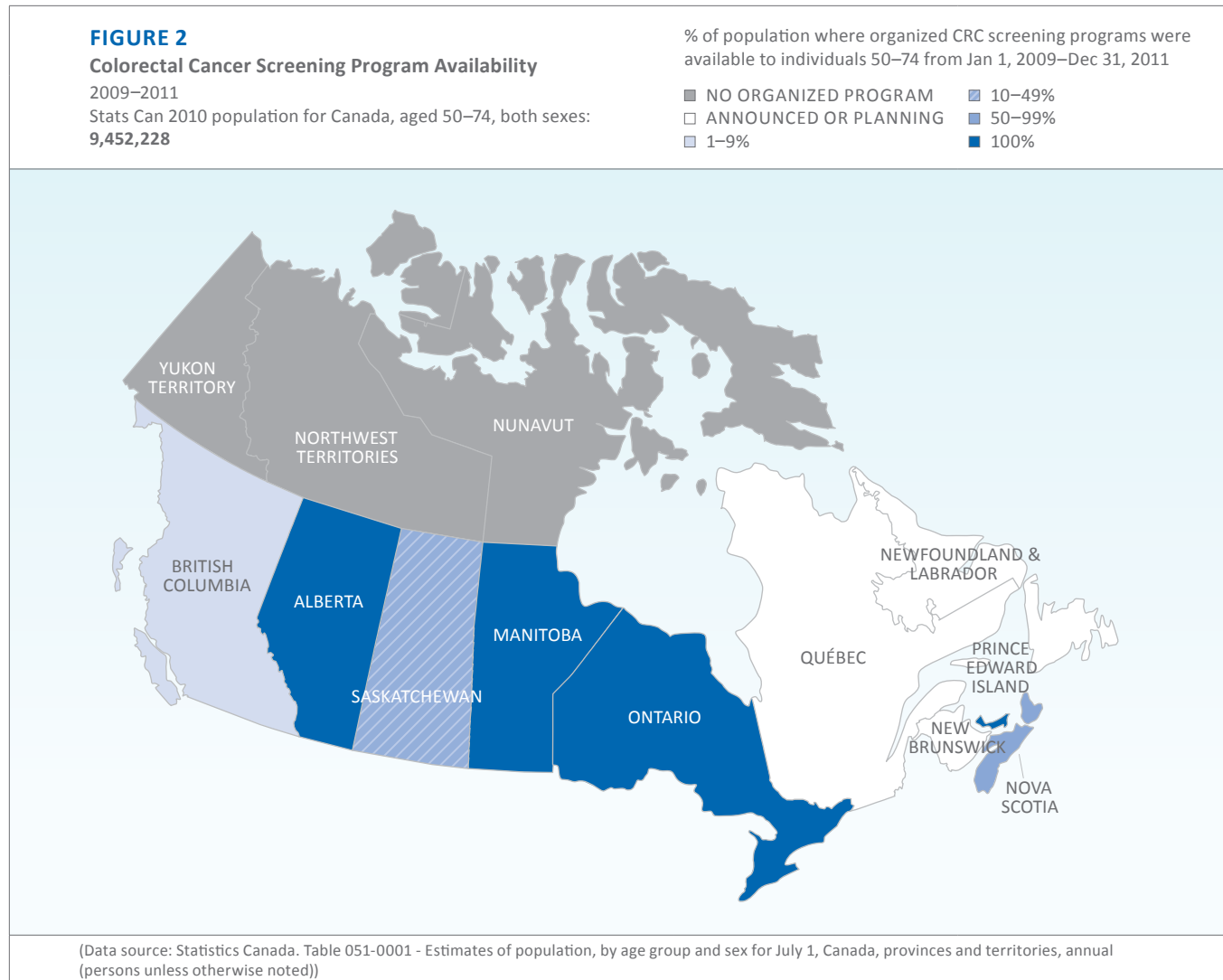
The findings presented in this report will assist in the advancement of program development and quality monitoring in organized CRC screening programs throughout Canada.

National collaboration and the identification of a set of common quality indicators for reporting CRC screening performance enables the sharing of best practices and lessons learned. Such an approach will lead to advances in the quality of CRC screening programs in Canada.

This report presents early results for key indicators and targets for the provinces that were able to provide first-round data from January 1, 2009 to December 31, 2011. Those provinces are British Columbia, Saskatchewan, Manitoba, Prince Edward Island and Nova Scotia. Ontario's data combine program and non-program data and are discussed under Utilization. In addition to the results described above, this report provides further information on program planning and development for the provinces and territories that were unable to provide first-round data from January 1, 2009 to December 31, 2011. Those provinces and territories are Alberta, Quebec, New Brunswick, Newfoundland and Labrador, Nunavut, Northwest Territories and Yukon.

Overview of Organized Colorectal Cancer Screening in Canada

CRC screening programs across Canada have evolved at different rates and are shaped by provincial and territorial characteristics and factors. This development process has resulted in variation in the availability of programs to the population (Figure 2) and in adoption of different screening models among the provinces and territories (Appendix B). Therefore, results and information should be interpreted cautiously.



The provinces and territories continue working to adopt and/or establish best practices in recruitment, testing, education and communication with health-care providers and the general public.

The following section on program characteristics provides a synopsis of the approaches taken by the provinces and territories that are in program planning stages, and provinces that contributed first-round data to this report.

PROGRAM CHARACTERISTICS OF PROVINCES AND TERRITORIES IN PROGRAM PLANNING STAGES

The **Alberta** CRC Screening Program was launched in 2007 and has adopted a province-wide, phased-in approach. The rationale behind this implementation approach is to facilitate and co-ordinate services and activities related to programmatic population-based CRC screening within each of the province's health zones. Services and activities are modified zone by zone to meet the unique needs of each zone. As the zones continue to implement programmatic CRC screening components (in collaboration with the program at a provincial level), all residents aged 50 to 74 years who are of average risk for colorectal cancer will have access to CRC screening through non-programmatic channels – their primary care providers.

The five key components of the Alberta program are:

1. Primary care recruitment and engagement activities
2. FTi logistics planning
3. Information management, including information technology, systems and indicator reporting
4. Clinical services and navigation
5. Program quality improvement, initially focused on colonoscopy services

The *Programme québécois de dépistage du cancer du côlon et du rectum* (PQDCCR) – **Quebec's** CRC screening program – plans to invite people aged 50 to 74 to take part in screening. The FTi is the screening modality chosen for Quebec's population-based program. Following an invitation to participate, patients pick up the FTi kit and return the completed kit to predetermined collection points. If the result is negative, patients are tested every two years with repeat FTis; if positive, participants are referred for colonoscopy.

The PQDCCR has undergone phased development aimed at ensuring high-quality performance in all programmatic aspects. Phase one of the program started in 2010 and included the selection of eight pilot sites throughout the province. Phase one optimizes triaging and quality of colonoscopy resources to increase access to colonoscopy, while Phase two (2013–14) targets invitations, FTi pick-up and return, and navigation of individuals across the health-care system resulting in timely access to colonoscopy.

In parallel, the province embarked on a study of FOBT testing and decided to deploy the FTi test in March 2013. Over the next year, all colonoscopy units in Quebec will go through an upgrading process to meet organizational and quality standards to ensure timely access to quality colonoscopy. A province-wide competence assessment and skills-upgrading quality initiative (web-based e-learning and testing and direct skills observation in specialized colonoscopy evaluation centres) is being developed and field-tested to ensure adherence to best practices in colonoscopy. While the pilot sites transition from phase one to phase two, family doctors will be encouraged to carry out opportunistic screening with FOBT. The first patients outside the pilot projects will be invited to programmatic screening in 2014.

A provincial steering advisory committee of the **New Brunswick** Cancer Network is overseeing the province's CRC Screening Program. It is anticipated that program implementation will commence during the first quarter of 2014. The program, using FTi, will target residents aged 50 to 74 who are at average risk of colorectal cancer. The FTi will be processed in a central laboratory. Clients with a positive FTi result will be referred for follow-up colonoscopy. A new cancer screening integrated information system will automate the majority of the program's required functions to manage participants through the various workflows.

The target population will participate in the program by invitation only. Clinical practice guidelines have been established for the program and will be shared with clinicians in 2013.

The province is currently restructuring its health-care system and is placing greater emphasis on wellness, prevention and early intervention, making this an opportune time to implement the CRC screening program. Approximately 30% of the province's population falls within the 50 to 74 target age range. In addition, CRC is the second leading cause of cancer death in the province. Given the current environment and these statistics, the New Brunswick Cancer Network is confident the program will have a profound positive impact on both the population and the health-care system.

The **Newfoundland and Labrador** CRC Screening Program was launched in July 2012. It has been designed primarily as a self-referral program, targeting residents aged 50 to 74 years who are at average risk of CRC. The program will be phased in throughout the province, with the initial phase commencing in the Western Health Region.

The program uses home FTi kits. Residents can access the program three different ways: by calling a toll-free number, by requesting a kit by email or by being referred by a primary care provider. In addition, women participating in the Provincial Breast Screening Program are being approached by program staff and encouraged to consider CRC screening both for themselves and their family members who are within the target age range. Public advertising has also been designed to promote and encourage program participation.

Completed kits are mailed to a central laboratory for analysis. Clients with a positive FTi are contacted by a program nurse, who conducts a detailed health assessment. The client is then referred for follow-up colonoscopy. A quality assurance program has been established and is implementing standards for program colonoscopies that are based on best practices.

Nunavut is developing a pilot study prior to implementing a territory-wide CRC screening program. Nunavut has unique challenges and strengths that need to be considered in its CRC screening program's development, including being the least populated province (34,000 residents) but having the largest land mass. There are great distances between communities, linked only by air, making the travel costs associated with follow-up colonoscopy quite significant.

There are also cultural differences that need to be considered. For example, because of cultural practices, FTi is the only screening option. In addition, the majority of the population (70–75%) identify their mother tongue as Inuktitut and more than one-quarter (27%) are unilingual. Retention of health-care providers, most notably primary care physicians and health-centre nurses, is also a challenge the program must overcome.

On a positive note, in each community there is a single health-care centre, which makes it easier to have direct contact with the target population. In addition, each region has an established link with a hospital that provides the region with hospital-based care. The territory also has two medical laboratories. Together, these factors will enable the CRC screening program to implement robust data and quality control practices.

The incidence of CRC among people under age 50 in Nunavut is the highest in the country. The target age group for Nunavut will need to reflect this difference. Overall, residents are aware of the impact CRC is having in their communities and are interested in screening initiatives.

In March 2011, the revised **Northwest Territories** CRC Screening Clinical Practice Guideline was adopted as a standard of practice throughout the Northwest Territories. The guideline includes the use of the FTi (Hemoccult ICT) as the primary colorectal cancer screening intervention for average risk clients aged 50 to 74 years. It also addresses screening in increased risk and special risk population groups.

Early detection and treatment of colorectal cancer is an important priority for the Northwest Territories. From 2001 to 2010, colorectal cancer was the most commonly diagnosed cancer in the Northwest Territories, accounting for 217 new cancer cases – 99 in females and 118 in males. Colorectal cancer is the second most common cancer in both sexes, after breast cancer in women and prostate cancer in men; the incidence rate of colorectal cancer in both sexes in the territory is significantly higher than the Canadian rate.*

Colorectal cancer was the second leading cause of cancer death in the territory from 2000 to 2009, behind lung cancer. In women it was the third leading cause of cancer death, with 17% of deaths (after lung and breast cancer); in men it was the second leading cause of cancer death, with 21% of deaths (after lung cancer). The rate of colorectal cancer deaths in the Northwest Territories was significantly higher (in both sexes) than the overall Canadian rate.

Although the Northwest Territories does not have an organized screening program, FTi results have been reported to the Office of the Chief Public Health Officer since 2009 with the proclamation of the revised NWT Public Health Act. FTi screening rates are therefore available for the fiscal years 2009/10, 2010/11 and 2011/12. Rates of uptake have increased from approximately 13% to 19% over the three-year period.

*Comparison to the 2005 Canadian colorectal cancer incidence rate reported in the 2012 Canadian Cancer Statistics.

Another important stride has been the movement toward harmonization of endoscopy policies and procedures across the three hospitals in the Northwest Territories (Stanton, Hay River and Inuvik). Harmonization includes participation in a Territorial Endoscopy Implementation Group, development of a territorial endoscopy program manual, use of a standard territorial endoscopy referral form and initiation of a territorial endoscopy booking process. Indicator development for monitoring the endoscopy process as well as overall colorectal cancer screening indices is another important objective of the implementation group.

In March 2013 a report examining the feasibility of starting an organized colorectal cancer screening program in **Yukon** was produced after a three-month consultation. The report examined some of the opportunities and challenges that need to be considered in preparation for an organized program.

Because of small numbers, few data are available to assess colorectal cancer rates in Yukon with any degree of confidence. The only comparative data available show that over a three-year period, from 2005 to 2007, Yukon's colorectal cancer incidence was about 27 per 100,000 population, suggesting a rate higher than Canada's average but with a confidence interval that overlapped Canada's. However, the 2011 Canadian Cancer Statistics do offer some data on the three territories combined. Of some concern is evidence of higher incidence and mortality rates than the Canadian average, particularly among men.

As far as priorities within cancer control, colorectal cancer is certainly one of the highest. However, current priority demands and budget constraints, as well as Yukon's capacity, have prohibited further development of an organized program. The Department of Health and Social Services is currently developing a clinical services plan for Yukon and further development of a Yukon colorectal screening program will be considered within the overall plan. In addition to the clinical services plan, the department is finalizing the strategic plan for the next five years, within which cancer screening will have its place. Yukon has determined that a business case for colorectal screening (that is, a cost analysis that could lend itself to comparison with other health-care priorities) would be most useful in assisting with prioritization of colorectal screening.

At this time, active pursuit of organized colorectal screening is on hold pending strategic plan and clinical service plan completion. In addition, the Yukon health and social services system is tasked with supporting additional programs within current funding. Yukon will actively follow, and hopefully benefit from, the progress made in other jurisdictions, particularly in the North.

PROGRAM CHARACTERISTICS OF DATA-REPORTING PROVINCES

Between January 2009 and April 2013 the **British Columbia** Cancer Agency developed and operated a pilot program for population-based colon cancer screening, Colon Check. The pilot was established in three communities in BC: Penticton, Powell River and parts of Vancouver. The pilot targeted people with a family history, as well as average risk adults aged 50 to 74. Participants were advised of the program by personal mailed invitation, their family physician or word of mouth in the community.

Average risk participants were mailed a two-sample FTi (Somagen, OC Auto Micro 80) to complete at home. A result was considered abnormal if either of the samples measured 100 ng/ml or more of globin. All tests were analyzed at a central laboratory and participants received their results by mailed letter. All participants with an abnormal result were referred to a nurse in the participant's community who completed a pre-colonoscopy assessment and, as appropriate, booked the participant for colonoscopy. Pathology was completed centrally at the BC Cancer Agency.

Colonoscopy units participated in the Global Rating Scale and colonoscopists' skills were assessed using the Direct Observation of Procedural Skills assessment tool. Participants' screening and follow-up data were collected in the pilot program registry and analyzed at the BC Cancer Agency.

BC is implementing a province-wide colon screening program in 2013.

The **Saskatchewan** Cancer Agency launched its Screening Program for CRC in September 2009 in the Five Hills Health Region. Piloting the program in one region enabled the Agency to conduct a thorough evaluation before the program's expansion into other health regions. Based on best practices, the program targets clients aged 50 to 74 years with no personal history of colorectal cancer within the past five years.

The program uses a home-based FTi kit. Clients are mailed the test with their invitation to the program. Completed kits are mailed to the provincial laboratory for analysis. In northern Saskatchewan communities, the program adopted a blended delivery model. The test is either mailed to clients or delivered by a community health-care worker who provides personalized education to align with unique cultural or ethnic needs. All clients and their primary care providers are notified immediately of the test results. As of December 2011, 43,900 individuals had been invited to participate in Saskatchewan's Screening Program for CRC.

Saskatchewan Cancer Agency Screening Program for Colorectal Cancer Phased-In Implementation Strategy

■ IMPLEMENTATION

January 2009 – December 2011

- Five Hills – October 2009
- Kelsey Trail – March 2011
- Regina Qu'Appelle – June 2011
- Athabasca – May 2011
- Keewatin Yatthe – May 2011
- Mamawetan Churchill River – May 2011

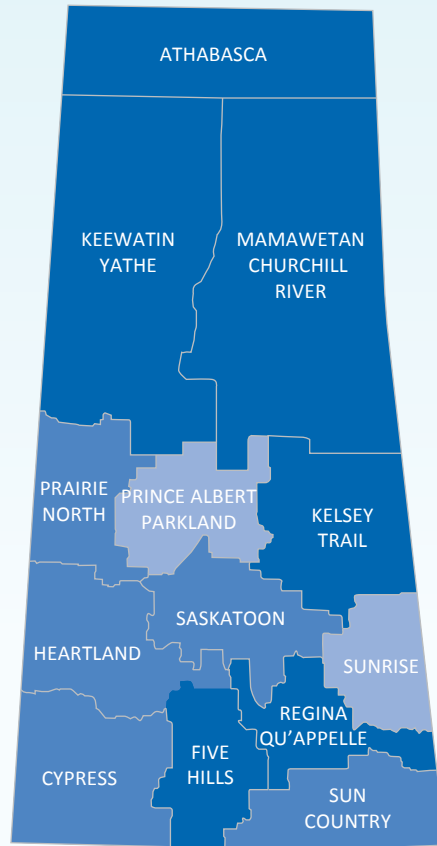
■ PROJECTED IMPLEMENTATION

January 2012 – December 2012

- Prairie North – March 2012
- Heartland – March 2012
- Cypress – March 2012
- Sun Country – July 2012
- Saskatoon – September 2012

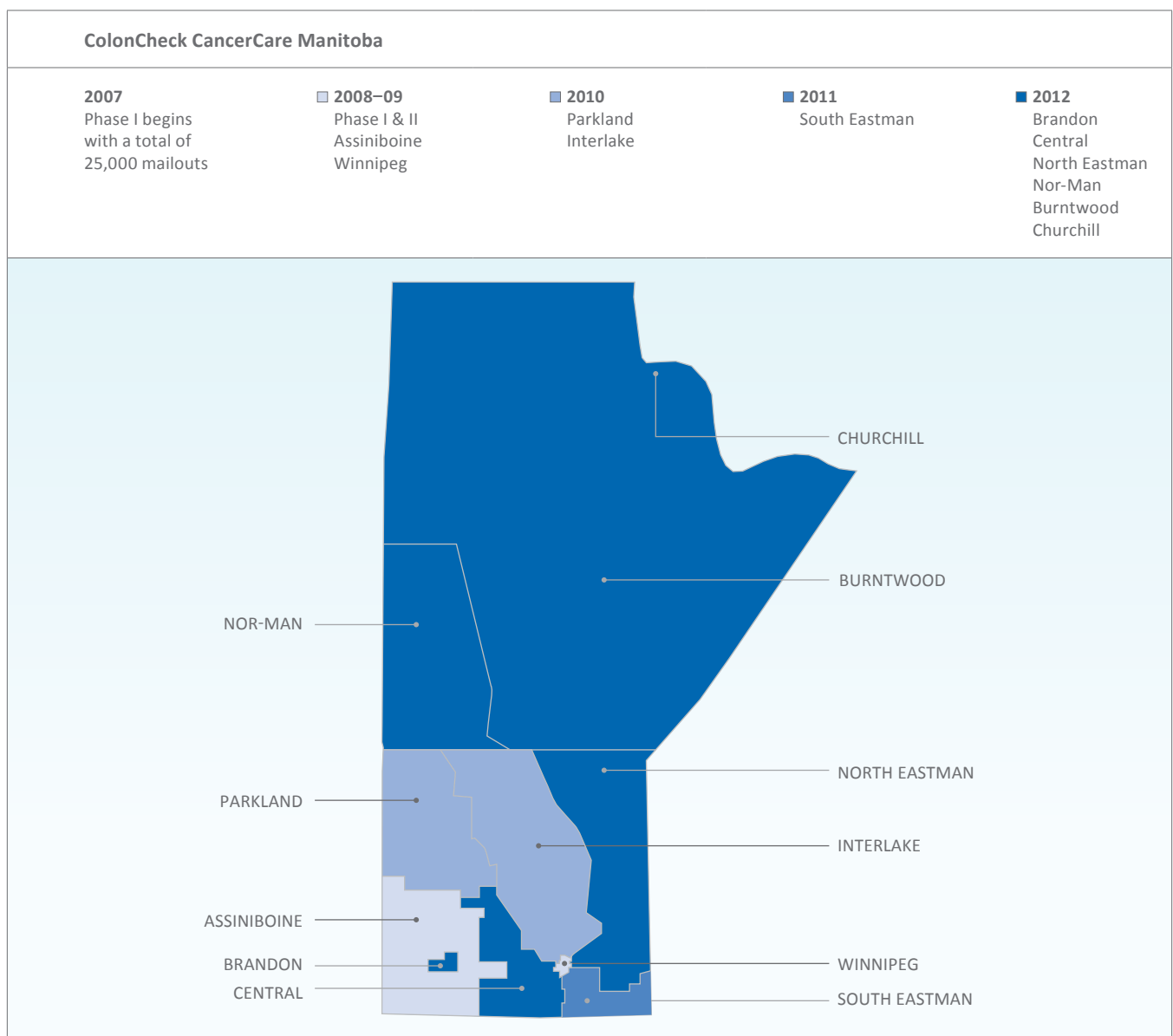
■ PROJECTED PROVINCIAL IMPLEMENTATION

- January 2012 – March 2013
- Sunrise – January 2013
- Prince Albert Parkland – February 2013



Cancer Care **Manitoba**'s screening program, ColonCheck, was implemented on a health region basis, contingent on the capacity for follow-up colonoscopy services. ColonCheck began in 2007, at which time 25,000 individuals in two health regions were invited to participate in screening. By the end of 2009, an additional 26,000 people in those two health regions were included in the program. Between 2010 and 2011, the program expanded to six of Manitoba's 11 health regions and invited 132,000 individuals.

Although the program invited people only by region, any resident of Manitoba between 50 and 74 years who is of average risk for CRC is able to refer him- or herself to the program. By 2013, the program will be inviting all eligible Manitoba residents by mail to participate. The program collaborates with primary care providers to provide ColonCheck's FTg to their patients. Follow-up for most patients requiring colonoscopy after an abnormal FT result is organized by ColonCheck; however, some primary care providers prefer to make arrangements for their patients themselves.



Ontario established its ColonCancerCheck (CCC) province-wide CRC screening program in 2008. The program is open to all residents between 50 and 74 years who are at average risk and to those at increased risk (defined as having one or more first-degree relative with colorectal cancer). Access to the program is through the primary care provider, who completes a CRC screening assessment. Individuals of average risk receive an FTg kit. People assessed as having increased risk are referred for colonoscopy. The primary care provider is also responsible for organizing follow-up colonoscopy for individuals with an abnormal FTg result. In addition, screening eligible individuals who do not have a primary care provider can access FTg kits through Telehealth Ontario or pharmacies.

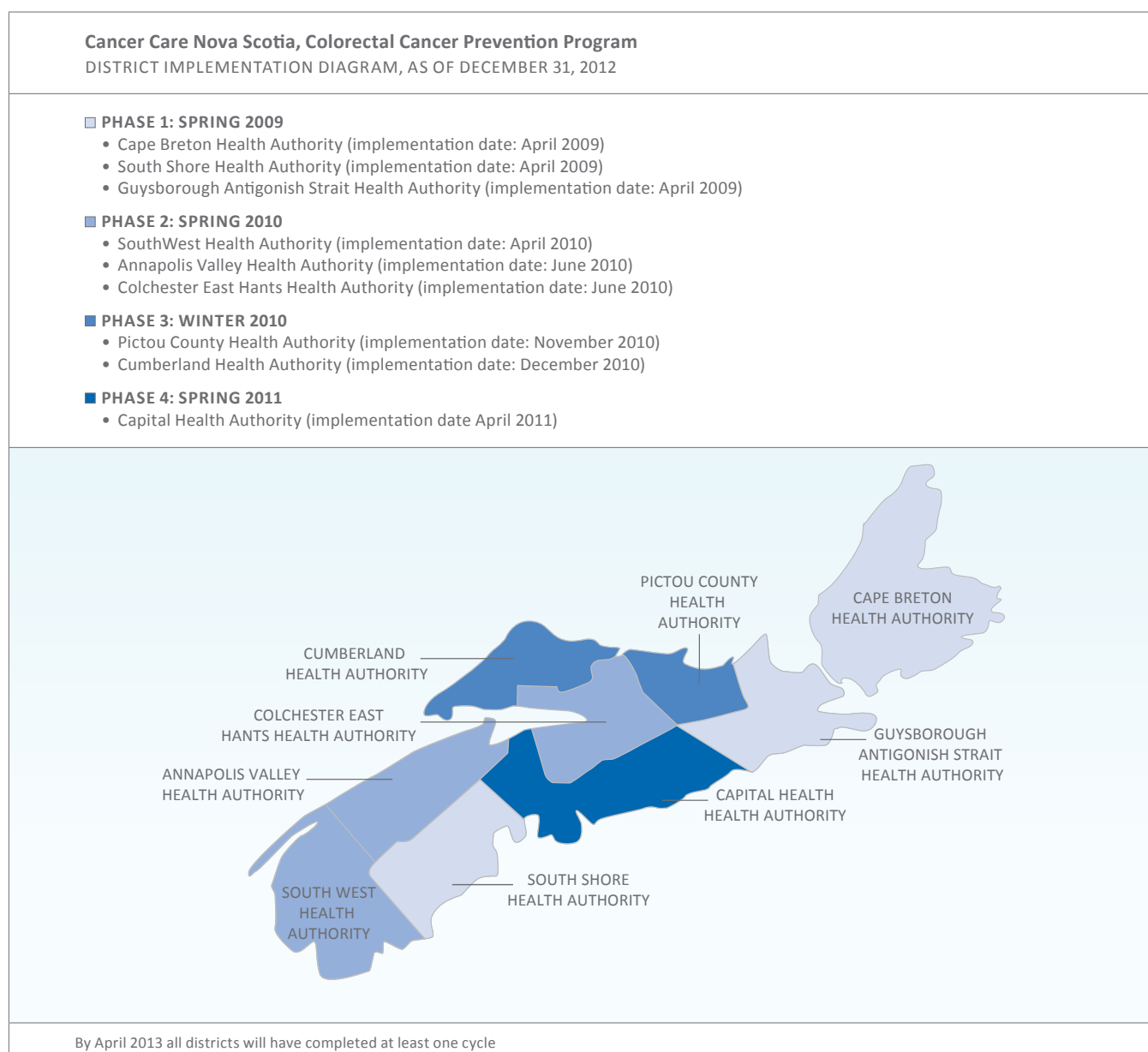
On their 50th birthday, all Ontarians are mailed invitations encouraging them to visit their primary care provider to arrange for CRC screening. The program plans to expand the scope of these mailed invitations in the near future. Individuals who have previously participated with FTg and are due for repeat screening are also recalled with mailed invitations.

The CCC Program operates in a context in which individuals at average risk for CRC can access non-programmatic screening with colonoscopy without restriction. The province's large number of private endoscopy clinics enhances access to colonoscopy. Private clinics perform more than one-quarter of the province's colonoscopies; this availability of colonoscopy may affect FTg participation rates.

Ontario is geographically large, with a proportion of the population living in remote, difficult-to-access areas. Initiatives are underway to address under- and never-screened populations, including individuals living in remote or rural areas and underserved urban groups such as First Nations, Inuit and Métis peoples. Other initiatives are underway to increase screening rates, including pilot programs for both the FTi and Registered Nurse (RN) Flexible Sigmoidoscopy Program. With respect to the latter initiative, more than 7,000 people have been screened with flexible sigmoidoscopy by RNs at 11 sites across Ontario.

Cancer Care Nova Scotia's Colon Cancer Prevention Program is intended primarily for people who are at average risk for colon cancer and who have no signs or symptoms of disease. The program was introduced in March 2009 in three district health authorities and was phased in across the province. The program became available province-wide in April 2011. Through the program, Nova Scotians between the ages of 50 and 74 automatically receive a home screening test in the mail every two years. The program uses FIT and all tests are mailed to a central laboratory in the province for processing.

To meet the needs of the province's francophone community, instructions for completing the screening kit are provided in English and French, and the program operates a toll-free number staffed by a bilingual individual. The program uses district screening nurses in each health region of the province to support both participants and health providers following an abnormal screening test result, as well as to facilitate timely access by patients to colonoscopy services when needed.



The **Prince Edward Island** Colorectal Cancer Screening Program was launched province-wide in May 2011 following two pilot phases using a three-sample FTg. Participants can refer themselves to the program by calling a toll-free line or getting a screening kit through their community health centre. The program is intended for asymptomatic adults aged 50 to 74 years who are of average risk for colorectal cancer.

The program screening kit includes a lab request form specific to the program for the patient to complete. Completing the kit is considered the point of entry to the organized screening program. Once a participant completes the kit and it is analyzed by the lab, the program sends a test result letter to the patient. This information is stored in a database and follow-up of abnormal results is monitored. Primary care providers are responsible for following up abnormal results. A program staff person assists in assigning a primary care provider to any participant with an abnormal result who does not have a family physician.

In April 2012 provincial laboratory services moved from the FTg to the FTi. A new screening program kit (the FTi kit) was designed and distributed. All specimens were analyzed at a central laboratory at the Queen Elizabeth Hospital in Prince Edward Island (PE).

Program invitation letters were also tested in the pilot phases and introduced with the change to FTi in April 2012. The invitations were sent to all residents with a PE health card, aged 50 to 74 years, in ascending age increments so as not to overburden the health system. People who turn 50 or who are new residents in the target age group will continue to receive invitations over time.

This provincial program is supported by a steering committee and benefits from a strong relationship with laboratory services, primary care, ambulatory care and the PE Cancer Treatment Centre. Awareness and education are an ongoing priority to ensure Islanders are receiving the right service at the right time. Promotions have been done in partnership with the Canadian Cancer Society, PE Division, which strengthens the engagement of the community.

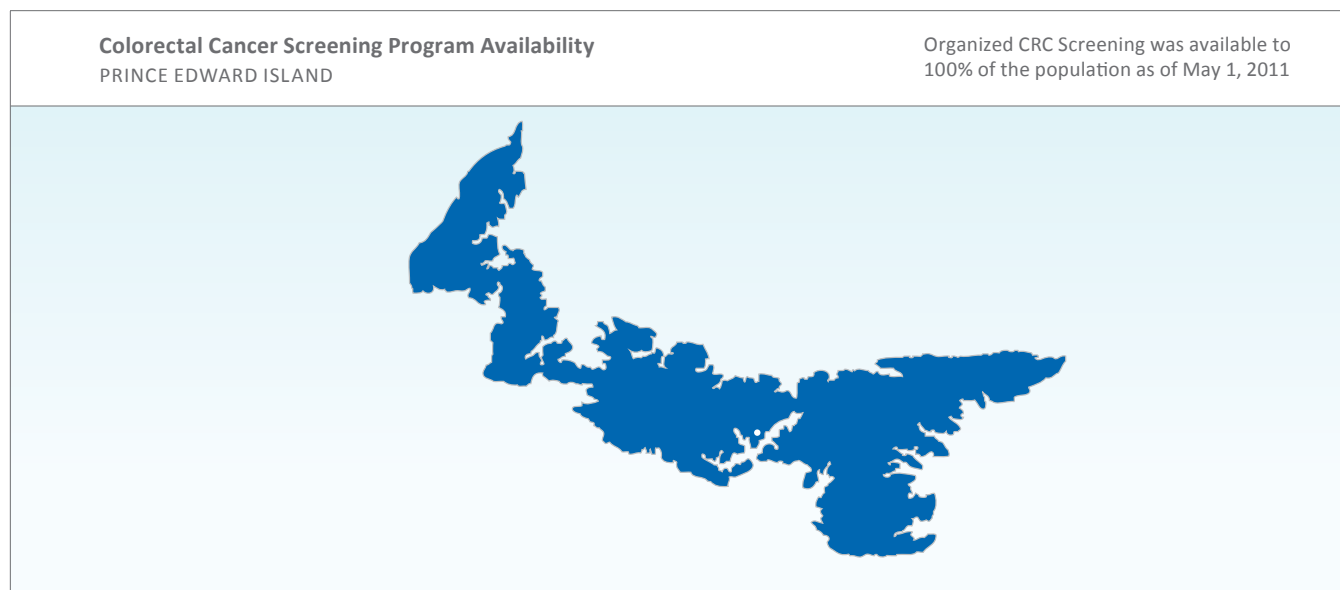


Table 2 summarizes the characteristics of the screening programs in the provinces that were able to provide first-round data included in this report.

	BC	SK	MB	ON	NS	PE
START DATE	2009	2009	2007	2008	2009	2009
APPROACH TO IMPLEMENTATION	Pilot in three areas	Phased	Phased	Full program – province wide	Phased	Phased
RECRUITMENT STRATEGY	Personal invitation; primary care physician	Personal invitation	Personal invitation	Personal invitation and primary care physician	Personal invitation	Primary care physician and community marketing
AVAILABILITY (% OF PROVINCIAL TARGET POPULATION AS OF DEC. 31, 2011)	4.0	6.2	100	100	80–90	100
FIRST ROUND SCREENED JAN. 1, 2009 DEC. 31, 2011 (NUMBER OF PATIENTS)	9,951	6,272	30,291	Not available	56,012	2,224
TYPE OF TEST / BRAND / THRESHOLD CUT OFF	FTi / OC Auto Micro 80 / \geq 100 ng/mL	FTi / Polymedco / 100 ng/mL	FTg / Hemoccult II Sensa	FTg/Hema Screen	FTi / Hemoccult ICT / 0.3 mg Hb/g	FTg / Hema Screen
NUMBER OF SAMPLES / DAYS / POSITIVITY	2 samples / 2 days / at least 1 +	1 sample / 1 day / 1 +	2 samples / 3 days / at least 1 +	2 samples / 3 days / at least 1 +	2 samples at least 1 +	3 samples / 3 days / at least 1 +
NS data are for Apr. 1, 2009–Dec. 31, 2011. PE data reflect participation in the province-wide screening program effective May 1, 2011. SK data include one health region in which the program started on Oct. 1, 2009						

Quality Indicators

Participation

Participation in CRC screening was higher for women and increased with age. Participation was less than the target but is expected to increase as screening programs become more established and available to a greater proportion of the population.

WHAT IS PARTICIPATION?

Participation is the percentage of the target population who successfully completed a fecal test (guaiac – FTg, or immunochemical – FTi) in a specified timeframe. Participation should be calculated separately for first versus return screens.

By December 31, 2011, Manitoba, Nova Scotia and Prince Edward Island offered province-wide screening programs. Screening programs in British Columbia and Saskatchewan were either being phased in by health regions or through pilot sites. To measure participation in the early stages of program development, only the population to which the program was available at that time should be included. This is important because organized CRC screening programs have evolved at different rates across the country.

Because this report reflects early CRC screening program implementation across Canada, a three-year participation period has been calculated by taking program availability into account and only for first screens unless otherwise identified. Future reports will calculate participation based on the recommended two-year screening interval and as a proportion of the entire population.

HOW WAS PARTICIPATION CALCULATED?

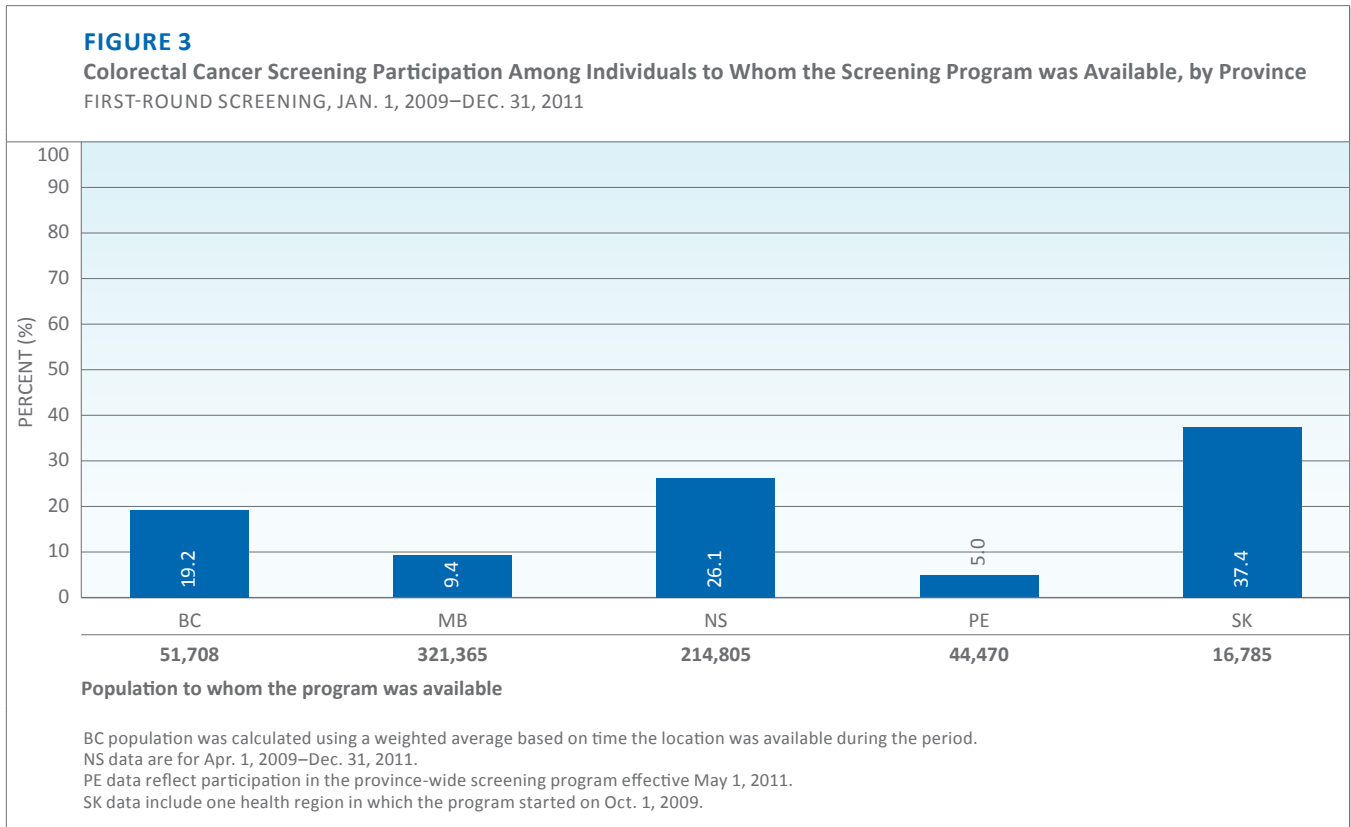
Participation was calculated as follows:

- **Numerator:** Number of individuals who completed a program FT between January 1, 2009, and December 31, 2011.
- **Denominator:** Number of individuals in the target population to which the program was available between January 1, 2009, and December 31, 2011.
- **Target:** $\geq 60\%$

ABOUT PARTICIPATION

Participation measures the program’s success at reaching the target population. Strategies used to engage the population, provide education and increase participation include mass media (newspaper, radio and television ads), small media (pamphlets and posters) and invitation letters from the program or primary care providers that may also include an FT.

Figure 3 shows participation in the screening programs for the five provinces that submitted data. Participation varied from 5% in Prince Edward Island to 37.4% in Saskatchewan.



Participation in screening programs was higher for women than for men and increased with age (Figure 4).

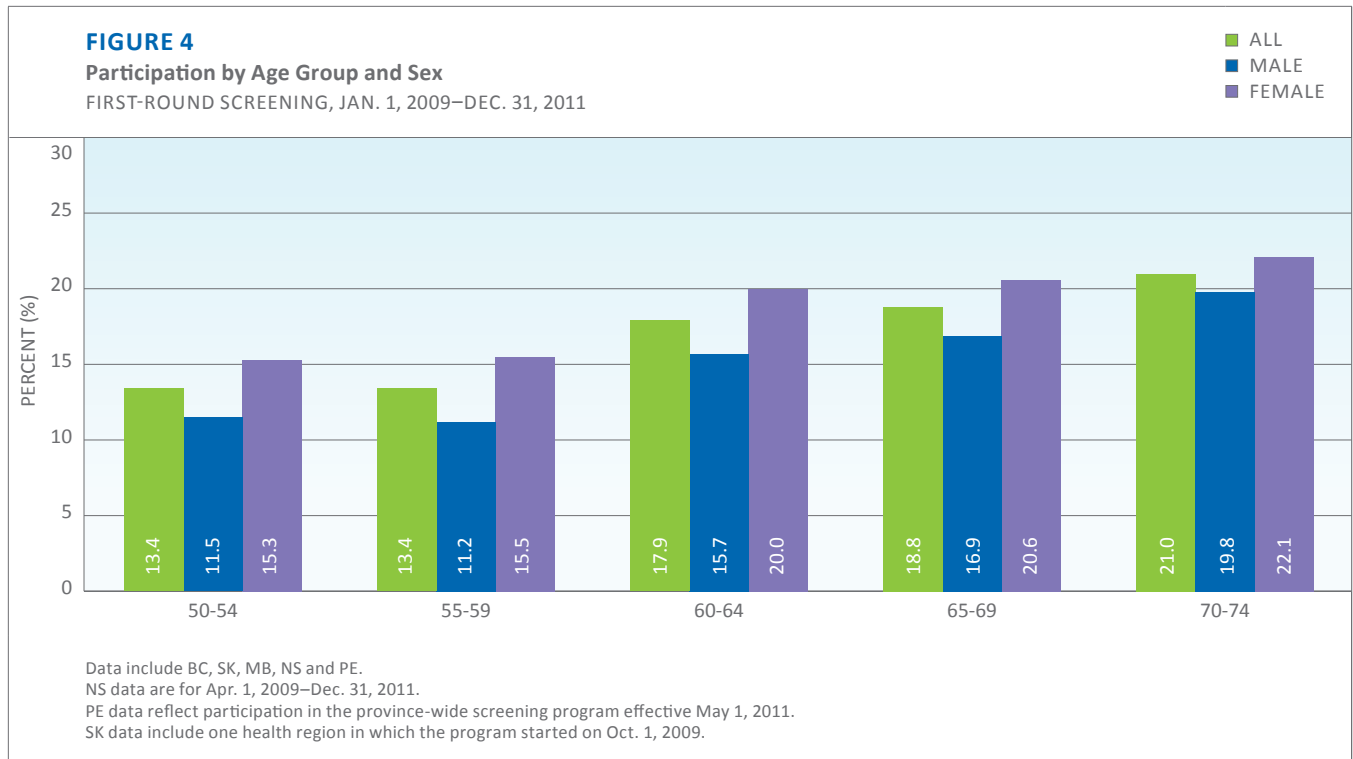
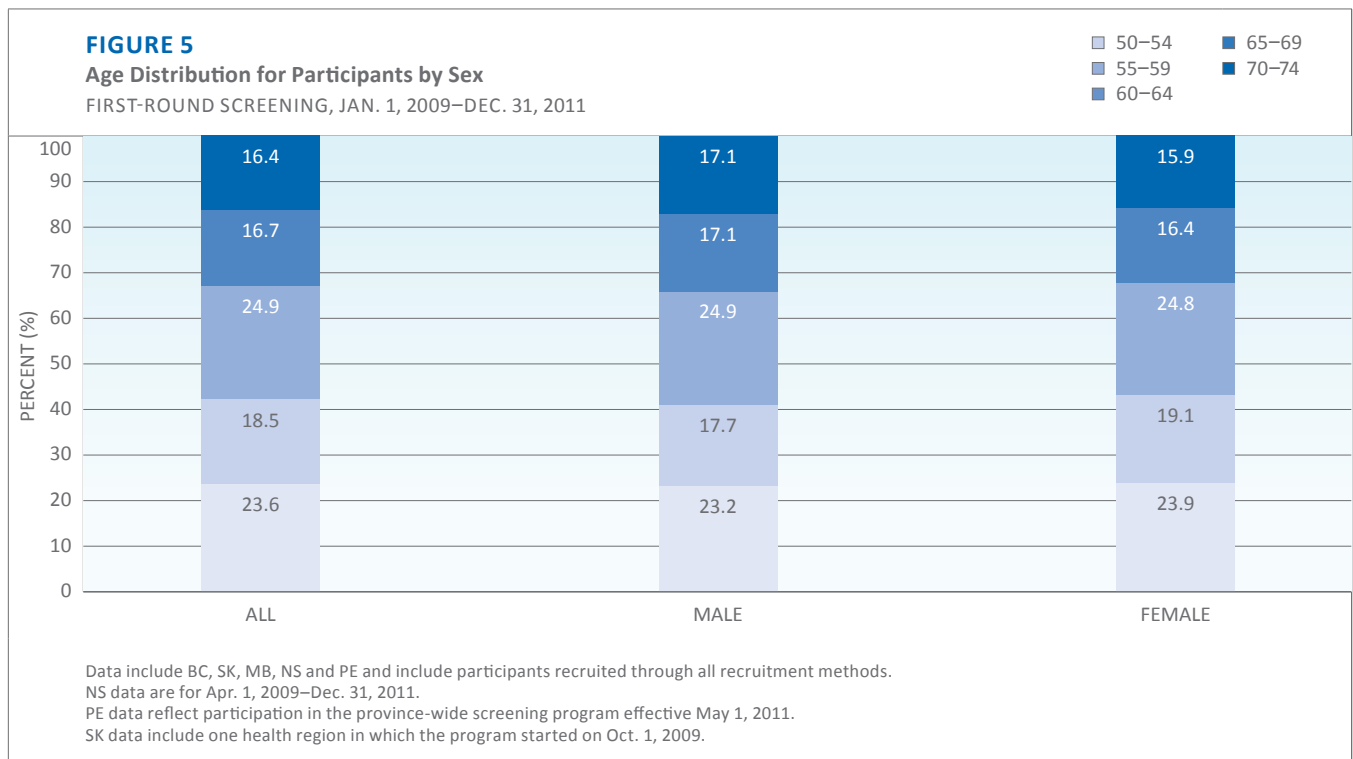


Figure 5 shows that among individuals who were screened, a higher percentage were 50 to 54 years of age (23.6%) or 60 to 64 years of age (24.9%) regardless of sex.



Fecal Test Utilization

As organized screening programs develop, it is important to recognize that a portion of CRC screening occurs outside organized screening programs. The utilization of CRC screening was evaluated to reflect all screening in the whole population.

WHAT IS FECAL TEST UTILIZATION?

Utilization is the percentage of the target population that successfully completed at least one FT, either programmatic or non-programmatic. This information may be available from a variety of sources, including screening programs, fee-for-service data and self-reporting.

ABOUT FECAL TEST UTILIZATION

Ontario provided information on FT utilization: 27% of Ontarians aged 50 to 74 had at least one FT (programmatic or non-programmatic) between January 1, 2009, and December 31, 2010.

It is expected that utilization will be more widely reported as the ability to collect information grows with the programs. Until that time, national surveys will be used to reflect FT utilization in Canada.

Figure 6 shows the percentage of Canadians aged 50 to 74 at average risk who reported having an FT in the past two years in 2009 and 2011. In 2009, 26.1% of individuals surveyed reported having had an FT. This percentage increased to 28.5% in 2011. FT utilization ranged from 5.9% to 44.3% in 2009 and from 12.4% to 58.2% in 2011.

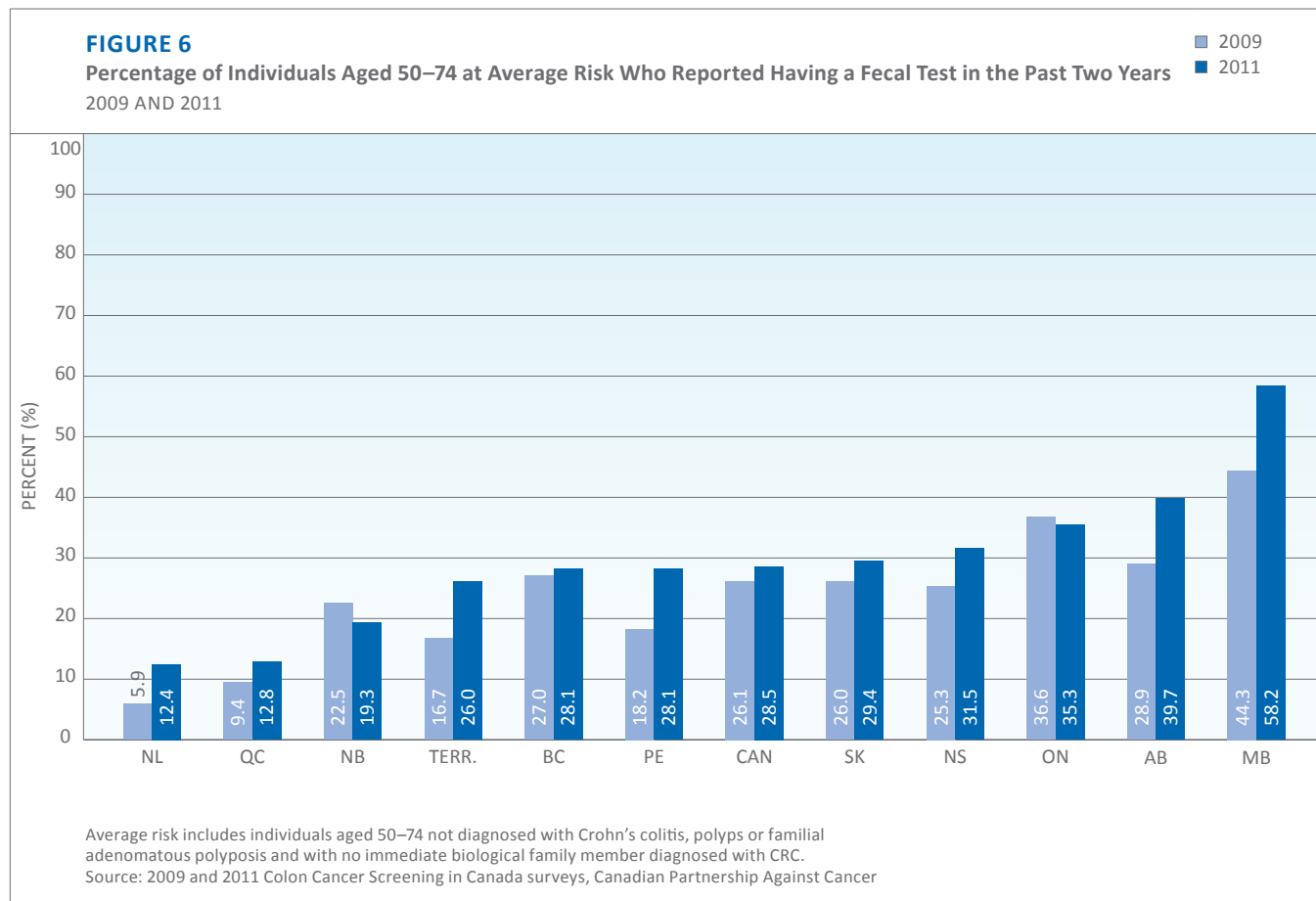
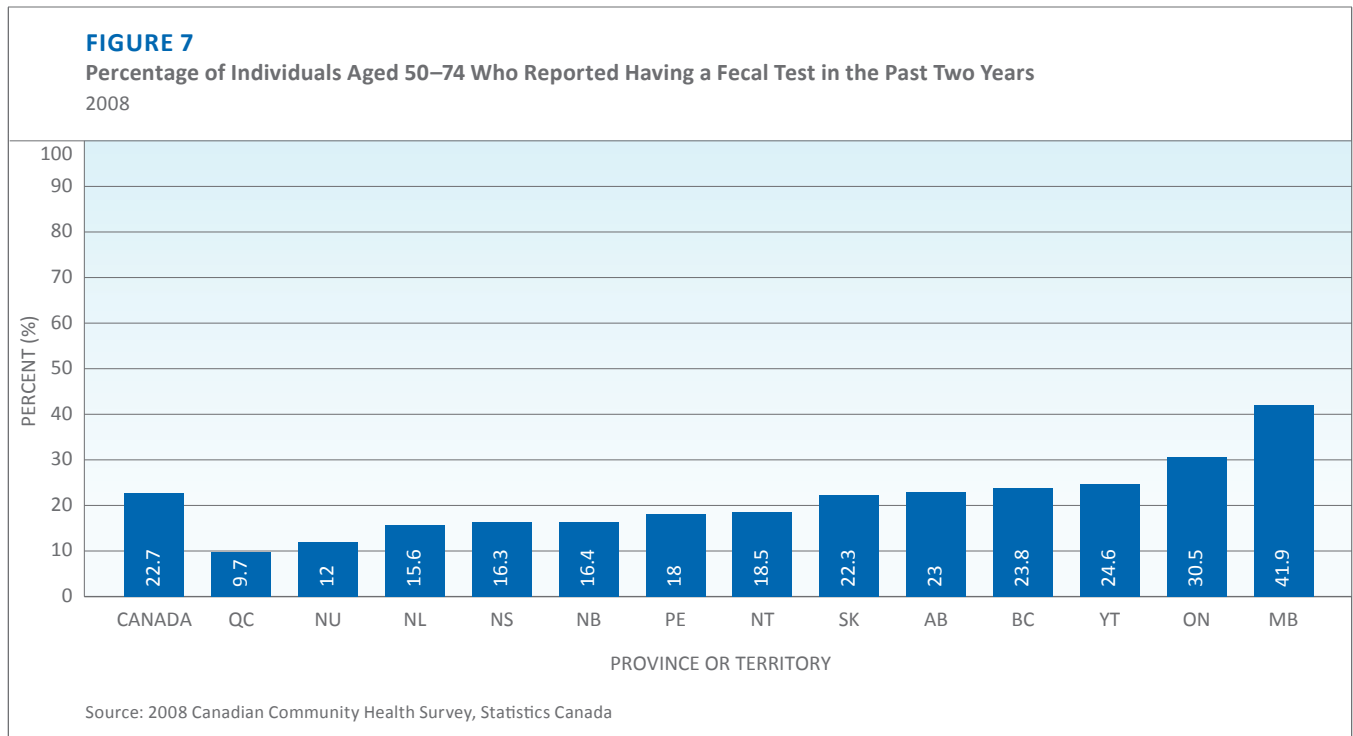


Figure 7 shows the percentage of individuals who had an FT according to the 2008 Canadian Community Health Survey. The results are similar to those of the Colon Cancer Screening in Canada survey. In 2008, 22.7% of individuals stated they had had an FT in the previous two years. FT use ranged from 9.7% to 41.9%.



Fecal Test Inadequacy Rate

FT inadequacy rates varied by province.

WHAT IS AN FT INADEQUACY RATE?

The FT inadequacy rate is the percentage of individuals whose FT was inadequate and who have not repeated the test to get a successful result. Only first FTs are reported.

FTs may be inadequate as a result of improper or damaged samples, missing identification or equivocal results.

HOW WAS THE FT INADEQUACY RATE CALCULATED?

The FT inadequacy rate was calculated as follows:

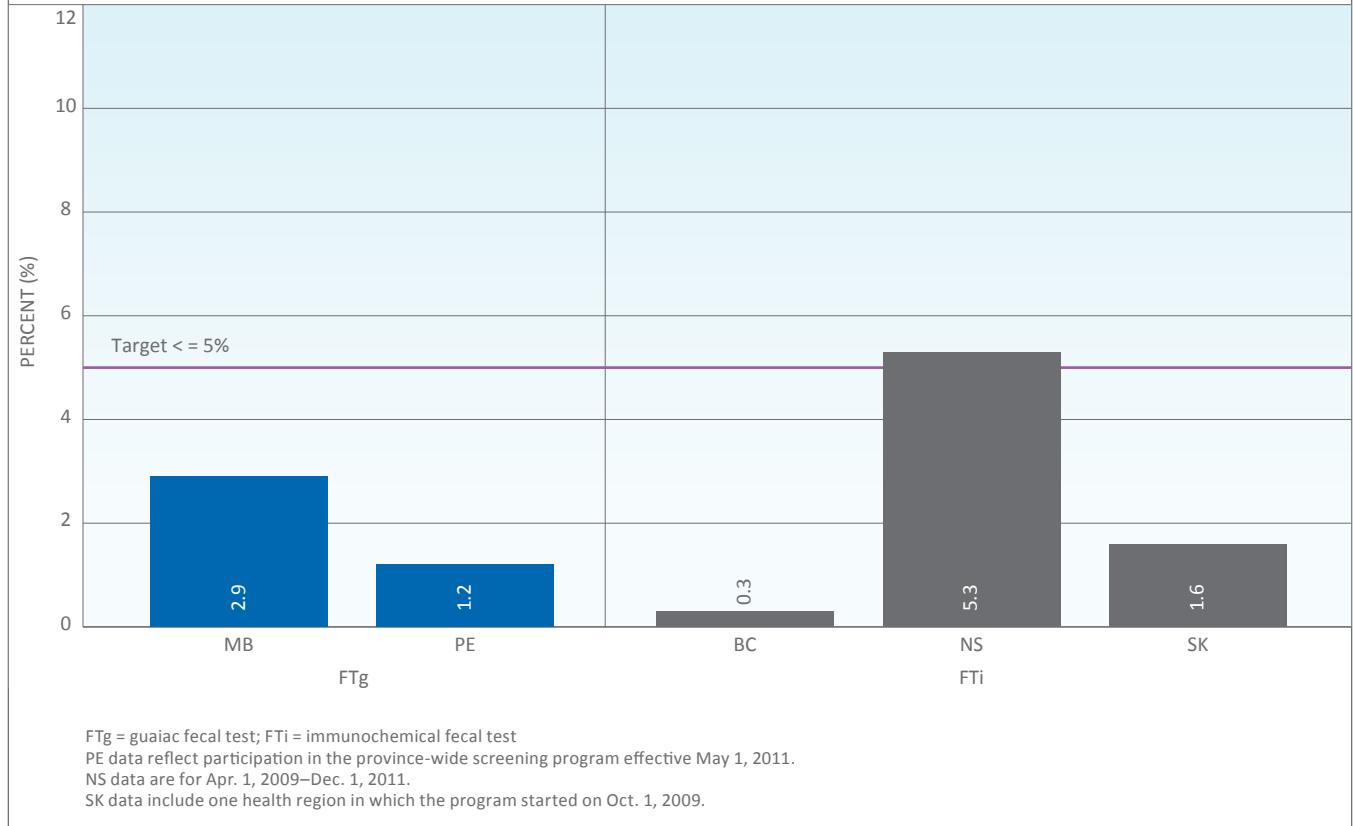
- **Numerator:** Number of individuals who had an inadequate first FT, and did not repeat the FT to get a satisfactory result, between January 1, 2009, and December 31, 2011.
- **Denominator:** Number of individuals who completed an FT between January 1, 2009, and December 31, 2011.
- **Target:** ≤ 5%

ABOUT FT INADEQUACY RATES

The FT inadequacy rate provides information about the effectiveness of the program FT. Factors that may influence the inadequacy rate include the type of FT used (FTg versus FTi), test complexity, participants' understanding of test instructions and laboratory quality assurance issues.

As shown in Figure 8, the FT inadequacy rate varied from 0.3% in British Columbia to 5.3% in Nova Scotia. Most FT inadequacy rates met the target (5% or less).

FIGURE 8
Fecal Test Inadequacy Rates by Test Type and Province
 FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011



Positivity

Positivity was higher among men and increased with age.

WHAT IS POSITIVITY?

Positivity is the percentage of individuals who had an abnormal FT result. Only first FTs are reported.

HOW WAS POSITIVITY CALCULATED?

Positivity was calculated as follows:

- **Numerator:** Number of individuals who had an abnormal FT result between January 1, 2009, and December 31, 2011.
- **Denominator:** Number of individuals who had at least one successful FT between January 1, 2009, and December 31, 2011.
- **Target:** Not defined.

ABOUT POSITIVITY

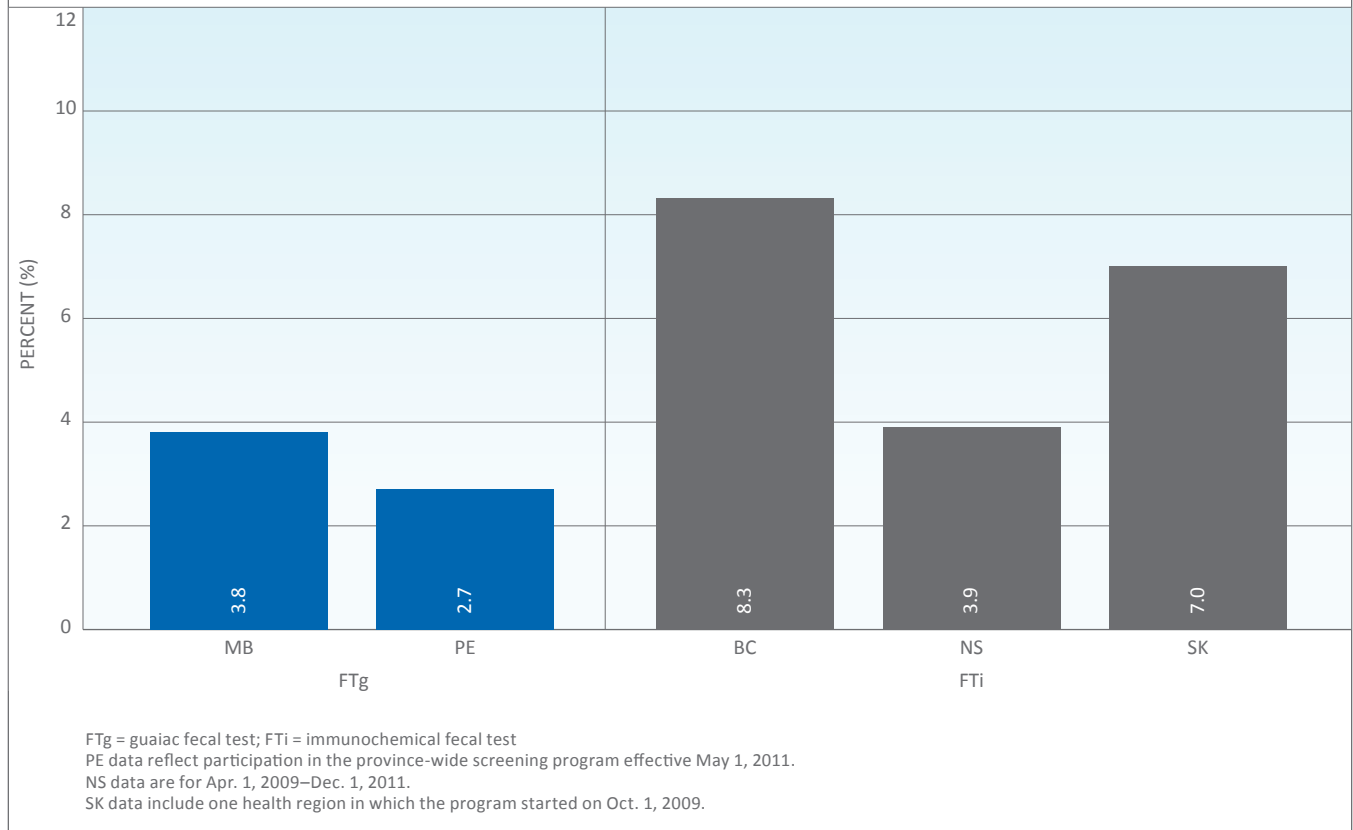
Test positivity depends primarily on test type (FTg versus FTi) and the particular characteristics of the tests that can affect the result (manufacturer, number of samples per test and number of collection days).⁵

Figure 9 summarizes the positivity characteristics for each of the five provinces covered in this report.

Two of the provincial programs (Manitoba and Prince Edward Island) use an FTg; the others (British Columbia, Saskatchewan and Nova Scotia) use FTi. British Columbia and Saskatchewan use a quantitative FTi test and Nova Scotia uses a qualitative FTi test.

As shown in Figure 9, positivity varied among the provinces using the FTi, from 3.9% in Nova Scotia to 8.3% in British Columbia. For the provinces using the FTg, positivity was 2.7% in Prince Edward Island and 3.8% in Manitoba. Positivity rates were higher for the FTi (4.8%) than the FTg (3.7%). The positivity rate for all five provinces combined was 4.4%.

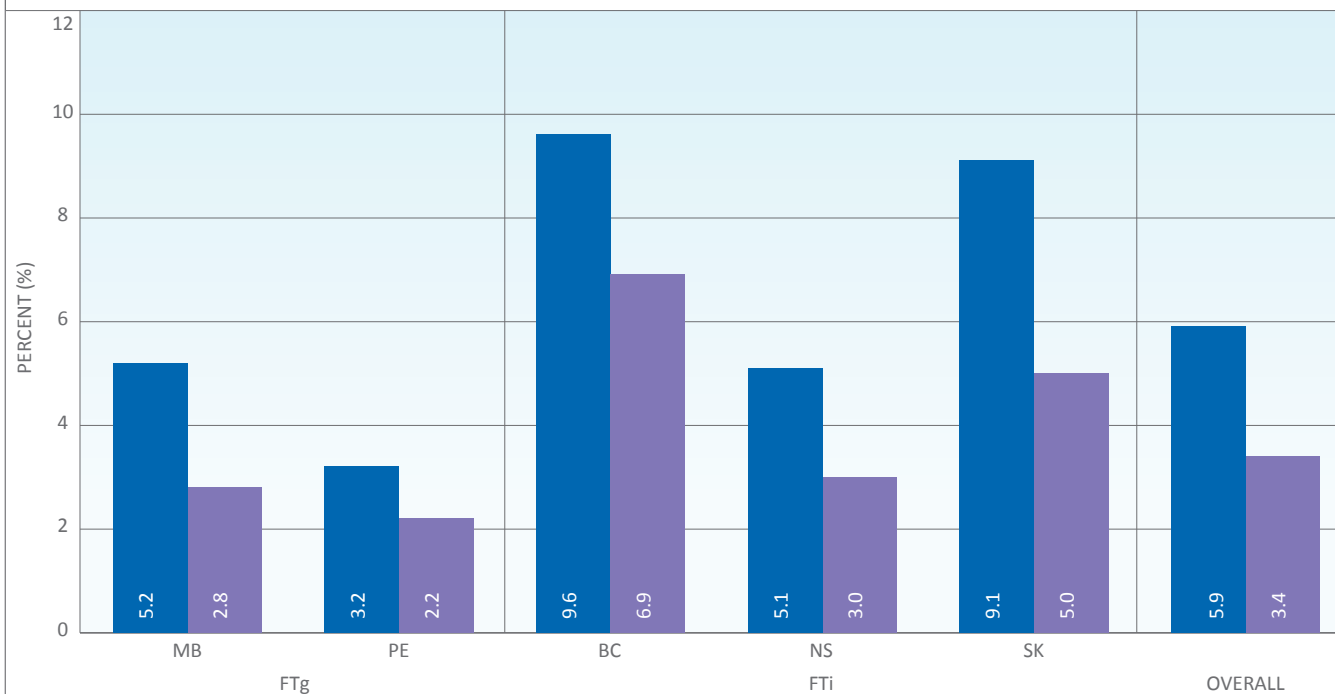
FIGURE 9
Positivity by Fecal Test Type and Province
 JAN. 1, 2009–DEC. 31, 2011



Figures 10 and 11 show that positivity was higher among men in all five provinces and clearly increased with age in four of the five provinces. This result is consistent with previous observations and is likely due to the natural history of CRC.⁸

FIGURE 10
Positivity by Fecal Test Type, Province and Sex
 JAN. 1, 2009–DEC. 31, 2011

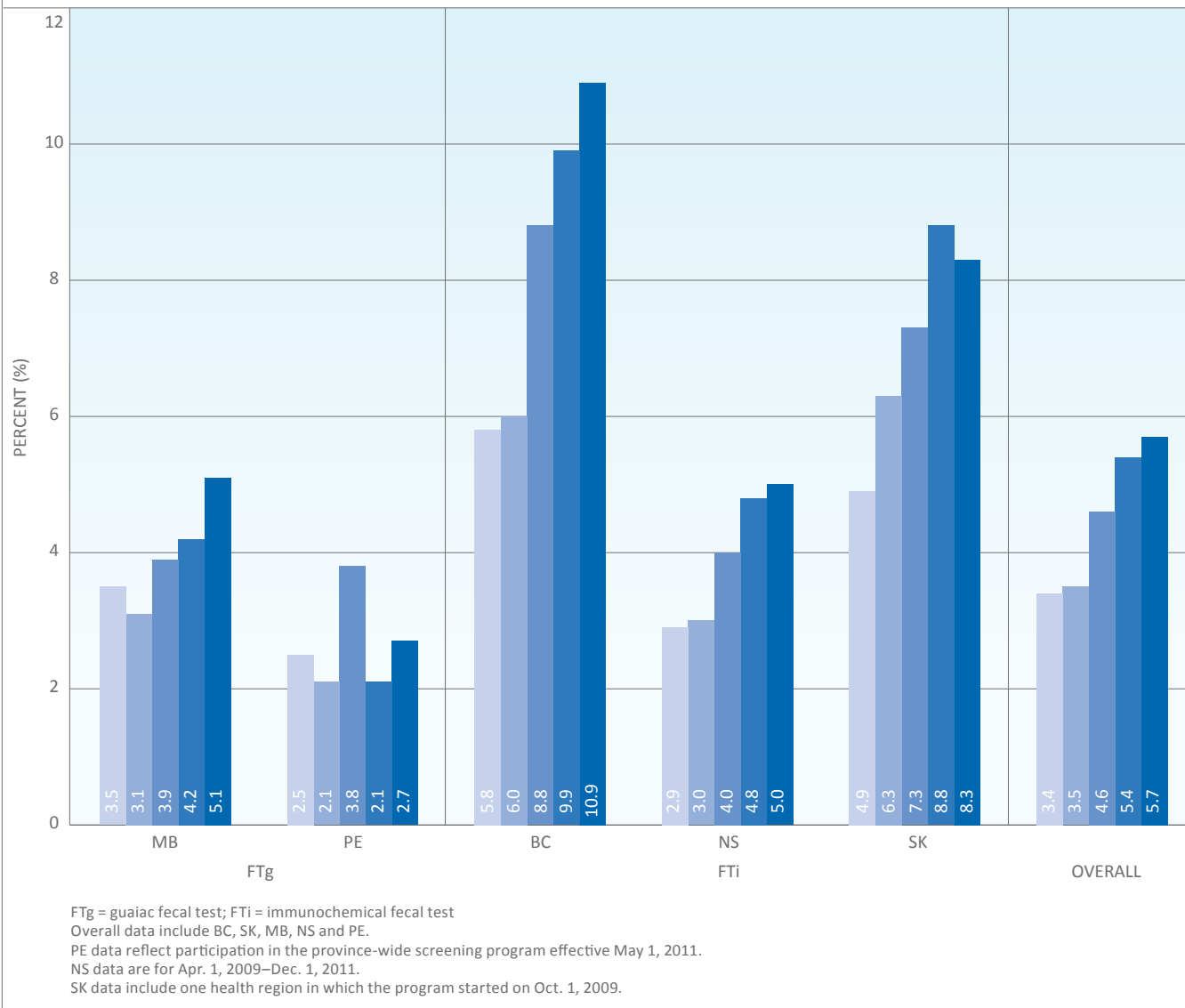
■ MALE
 ■ FEMALE



FTg = guaiac fecal test; FTi = immunochemical fecal test
 Overall data include BC, SK, MB, PE and NS.
 PE data reflect participation in the province-wide screening program effective May 1, 2011.
 NS data are for Apr. 1, 2009–Dec. 1, 2011.
 SK data include one health region in which the program started on Oct. 1, 2009.

FIGURE 11
Positivity by Fecal Test Type, Province and Age Group
 JAN. 1, 2009–DEC. 31, 2011

50–54 65–69
 55–59 70–74
 60–64



Follow-up Colonoscopy Uptake

One province reached the target for follow-up colonoscopy uptake after an abnormal FT within six months. Results in the other provinces varied.

WHAT IS FOLLOW-UP COLONOSCOPY UPTAKE?

Follow-up colonoscopy uptake is the percentage of individuals with an abnormal FT result who undergo follow-up colonoscopy within 180 days of the date of the FT result.

HOW WAS FOLLOW-UP COLONOSCOPY UPTAKE CALCULATED?

- **Numerator:** Number of individuals who had an abnormal first FT result between January 1, 2009, and December 31, 2011, and who had a follow-up colonoscopy within 180 days of the date of the abnormal FT result.
- **Denominator:** Number of individuals who had an abnormal first FT result between January 1, 2009, and December 31, 2011.
- **Target:** $\geq 85\%$ within 180 days

ABOUT FOLLOW-UP COLONOSCOPY UPTAKE

Follow-up colonoscopy uptake reflects the program's ability to provide access to colonoscopy for individuals with an abnormal FT result within a defined period of time. To achieve maximum impact, organized CRC screening programs must minimize the amount of time from screening to final diagnosis. This can be achieved by increasing human and financial resources for screening programs or using programmatic nurse/client navigator systems.

Overall, 4,661 individuals had abnormal FT results between January 1, 2009, and December 31, 2011 (Table 3). Of these, 3,751 (80.5%) had follow-up colonoscopy within 180 days of the date of their abnormal result. Follow-up colonoscopy uptake ranged from 67.8% in PE to 89.5% in BC. A further breakdown of follow-up colonoscopy within 60 days and within 180 days by province is shown in Figure 12.

Overall, 45% of individuals underwent follow-up colonoscopy within 60 days of an abnormal FT test result.

TABLE 3

Follow-up Colonoscopy Uptake within 180 Days by Province, Sex and Age Group

FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011

	BC	MB	NS	PE	SK	OVERALL
FOLLOW UP COLONOSCOPY DONE WITHIN 180 DAYS, % (TARGET ≥ 85%) (NUMBER OF FOLLOW UP COLONOSCOPIES / NUMBER OF ABNORMAL FTS)	89.5 (735/821)	72.9 (842/1155)	82.3 (1801/2188)	67.8 (40/59)	76.0 (333/438)	80.5 (3751/4661)
MALE	90.2	71.5	82.9	65.6	76.8	80.6
FEMALE	88.6	74.7	81.6	70.4	74.7	80.4
50-54	89.3	75.8	80.1	70.0	76.1	79.2
55-59	93.4	72.3	83.9	77.8	82.7	82.0
60-64	88.0	74.5	83.7	70.0	70.2	80.9
65-69	89.0	69.5	84.5	60.0	76.0	81.5
70-74	89.3	70.2	79.3	60.0	78.4	79.0

Overall data include BC, MB, NS, PE and SK.

NS data are for April 1, 2009 to December 31, 2011.

PE data reflect the participation of the province-wide Provincial Screening Program effective May 1, 2011.

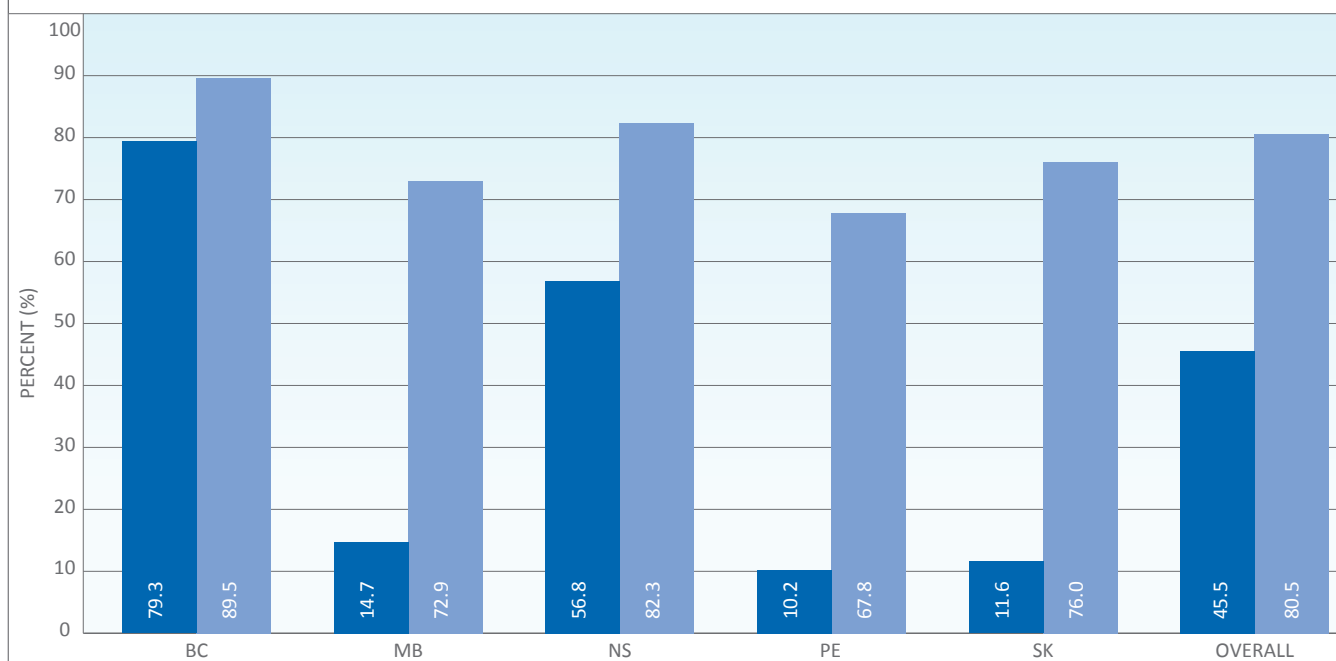
SK data include one health region in which the program started on October 1, 2009.

FIGURE 12

Follow-up Colonoscopy within 60 and 180 Days, by Province

FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011

■ WITHIN 60 DAYS
■ WITHIN 180 DAYS



NS data are for Apr. 1, 2009–Dec. 31, 2011.

PE data reflect participation in the province-wide screen program effective May 1, 2011.

SK data include one health region in which the program started on Oct. 1, 2009.

Wait Time for Follow-up Colonoscopy

The 90th percentile wait time for follow-up colonoscopy ranged from 63 to 160 days.

WHAT IS WAIT TIME FOR FOLLOW-UP COLONOSCOPY?

Wait time for follow-up colonoscopy is the time from abnormal FT to follow-up colonoscopy.

HOW WAS FOLLOW-UP COLONOSCOPY WAIT TIME CALCULATED?

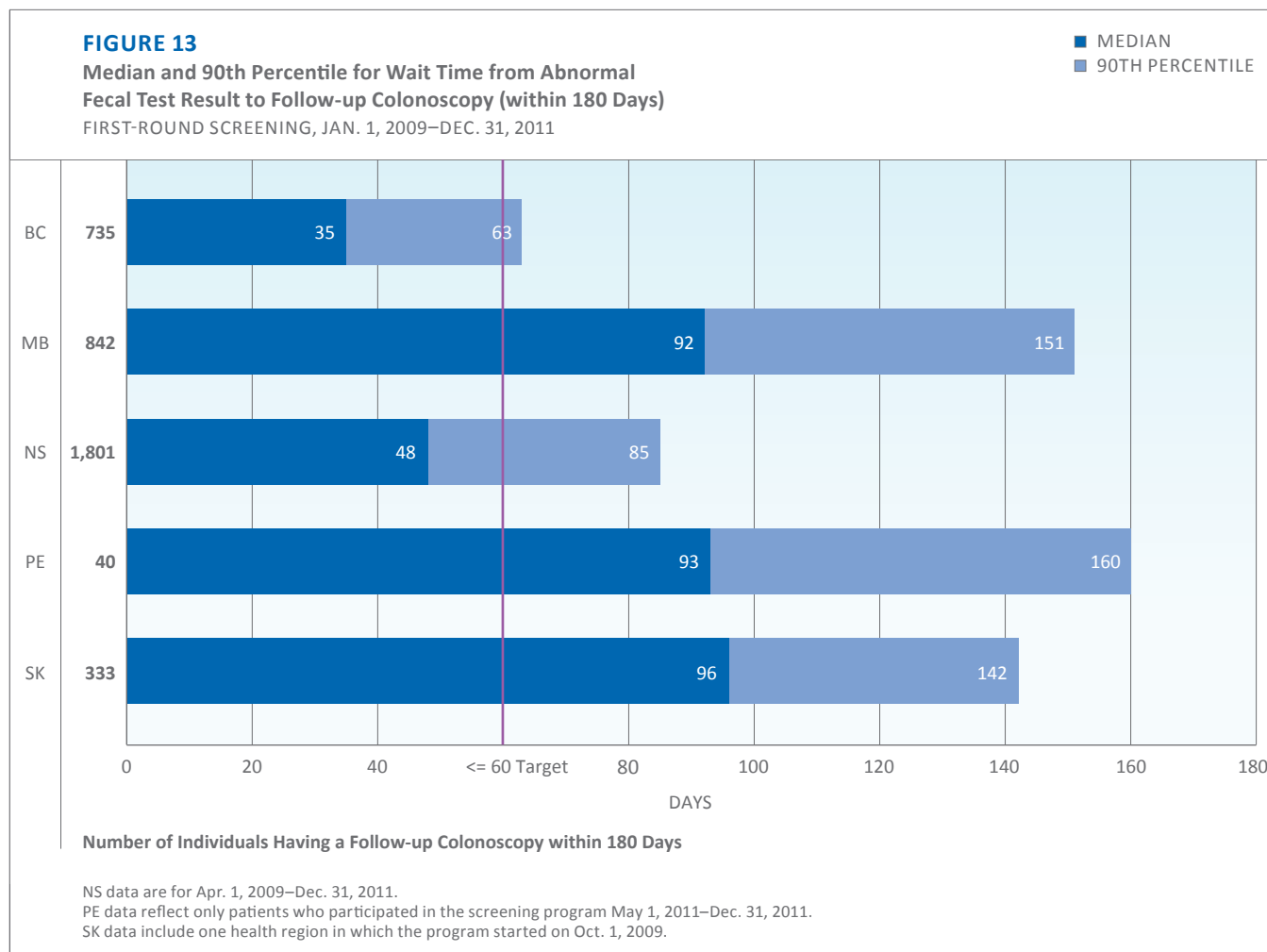
Median and 90th percentile number of days from the date of the first abnormal FT result to the date of follow-up colonoscopy procedure were determined. This report includes individuals who had an abnormal FT result between January 1, 2009, and December 31, 2011, and who underwent follow-up colonoscopy (within 180 days).

- **Target:** $\geq 90\%$ within 60 days

ABOUT WAIT TIMES FOR FOLLOW-UP COLONOSCOPY

Wait times are influenced by patient, provider and system-related factors. However, this indicator also reflects the success of the screening program in encouraging and facilitating the provision of follow-up colonoscopy for individuals with an abnormal FT result.

Figure 13 shows that the median wait times for follow-up colonoscopy ranged from 35 to 96 days. The 90th percentile wait time ranged from 63 to 160 days. Wait times for follow-up colonoscopy varied across provinces. The results shown include only individuals with abnormal FT results who underwent colonoscopy within 180 days of the abnormal result.



Wait Time for Definitive Pathological Diagnosis

The median number of days from follow-up colonoscopy to pathology report ranged from two to 12 days and the 90th percentile wait times ranged from five to 24 days.

WHAT IS WAIT TIME FOR DEFINITIVE PATHOLOGICAL DIAGNOSIS?

Wait time for definitive pathological diagnosis is the time from follow-up colonoscopy to the final reportable results based on pathology.

HOW WAS WAIT TIME FOR DEFINITIVE PATHOLOGICAL DIAGNOSIS CALCULATED?

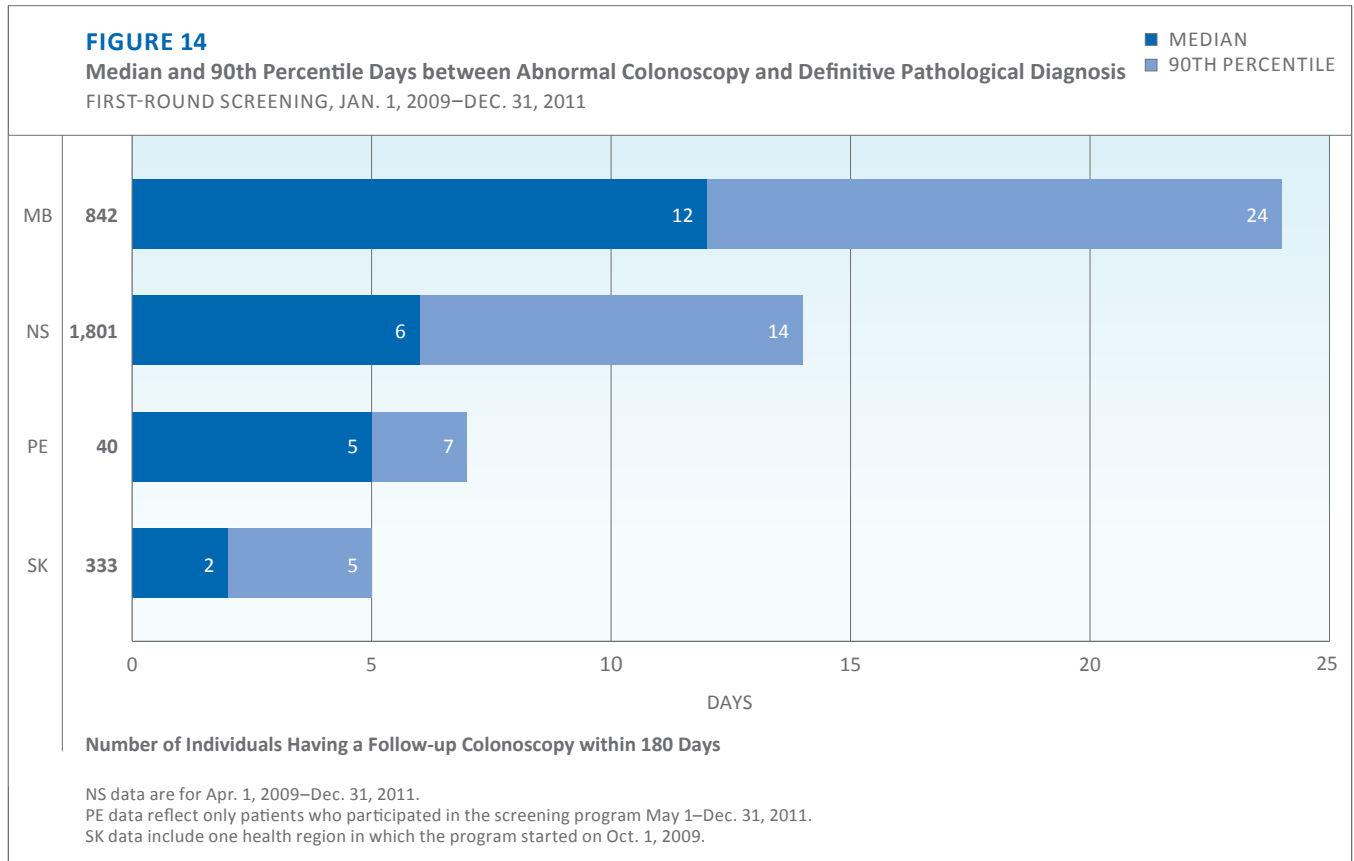
The wait times are the median and the 90th percentile number of days from the date of colonoscopy to the date of pathological diagnosis in people who had an abnormal FT result between January 1, 2009, and December 31, 2011, and who had follow-up colonoscopy within 180 days of that result.

Target: Not defined

ABOUT WAIT TIME FOR DEFINITIVE PATHOLOGY DIAGNOSIS

The ability to provide complete and timely results to health-care providers and patients is an important part of screening and helps to ensure that any additional treatment begins as soon as possible.

Figure 14 shows that the median number of days between an abnormal colonoscopy result and a definitive diagnosis ranged from two to 12 and the 90th percentile wait times ranged from five to 24 days.



Positive Predictive Value

The positive predictive value was higher for FTi and for men and increased with age.

WHAT IS POSITIVE PREDICTIVE VALUE?

Positive predictive value (PPV) is the proportion of individuals with an abnormal FT test result diagnosed with an adenoma, advanced adenoma, CRC, neoplasia (adenoma and CRC) or advanced neoplasia (advanced adenoma and CRC).

HOW WAS THE POSITIVE PREDICTIVE VALUE CALCULATED?

- **Numerator:** Number of individuals with an abnormal first FT result between January 1, 2009, and December 31, 2011, who had one or more adenomas, advanced adenomas or CRC confirmed by pathology from follow-up colonoscopy (within 180 days).
- **Denominator:** Number of individuals with an abnormal first FT laboratory result between January 1, 2009, and December 31, 2011, who had follow-up colonoscopy (within 180 days).
- **Target:** $\geq 35\%$ for FTg and $\geq 50\%$ for FTi for adenomas.

ABOUT POSITIVE PREDICTIVE VALUE

PPV is a widely used indicator of colonoscopy quality. It can be a marker of both the technical quality of the procedure and the efficacy of the screening strategy. A high PPV indicates that fewer people have been unnecessarily referred to colonoscopy. PPV depends on the underlying prevalence of the condition in the population and thus will be lower for CRC than for adenomas.

Table 4 shows the PPV for adenomas and CRC by province. The overall PPV was 47.2% for adenomas, 23.6% for advanced adenomas and 4.4% for CRC. It should be noted that the inclusion criteria for advanced adenoma was not consistent among the five reporting provinces – three different types of inclusion criteria were used. Consultation is ongoing with pathologists across the country to obtain consensus on the inclusion criteria.

TABLE 4
Positive Predictive Values by Province (%)
 FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011

TYPE OF LESION	BC (FTi)	SK (FTi)	MB (FTg)	NS (FTi)	PE (FTg)	OVERALL
ADENOMA	57.1	48.6	36.5	48.3	25.0	47.2
ADVANCED ADENOMA*	31.6 [†]	25.5 [†]	19.5	22.3 [†]	‡	23.6
CRC	4.8	3.3	4.3	—	‡	4.4
NEOPLASIA [§]	61.9	52.0	40.7	—	35.0	50.5
ADVANCED NEOPLASIA**	36.3	28.8	23.8	—	20.0	29.3

FTg = guaiac fecal test; FTi = immunochemical fecal test; — = Data are not available
 SK data include one health region in which the program started on Oct. 1, 2009.
 NS data are for Apr. 1, 2009–Dec. 31, 2011.
 PE data reflect participation in the province-wide provincial screening program effective May 1, 2011.
 *An advanced adenoma is either 1 cm or more in size, has a villous component (villous or tubulovillous or has high-grade dysplasia characterized by architectural distortion – cribriform or back-to-back crypts), including sessile serrated adenoma (also referred to as a sessile serrated polyp); a benign polyp characterized by non-dysplastic crypts that are dilated and serrated (saw-toothed) and have architectural distortion and an increased proliferative zone.
[†]In SK and NS, advanced adenoma also includes traditional serrated adenomas. In BC, advanced adenoma also includes traditional serrated adenomas and patients with 3 or more adenomas.
[‡]Suppressed owing to small numbers.
[§]Neoplasia refers to the sum of all adenomas + CRC
 **Advanced neoplasia refers to the sum of advanced adenoma + CRC.

As shown in Table 5, the targets for both FTg (≥ 35%) and FTi (≥ 50%) PPV for adenomas were met. As expected, the adenoma PPVs were higher for FTi and for men and increased with age.

TABLE 5
Positive Predictive Value for Adenomas by Fecal Test Type, Sex and Age Group
 FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011

		POSITIVE PREDICTIVE VALUE, %	NUMBER OF ADENOMAS DETECTED
FECAL TEST TYPE	FTg (target ≥ 35%)	35.9	317
	FTi (target ≥ 50%)	50.6	1,452
SEX	MALE	54.3	1,160
	FEMALE	37.7	609
AGE GROUP	50–54 YEARS	35.1	237
	55–59 YEARS	44.9	251
	60–64 YEARS	48.8	470
	65–69 YEARS	51.4	397
	70–74 YEARS	53.0	414

Data include BC, SK, MB, NS and PE.
 SK data include one health region in which the program started on Oct. 1, 2009.
 NS data are for Apr. 1, 2009–Dec. 31, 2011.
 PE data reflect participation in the province-wide screening program effective May 1, 2011.

Adenoma Detection Rate

Overall, the adenoma detection rate was 16.9 per 1,000 people screened and differed by type of test.

WHAT IS THE ADENOMA DETECTION RATE?

The adenoma detection rate is the number of individuals with one or more adenoma(s) confirmed by pathology from follow-up colonoscopy (performed within 180 days of the date of an abnormal screening FT) per 1,000 people screened within a respective date frame.

HOW WAS THE ADENOMA DETECTION RATE CALCULATED?

- **Numerator:** Number of individuals with adenoma confirmed by pathology from a colonoscopy (performed within 180 days of the date of an abnormal FT result obtained between January 1, 2009, and December 31, 2011).
- **Denominator:** Number of individuals having had at least one successful FT processed by the lab between January 1, 2009, and December 31, 2011, per 1,000 people screened.
- Rate is multiplied by 1000.
- **Target:** Not defined.

ABOUT THE ADENOMA DETECTION RATE

Similar to the PPV, this indicator is a marker of colonoscopy quality as well as overall program performance. The adenoma detection rate could be an independent predictor of the risk of interval CRC.

Due to the variability in the number of successful FTs in this date frame, it is too early to draw a conclusion on colonoscopy quality. As more data becomes available, this will be an interesting indicator to follow.

Table 6 shows the adenoma detection rate by type of fecal test.

TYPE OF FECAL TEST	FTg	FTi
TESTED POPULATION (N)	32,515	72,235
ADENOMA DETECTION RATE PER 1,000 PEOPLE SCREENED	9.7	20.1

FTg=guaiaac fecal test; FTi=immunochemical fecal test
 FTg data include MB, PE; PE data reflect participation in the province-wide screening program effective May 1, 2011.
 FTi data include BC, SK, NS; SK data include one health region in which the program started on Oct. 1, 2009; NS data are qualitative FTi and are for Apr. 1, 2009–Dec. 31, 2011.

Colorectal Cancer Detection Rate

The CRC detection rate of almost 1.8 per 1,000 people screened was close to the target of two per 1,000 screened.

WHAT IS CRC DETECTION RATE?

The CRC detection rate is the number of individuals with CRC confirmed by pathology from follow-up colonoscopy (performed within 180 days of the date of an abnormal screening FT result), per 1,000 people screened within a respective date frame.

HOW WAS THE CRC DETECTION RATE CALCULATED?

- **Numerator:** Number of individuals with CRC confirmed by pathology from a colonoscopy (performed within 180 days of the date of an abnormal FT result obtained between January 1, 2009, and December 31, 2011).
- **Denominator:** Number of individuals having had at least one successful FT processed by the lab between January 1, 2009, and December 31, 2011, divided per 1,000 people screened.
- **Target:** ≥ two per 1,000 people screened

ABOUT CRC DETECTION RATE

The CRC detection rate is an important measure of the effectiveness of the CRC screening program.

Table 7 shows the CRC detection rate by province.

	BC	SK	MB	PE	NS	OVERALL
TYPE OF FECAL TEST	FTi	FTi	FTg	FTg	FTi*	
COLORECTAL CANCER DETECTION RATE PER 1,000 PEOPLE SCREENED	3.5	1.8	1.2	†	—	1.8

FTi = immunochemical fecal test; FTg = guaiac fecal test; — = data not available
 *Qualitative FTi
 †Suppressed owing to small numbers.
 SK data include one health region in which the program started on Oct. 1, 2009.
 NS data are for Apr. 1, 2009–Dec. 31, 2011.
 PE data reflect participation in the province-wide screening program effective May 1, 2011.

Stage Distribution of Invasive Colorectal Cancer

Overall, 64.6% of people diagnosed with CRC were diagnosed at Stage 1 or 2.

WHAT IS STAGE DISTRIBUTION OF INVASIVE CRC?

Stage distribution of invasive CRC is the distribution of screen-detected invasive CRC cases by stage within a respective date frame.

HOW WAS STAGE DISTRIBUTION CALCULATED?

- **Numerator:** The number of individuals with invasive CRC Stage 1 or 2 diagnosed by follow-up colonoscopy (within 180 days after an abnormal FT result between January 1, 2009, and December 31, 2010).
- **Denominator:** The number of individuals with invasive CRC confirmed by pathology at follow-up colonoscopy (within 180 days after an abnormal FT result between January 1, 2009, and December 31, 2010).
- **Target:** Not defined

ABOUT STAGE DISTRIBUTION OF INVASIVE CRC

Screening aims to reduce the incidence and mortality of cancer by diagnosing individuals at an early stage. A shift toward detection of more earlier-stage cancers and fewer late-stage cancers is expected as participation in programmatic CRC screening increases.

Table 8 shows the percentage of individuals diagnosed with a Stage 1 or Stage 2 invasive CRC by province. Appendix C summarizes performance indicators by province.

TABLE 8
Percentage of Individuals Diagnosed with a Stage 1 or 2 Invasive Colorectal Cancer* by Province
 FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2010

	BC	SK	MB	NS	PE	OVERALL
TYPE OF FECAL TEST	FTi	FTi	FTg	FTi [†]	FTg	
STAGE 1 OR 2 INVASIVE COLORECTAL CANCER (%)	80.6	45.5	55.6	—	‡	64.6

FTi = immunochemical fecal test; FTg = guaiac fecal test; — = data not available
 *Includes invasive cancers Stage 1–2; excludes unknown and unstaged cancers.
[†]Qualitative FTi
[‡]Suppressed owing to small numbers.
 SK data include one health region in which the program started on Oct. 1, 2009.
 NS data are for Apr. 1, 2009–Dec. 31, 2011.
 PE data reflect participation in the province-wide screening program effective May 1, 2011.

30-Day Mortality

Three provinces (British Columbia, Saskatchewan and Prince Edward Island) provided information about 30-day mortality on a total of 709 colonoscopies; no deaths occurred.

WHAT IS 30-DAY MORTALITY?

Thirty-day mortality is defined as the number of deaths due to any cause that occurred within 30 days of follow-up colonoscopy for an abnormal FT result.

ABOUT 30-DAY MORTALITY

Mortality from CRC is an important indicator that assesses performance of programmatic CRC screening. Randomized controlled trials have demonstrated that CRC screening using an FT can reduce mortality from the disease; however, deaths may occur following colonoscopy, whether diagnostic or therapeutic.

CONCLUSION

The collaborative efforts of provinces and territories have led to the establishment of a set of national quality indicators, targets and processes to share aggregate data about CRC screening in Canada. This report documents results from the early implementation of screening programs in five provinces. While CRC programs have been established only recently (since 2007) and are in an early stage of development, the monitoring of quality indicators has highlighted some interesting trends.

Participation is a key indicator of program success. At this early stage, when programs are not available to the whole eligible population, reporting participation among the population with access to the screening program allows an assessment of uptake of screening thus far. Participation rates vary and are much lower than the Canadian target of 60% or more of the target population. It will be important to monitor the variability in this indicator across Canada, together with the various recruitment strategies being implemented to identify those strategies that are most effective in a Canadian setting.

In Canada there is also wide access to screening with FT, flexible sigmoidoscopy or colonoscopy outside screening programs, as shown by self-reported rates from the Colon Cancer Screening in Canada Survey,⁹ and this access affects provinces' program participation. For example, asymptomatic individuals in the target age group who undergo colonoscopy could potentially become ineligible to participate in a CRC program for up to 10 years because they are up to date on their screening.¹⁰ A more comprehensive assessment of participation will need to include measures that capture the concept of being up to date and the use of tests outside the programs.

The results of first-round screening in five provincial programs show some interesting gender differences. Participation rates were consistently higher for women than for men for all age groups, but the positivity rate in men was higher than that for women. Men have a higher colorectal cancer incidence than women and specific recruitment strategies to increase their participation in screening would be beneficial.

The Monitoring Program Performance Working Group of the NCCSN will continue to:

- Refine and monitor quality indicators
- Assess and establish additional indicators and targets
- Ensure that data collection processes and reporting mechanisms are efficient and effective
- Report regularly on national outcomes

The purpose of reporting on quality indicators is to support the advancement and improvement of CRC programs in Canada. As programs become more established and participation rates increase it is anticipated that opportunities to collaborate on quality improvement initiatives will be identified through these reports. Such initiatives would include those that the NCCSN will oversee, with input from other organizations, clinical groups and individual experts, as appropriate.

Appendix A

COLORECTAL CANCER SCREENING MONITORING PROGRAM PERFORMANCE WORKING GROUP MEMBERSHIP

A special thank you to the individuals below for their contributions:

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Vice-President, Cancer Control, Canadian Partnership Against Cancer

CRC SCREENING MONITORING PROGRAM PERFORMANCE WORKING GROUP MEMBERSHIP	
Diane Major	Chair, CRC Screening Monitoring Program Performance Working Group
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Laura Gentile	British Columbia
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Grlica Bolesnikov	New Brunswick
Scott Antle	Newfoundland and Labrador
Kami Kandola	Northwest Territories
Erika Nicholson, Amy Folkes	Nova Scotia
Katherine Canil	Nunavut
Joanne Hader, Jill Tinmouth	Ontario
Marla Delaney	Prince Edward Island
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Riaz Alvi, Yvonne Taylor	Saskatchewan
Gregory Doyle	Chair, Canadian Breast Cancer Screening Initiative
Susan Fekete	Director, Screening and Early Detection Portfolio, Canadian Partnership Against Cancer
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Appendix B

PROVINCIAL AND TERRITORIAL HIGHLIGHTS OF COLORECTAL PLANNING AND SCREENING, AS OF 2013

	BC	AB	SK	MB	ON	QC
Program start date	2009	2007	2009	2007	2008	N/A
Approach to implementation/ current phase (at Dec. 31, 2011)	Pilot in 3 areas of province	Province wide phased program components	Provincial phased approach with 13 health regions	Phased/province wide	Full program, province wide	Planning
Entry-level test	FTi	FTi	FTi	FTg	FTg	FTi
Age of target population, years	50–74	50–74	50–74	50–74	50–74	50–74
Screening interval (annual vs. biennial)	Biennial	Annual or at least biennial	Biennial	Biennial	Biennial	Biennial
Recruitment strategy/ invitation: detail all methods used (direct personal invitation, media, self-referral, physician, etc.)	Personal invitation; PCP	PCP; other	Personal invitation through direct correspondence. In Northern SK: blended invitation model (direct correspondence and/or personal hand delivery by community health worker	Personal invitation, breast screening program, PCP, self-referral, media	PCP and self-referral through telehealth and pharmacies	N/A
N/A = not applicable; FTi = immunochemical fecal test; FTg = guaiac fecal test; PCP = primary care physician						

Appendix B

PROVINCIAL AND TERRITORIAL HIGHLIGHTS OF COLORECTAL PLANNING AND SCREENING, AS OF 2013

	NB	NS	PE	NL	YT	NT	NU
Program start date	2014	2009	2009	2012	No organized program	No organized program	No organized program
Approach to implementation/ current phase (at Dec. 31, 2011)	Planning	Phased	Pilot/ Province wide	Phased	N/A	FTi available territory wide	Planning
Entry-level test	FTi	FTi	2009 – FTg April 2012 – FTi	FTi	N/A	FTi	FTi
Age of target population, years	N/A	50–74	50–74	50–74	N/A	N/A	N/A
Screening interval (annual vs. biennial)	Biennial	Biennial	Biennial	Biennial	N/A	N/A	N/A
Recruitment strategy/ invitation: detail all methods used (direct personal invitation, media, self-referral, physician, etc.)	Bilingual personal invitation; marketing campaign	Personal invitation	Personal invitation, marketing campaign, self-referral, toll-free line, PCP office	Self-referral; physician referral; media and advertising; referral through breast screening centres	N/A	Colorectal cancer guidelines in place March 2011	Direct invitation through individual community campaigns

N/A = not applicable; FTi = immunochemical fecal test; FTg = guaiac fecal test; PCP = primary care physician

Appendix C

SUMMARY OF PERFORMANCE INDICATOR RESULTS BY PROVINCE (FIRST-ROUND SCREENING, JAN. 1, 2009–DEC. 31, 2011)

	BC	SK	MB	NS	PE	OVERALL
Type of fecal test	FTi	FTi	FTg	FTi*	FTg	
Tested population (n)	9,951	6,272	30,291	56,012	2,224	104,750
Positive results (n)	821	438	1,155	2,188	59	4,661
Positive results (%)	8.3	7.0	3.8	3.9	2.7	4.4 FTi 4.8 FTg 3.7
Follow-up colonoscopy within 180 days (n)	735	333	842	1,801	40	3,751
Follow-up colonoscopy uptake within 180 days (%)	89.5	76.0	72.9	82.3	67.8	80.5
Wait time for colonoscopy, days (90th percentile)	63	142	151	85	160	—
PPV adenoma (%)	57.1	48.6	36.5	48.3	25.0	47.2 FTi 50.6 FTg 35.9
Adenoma detected per 1,000 people screened	42.2	25.8	10.1	15.5	4.5	16.9
PPV CRC (%)	4.8	3.3	4.3	—	†	4.4
CRC detected per 1,000 people screened	3.5	1.8	1.2	—	†	1.8
Stage 1 or 2 invasive CRC (%)	80.6	45.5	55.6	—	†	64.6
<p>FTi = immunochemical fecal test; FTg = guaiac fecal test; — = data not available SK data include one health region in which the program started on Oct. 1, 2009. NS data are for Apr. 1, 2009–Dec. 31, 2011. PE data reflect participation in the province-wide provincial screening program effective May 1, 2011. *Qualitative FTi †Suppressed owing to small numbers.</p>						

Appendix D

GLOSSARY

VARIABLES RELATED TO FT SCREENING

The following process variables are described in the context of CRC screening in which FT is used as the primary screening test.

Screened/tested (screened or tested participants)	People who have used and returned an FT, irrespective of the test result, including people with inadequate or incomplete results. Each person is counted once, regardless of the number of tests performed.
Inadequate test	An FT returned by a participant in which the results cannot be reliably determined (see Section 1). The quality is insufficient for processing and the test cannot be used for recording a result according to the program policy.
Abnormal test (also referred to as a positive test)	An abnormal FT result based on the last adequate test that, according to the program policy, leads directly to a follow-up colonoscopy referral.
Normal test (also referred to as a negative test)	A normal FT result based on the last adequate test according to the program policy.
Follow-up colonoscopy	Participants with an abnormal FT require a follow-up colonoscopy. Ideally all participants with abnormal FTs are referred for follow-up colonoscopy.

VARIABLES RELATED TO ENDOSCOPIC SCREENING

The following process variables are described in the context of CRC screening in which either flexible sigmoidoscopy (FS) or colonoscopy is used as the primary screening test.

Screened	Screened participants who have attended the FS or colonoscopy screening examination, irrespective of the result, including people with inadequate or incomplete results. Each person is counted once regardless of the number of exams performed.
Inadequate test	Participants who attended FS or colonoscopy screening for whom the test results could not be interpreted within the reporting period. A new screening examination should be performed.

Abnormal test (also referred to as a positive test)	An abnormal screening FS or colonoscopy resulting either in diagnosis of cancer, removal of an adenoma or other lesion or referral for further investigation, according to the program policy.
Normal test (also referred to as a negative test)	An FS or colonoscopy screening test that reports no abnormalities based on the last adequate test according to the program policy.
Follow-up colonoscopy	Participants with an abnormal screening FS or colonoscopy require a follow-up colonoscopy.
Referral to surgery or tertiary endoscopy	Participants who require surgery or tertiary endoscopy for removal of challenging lesions following a positive FS or colonoscopy.
Severe complications requiring hospitalization	Severe complications requiring hospitalization within 14 days of FS or colonoscopy due to serious hemorrhaging involving transfusion, or due to perforation, vagal syndrome or peritonitis-like syndrome.
30-day mortality	Deaths that may occur within 30 days after an FS or colonoscopy, whether diagnostic or therapeutic. If the death is attributed to complications caused by the endoscopy, the participant should be counted in this group.
Lesion	Any lesion removed or biopsied at endoscopy or surgery (whether or not it is diagnosed as adenoma).
Adenomas	Pathological specimens removed at endoscopy or surgery that have been reported by a pathologist to be adenomatous.
Cancers	Colorectal cancer diagnosed by the screening program, or diagnosed as a direct result of participating in the screening program.

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