



An agency of the Provincial Health Services Authority

Colon Screening Program Program Report

(Reported data from Nov. 15, 2013 to Dec. 31, 2015)



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1.0 Message



Message from the Medical Director

We are very pleased to present the inaugural report for British Columbia's Colon Screening Program.

This report provides results from the first two years of the program – from November 2013 to December 31, 2015 – highlighting the efforts of the BC Cancer Agency, regional health authorities and laboratories, as well as colonoscopists, pathologists and primary care providers across the province.

The launch of the provincial program in November 2013 was a historic moment for British Columbia, as previously colorectal cancer screening was only available opportunistically to individuals. The provincial Colon Screening Program benefits include:

- More equitable access to colorectal cancer screening for all eligible British Columbians;
- Standard processes for patients and providers;
- Patient and provider screening recall reminder system;
- Quality assurance for colonoscopy, and pathology; and
- The ability to monitor outcomes at a regional and provincial level (participation, fecal immunochemical test (FIT), wait times, colonoscopy outcomes, cancer incidence, cancer stage and cancer mortality).

We have encountered some challenges and obstacles along the way. However, because of strong partnerships, we are working towards solutions that will strengthen the Colon Screening Program and ultimately reduce the burden of colorectal cancer in British Columbia. In the coming years, I have no doubt that this program will have a positive impact on our province.

Sincerely,

Dr. Jennifer J. Telford Medical Director, Colon Screening Program, BC Cancer Agency

New Provincewide Colorectal Cancer Creening Program Screening Saves Lives

2.0 Executive Summary

The Colon Screening Program accomplished significant progress in its first two years. Working in partnership with key stakeholders, the program expanded from a pilot program operating in 3 communities, to a province-wide organized screening program.

Program highlights from November 2013 to the end of 2015 include:

- The program received fecal immunochemical test (FIT) results for 346,529 average risk individuals and colonoscopy referrals for 5,458 higher than average risk individuals. This represents 23% of the eligible population (men and women, ages 50 to 74 living in BC).
- Colorectal cancer was detected in 1008 participants 997 among average risk individuals screened with FIT and 11 among higher than average risk individuals screened through colonoscopy.
- High risk (pre-cancerous) polyps were detected in 8,489 colonoscopies performed – 8,176 among average risk individuals, and 313 among higher than average risk individuals.

These statistics are very compelling as screening is only recommended for asymptomatic individuals. The cancers detected by the program were found before the individual began experiencing symptoms – early detection means more treatment options and better outcomes. Furthermore, finding high risk (pre-cancerous) polyps means they can be removed before they turn into cancer.

2.1 Background

In British Columbia, colorectal cancer is the second most common cancer diagnosed in men and the third most common cancer diagnosed in women. In 2016, it is estimated that 3,200 British Columbians were diagnosed with colorectal cancer (1,800 men and 1,400 women) and 1,280 individuals died from the disease (670 men and 610 women)¹.

The new provincial Colon Screening Program is an organized population-based program aimed at reducing colorectal cancer incidence and mortality in BC by finding and removing pre-cancerous polyps (adenomas) and by finding cancers early – before they have had a chance to spread. Programmatic colon screening began in BC in January 2009 through the Colon Check pilot program, which was available in three communities (Penticton, Powell River, and downtown Vancouver). This evolved into the province-wide Colon Screening Program launched November 15, 2013.

¹ Canadian Cancer Society, Canadian Cancer Statistics 2016 (www.cancer.ca)

In BC, colon screening is recommended for asymptomatic women and men, ages 50 to 74. The risk for developing colorectal cancer increases substantially from age 50. There is little evidence that supports screening outside the 50 to 74 age range². Figure 1 demonstrates colorectal cancer incidence rate by age in BC. Other risk factors include a personal history of colorectal cancer or adenomas, first-degree family members who have been diagnosed with colorectal cancer or adenomas, smoking, alcohol consumption, obesity, and a diet high in red or processed meats and low in fibre, fresh fruits and vegetables.

FIGURE 1: BC COLORECTAL CANCER INCIDENCE RATE (PER 100,000) BY AGE FOR 2013 DIAGNOSIS



DATA SOURCE: BC Cancer Registry (December 12, 2016)

2.2 Program Overview

The BC Cancer Agency (BCCA) has the overall responsibility for the provincial Colon Screening Program, with regional health authorities, primary care providers, laboratories and professionals jointly responsible for the provision of screening and diagnostic services.

The program is responsible for public and health care provider awareness strategies, the provincial colonoscopy referral process for screening participants, the provincial screening reminder system, and the monitoring and reporting of program performance and outcomes in BC.

2.3 Screening Process

The screening pathway is initiated by primary care providers referring asymptomatic individuals 50 to 74 years of age for a screening test – either the fecal immunochemical test (FIT) or colonoscopy, depending on the patient's risk of developing colorectal cancer. Figure 2 provides an overview of the colon screening process. A more detailed screening pathway identifying patient and provider interactions is shown in Appendix 2.

² Zauber AG et al. Evaluating test strategies for colorectal cancer screening: a decision analysis for the U.S. Preventive Services Task Force. Ann Intern Med 2008; 149(9):659-669.



FIGURE 2: COLON SCREENING PROCESS OVERVIEW

2.4 Program Evaluation

Data is collected and analyzed on an ongoing basis to monitor performance and outcomes of colon screening in BC. Performance indicators are based on national and international guidelines and recommendations. The "Program Results" section of this report provides an overview of colon screening performance in BC based on data available on program participants.

2.5 Quality Initiatives

The Colon Screening Program is dedicated to continuous quality improvement. Clinical and operational representatives from regional health authorities participate in various provincial program committees to establish quality standards and indicators, review quality indicators and discuss opportunities for improvement. In addition, each regional health authority has identified a Colonoscopy Lead to champion quality assurance and colon cancer screening to primary care providers and colonoscopists within their health authority.

In 2014, the program recruited 23 gastroenterologists and surgeons from across all the health authorities to be trained as Direct Observation of Procedural Skills (DOPS) Assessors. Two training courses were offered in Vancouver to establish DOPS assessment capacity in BC. DOPS is an assessment of a colonoscopist's performance in terms of technical skill as well as patient and ancillary staff interaction. It has been validated as an assessment tool for trainees and experienced colonoscopists in the United Kingdom and requires two assessors to observe and provide feedback on two colonoscopies for each DOPS candidate.

2.6 Promotion and Education

The Colon Screening Program has developed materials for a variety of audiences including the public, primary care providers, colonoscopists and health authority patient coordinators. All materials have been focus tested with the intended audience to ensure that the content was relevant, clear and concise. Feedback is collected on an ongoing basis and assessed to improve future updates.

The program's primary method of public communication is the BCCA Screening Programs website (www.screeningbc.ca). The website, a comprehensive online destination for British Columbians seeking cancer screening-related information, is updated regularly. Features include a searchable document library, videos about screening and abnormal results and a mobile-friendly design.

A health care professionals section on the website aims to keep health care providers updated about current screening recommendations. This section contains the most recent forms and manuals, and provides easy access to resources, such as evidence-based research, fact sheets and promotional items to encourage and aid cancer screening discussions with patients.



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The Program's ongoing promotion and education activities include:

- Production and distribution of promotional tools, such as brochures, instructional videos, posters and promotional giveaways that effectively communicate the benefits of colorectal cancer screening;
- A Twitter account (@BCCancer_Agency) that promotes relevant information about cancer screening;
- Ongoing health care provider education and engagement via journal articles, presentations, newsletter articles in relevant publications and partnerships with physician-focused organizations and health authorities;
- Presence at health fairs and events throughout British Columbia.

3.0 Program Results

This section describes the Colon Screening Program results from November 15, 2013 to December 31, 2015.

3.1 Program Uptake

Asymptomatic British Columbians, ages of 50 to 74, can enter into the Colon Screening Program by visiting their primary care provider. The primary care provider assesses the individual's risk of developing colorectal cancer and orders the appropriate screening test – fecal immunochemical test (FIT) for an average risk individual and colonoscopy for higher than average risk.

The primary care provider enrolls an asymptomatic average risk individual aged 50 to 74 in the Colon Screening Program by selecting the appropriate option on the laboratory requisition form. Colonoscopy referral for a higher risk individual is sent directly to the Colon Screening Program for registration and for forwarding to the designated health authority colonoscopy processing center.



Figure 3 shows the volume of FIT results received by the Colon Screening Program by quarter over the report period. A total of 372,989 FIT results on individuals between 50 to 74 years of age were received. The Medical Services Plan of BC (MSP) reported that a total of 866,377 FITs were performed, of which 79% were on individuals ages 50 to 74. The proportion of FITs with results copied to the Colon Screening Program has increased steadily from 39% in the first quarter of 2014 to 66% in the last quarter of 2015 (Figure 4).



FIGURE 3: NUMBER OF FIT RESULTS RECEIVED BY THE COLON SCREENING PROGRAM OVER TIME

1. Colon Screening Program data extraction date: 04/10/2016



FIGURE 4: PROPORTION OF FITS PERFORMED ON BRITISH COLUMBIANS AGED 50-74 THAT ARE REGISTERED IN THE COLON SCREENING PROGRAM

1. Colon Screening Program data extraction date: 04/10/2016

NOTES:

2. An individual may have multiple FITs performed in any time period.

Figure 5 demonstrates that the volume of higher risk colonoscopy referrals from primary care providers to the Colon Screening Program has increased over time. The indications for the referral include having one first degree relative (i.e. mother, father, sister, brother, daughter or son) with colorectal cancer diagnosed under the age of 60 (35% of referrals); having two or more first degree relatives with colorectal cancer diagnosed at any age (12%); and having a personal history of adenoma(s) (53%).





NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

2. An individual may have multiple referrals.

In total, the program received 372,989 FIT results on 346,529 British Columbians ages 50 to 74, and colonoscopy referrals for 5,458 higher risk individuals from the same age group. Of these, 52% were females and the mean age of individuals was 61 years.

By defining program uptake as having a FIT result or colonoscopy referral sent to the Colon Screening Program, the overall program uptake rate was 22.9% by the end of 2015 – 25 months after the provincial program started. It should be noted that because clinicians can order colon screening outside the Colon Screening Program, the actual colon screening uptake rate may be much higher.

Figure 6 shows that the program uptake rate increased with age, and was higher for females in all age groups except ages 70 to 74. Regional variations are shown in Figure 7. The Interior Health Authority has the strongest program uptake at 27.5%.



FIGURE 6: PROGRAM UPTAKE RATE IN BC BY AGE AND SEX

NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

2. Population data source: PEOPLE2015



FIGURE 7: PROGRAM UPTAKE RATE FOR AGE 50-74 BY HEALTH AUTHORITY

NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

2. Population data source: PEOPLE2015

3.2 FIT Results

The FIT positivity rate, which is the proportion of satisfactory FITs with an abnormal result, was 13.9% during the report period. Figure 8 demonstrates that FIT positivity was higher in males and increased with age, which reflects the prevalence of colorectal cancer.

FIGURE 8: FIT POSITIVITY BY AGE GROUP AND SEX



NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

3.3 Colonoscopy Results

FIT Positive Participants

During the report period, a total of 65,658 program participants with FIT positive (i.e. abnormal FIT) results were referred to regional health authority centres for colonoscopy assessment. After initial assessment by the patient coordinator, 68.7% proceeded to colonoscopy booking, 10.4% were redirected to a specialist and the remaining 20.9% did not proceed to colonoscopy. The most frequently documented reasons for not proceeding to colonoscopy were that the patient was medically unfit to undergo the colonoscopy (33%) or the patient declined the procedure (24%). This underscores the importance of having primary care providers assess a potential participant's medical fitness and understanding that a positive FIT requires a colonoscopy to complete the screening episode. This assessment should occur prior to proceeding with FIT.

Figure 9 summarizes investigation results of positive FITs. Of the 41,235 cases with available pathology information, there were 997 cases for whom a colorectal cancer was found (2.4%), 8,176 cases with high risk polyp(s) identified (19.8%)³, 2,563 cases with multiple (3 or more) low risk polyps (6.2%) and 10,683 cases with 1 or 2 low risk polyp (25.9%).

FIGURE 9: COLONOSCOPY FINDINGS FOR POSITIVE FIT



³ High risk polyp(s) include the following: tubular adenoma or sessile serrated adenoma/ polyp ≥ 10 mm in diameter, villous or tubulovillous adenoma, sessile serrated adenoma/ polyp with dysplasia, traditional serrated adenoma, and multiple (≥3) tubular adenomas or sessile serrated adenoma/polyps without dysplasia <10 mm in size.

Additional quality indicators help assess the effectiveness of the colonoscopy. These include cecal intubation — defined as the passage of the tip of the colonoscope to a point proximal to the ileocecal valve so that the entire cecum is visualized — and adequate bowel preparation. The unadjusted cecal intubation rate was 97.5% and the adequate bowel preparation rate was 97.0% in FIT positive patients undergoing colonoscopy.

The positive predictive value (PPV) of a test is a measure of performance. It gives the probability that individuals with positive test results truly have the disease. The PPV of FIT is presented in Table 1. For ages 50 to 74 combined, the PPV for any neoplasia (cancer and any pre-cancerous polyp) is 54.3% while the PPV for colorectal cancer and high risk polyp is 22.2%. The PPV of FIT increases with age and is higher in males than females.

Age Group	Cancer	High Risk Polyp(s)	Cancer + High Risk Polyp(s)	Any Neoplasia
50-54	1.5%	15.0%	16.6%	44.0%
55-59	1.8%	18.1%	19.9%	50.3%
60-64	2.5%	19.6%	22.1%	55.3%
65-69	2.9%	23.2%	26.1%	60.1%
70-74	3.4%	22.6%	26.0%	61.1%
50-74 combined	2.4%	19.8%	22.2%	54.4%
Females	2.2%	15.1%	17.3%	45.5%
Males	2.6%	23.5%	26.1%	61.2%

TABLE 1: POSITIVE PREDICTIVE VALUE OF FIT

NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

Higher than Average Risk Participants

During the report period, the Colon Screening Program received a total of 5,615 colonoscopy referrals from primary care providers in British Columbia for higher risk screening. After initial assessment by health authority staff, 61.8% proceeded to colonoscopy booking, 3.7% were redirected to a specialist, and the remaining 34.4% did not proceed to colonoscopy. The most frequently documented reasons for not proceeding were that the patient did not meet the family history eligibility criteria (34%), or the patient had a colonoscopy within the previous five years and therefore was not yet due for screening (23%). This emphasizes the need for ongoing primary care education on the appropriate use of screening tests.

Figure 10 summarizes colonoscopy findings for higher risk participants. Of the 2,738 cases with available pathology information, 47.0% were found to have colorectal cancer or a precancerous polyp: 11 cases with colorectal cancer (0.4%), 313 cases with high risk polyp(s) (11.4%), 176 cases with multiple low risk polyps (6.4%) and 788 cases with a low risk polyp (28.8%).



FIGURE 10: COLONOSCOPY FINDINGS FOR HIGHER RISK PARTICIPANTS

In the higher risk patients undergoing colonoscopy, the unadjusted cecal intubation (defined as the passage of the tip of the colonoscope to a point proximal to the ileocecal valve so that the entire cecum is visualized) rate was 98.1%, and the adequate bowel preparation rate was 98.2%.

Detection of neoplasia in screening colonoscopy for higher risk patients is presented in Table 2. For ages 50 to 74 combined, detection of any neoplasia (cancer or any pre-cancerous polyps) is 47.0% and detection of cancer and high risk polyp is 11.8%. Both are lower than the detection rates in FIT positive patients that had colonoscopy (54.4% and 22.2% respectively).

Age Group	Cancer	High Risk Polyp(s)	Cancer + High Risk Polyp(s)	Any Neoplasia
50-54	0.2%	4.9%	5.1%	30.1%
55-59	0.2%	9.6%	9.8%	44.1%
60-64	0.2%	11.9%	12.1%	45.8%
65-69	0.3%	12.0%	12.4%	52.2%
70-74	1.3%	18.1%	19.4%	60.7%
50-74 combined	0.4%	11.4%	11.8%	47.0%
Females	0.4%	8.2%	8.6%	40.1%
Males	0.4%	14.5%	15.0%	53.7%

TABLE 2: DETECTION OF NEOPLASIA IN SCREENING COLONOSCOPY OF HIGHER RISK PATIENTS

NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

3.4 Wait Times

Wait times for colonoscopy after a positive FIT are shown in 6-month intervals in Figure 11. The rapid increase in the number of individuals requiring colonoscopy, since the launch of the program in November 2013, has created a challenge in every health authority to meet the 60-day target. For program participants with a positive FIT in the 6-month period ending December 2015, the median wait was 62 days and the 90th percentile was 139 days. It is recognized that there are many other indications for colonoscopy services aside from colon screening. Appropriate case prioritization is important to minimize the negative impact on health outcomes, for all patients requiring colonoscopy.



FIGURE 11: WAIT TIME FROM FIT TO COLONOSCOPY

NOTES:

1. Colon Screening Program data extraction date: 04/10/2016

3.5 Summary

The British Columbia Colon Screening Program Report is the first system performance reporting of the provincial Colon Screening Program. Table 3 summarizes the key performance indicators for ages 50 to 74. It is hoped that this overview will encourage discussion and inform opportunities for improvement.

Performance Measure	Definition	Nov. 2013 to Dec. 2015
Program Uptake	The percentage of age 50- 74 population with a FIT or colonoscopy referral sent to the Colon Screening Program	22.9% ¹
FIT Positivity	The percentage of FITs with an abnormal result	13.9%
Follow-up Colonoscopy Rate	The percentage of individuals with positive FIT that had a follow-up colonoscopy	68.7%²
Wait Time to Follow-up Colonoscopy	The time from positive FIT result to follow-up colonoscopy	50% within 62 days 90% within 139 days (Jul. 1 - Dec. 31, 2015)
Predictive Value (PPV) of FIT for any neoplasia	The percentage of individuals with diagnosis of neoplasia among those with positive FIT and have completed a follow-up colonoscopy	54.3%
PPV of FIT for cancer and high risk polyp	The percentage of individuals with diagnosis of colorectal cancer or high risk polyp(s) among those with positive FIT and have completed a follow-up colonoscopy	22.2%

TABLE 3: COLON SCREENING PROGRAM PERFORMANCE INDICATORS

NOTES:

1. It is important to recognize that this is not the colon screening participation rate in BC. Individuals who are up to date with screening (e.g. had a screening colonoscopy in last five years) would not have accessed screening during this time frame. It also does not include FIT or colonoscopies done outside the Colon Screening Program.

2. An additional 10.4% of patients were redirected to specialist consultation. No further information is available on these patients under the current data collection process.
3. Colon Screening Program data extraction date: 04/10/2016

Appendix 1 - Cancer Screening Program Overview

Definition of Screening

Screening is a prevention strategy. Primary cancer prevention strategies involve changes of behavior or habits that reduce a risk, for example, stopping smoking, fat reduction in the diet, etc. Screening for cancer is a secondary prevention strategy. Secondary cancer prevention strategies target disease in process⁴. A secondary prevention can reduce cancer morbidity and mortality by diagnosing invasive disease at an earlier prognostic stage; and, detecting precursor lesions associated with some cancers that once eliminated, prevent progression to invasive disease. Screening is "the application of various tests to apparently healthy individuals to sort out those who probably have risk factors or are in the early stages of specified conditions⁵."

Limitations of Screening

The decision to screen an at-risk population for pre-clinical signs of cancer is based on well-established criteria related to cancer and the screening tests that we use to identify individuals who may have occult disease.^{6,7,8}

The overall objective of an organized screening program is to reduce morbidity and mortality from cancer. The goal of screening is to "apply a relatively simple, inexpensive test to a large number of persons in order to classify them as likely or unlikely to have the cancer." The emphasis on likelihood underscores the limits of what should be expected from screening (i.e., screening tests are not diagnostic tests).

A person with an abnormal screening test does not have a definitive diagnosis until additional, more sophisticated diagnostic tests are completed. The emphasis on likelihood is also important because screening tests are inherently limited in their accuracy, which varies by test, cancer site and individual characteristics. Although most screening interpretations are accurate, it is inevitable that some individuals are identified as possibly having cancer when they do not, and screening tests fail to identify some individuals who do not have the disease.

The comparative evaluation of accuracy versus error cannot be considered in absolute terms, but rather should be evaluated in terms of the relative consequences of one or the other kind of error.

⁴ US Preventive Services Task Force: Guide to Clinical Preventive Services, Ed 2. Baltimore, Williams & Wilkins, 1996

⁵ Morrison A: Screening in Chronic Disease. New York, Oxford Press, 1992

⁶ Cole P, Morrison AS: Basic issues in cancer screening. In Miller AB (ed); Screening in Cancer. Geneva, International Union Against Cancer, 1978, p7

⁷ Miller AB; Fundamentals of Screening. In Screening for Cancer. Orlando, Academic Press, 1985, p3

⁸ Wilson JMG, Junger G; Principles and Practice of Screening for Disease. Geneva, World Health Organization, 196

Organized Screening Program

To reduce morbidity and mortality from cancer in a population by screening, there must be coordinated and effective strategies to ensure acceptance and utilization of the established screening test. Since screening is targeted at asymptomatic individuals, the fine balance between maximizing benefits and minimizing undesirable effects must be maintained.

An organized approach to screening ensures that the target population has access to the screening service and that it accepts and uses the services offered. This is achieved by including the following six program components:

- 1. Health Promotion
- 2. Professional Development/Education
- 3. Recruitment & Retention
- 4. Screening Test & Reporting
- 5. Follow-up
- 6. Evaluation/Research Partnerships

The success of screening is a shared responsibility of the team of individuals working together to develop goals, set standards, monitor progress and continue improvement in each of the six components.

Appendix 2 - Colon Screening Patient Pathway

Eligibility

- 1 PATIENT visits HEALTH CARE PROVIDER
- 2 HEALTH CARE PROVIDER assesses eligibility

× NOT ELIGIBLE

- Symptomatic
- Up to date with colon screening patient should wait for next recommended interval
- Has a personal history of colorectal cancer or have ulcerative colitis or Crohn's disease
 patient should continue to obtain care through their specialist or health care provider
- **ELIGIBLE**
 - Asymptomatic women and men ages 50 to 74.
- 3 HEALTH CARE PROVIDER assesses risk

AVERAGE RISK PATIENT: FIT

Patients who do not have high risk characteristics as belo w should be referred for the fecal immunochemical test (FIT).

Complete Standard Outpatient Lab Requisitio Form (select Fecal occult blood, age 50-74, asymptomatic q2y) and provide to patient.*

HIGHER THAN AVERAGE RISK PATIENT: COLONOSCOPY

- Higher than average risk patients are defined as those having one of the following:
- One first degree relative diagnosed with colorectal cancer under the age of 60; 0 r,
- Two or more first degree relatives with colorectal cancer diagnosed at any age; or,
- A personal history of adenoma(s)

Complete Colon Screening Program Colonoscopy Referral Form and fax to BC Cancer Agency at 1-604-297-9340.* For patients with a personal history of adenomas, attach previous colonoscopy and pathology reports.

FIT

- 1 PATIENT picks up FIT from LAB Patient brings Standard Outpatient Lab Requisition to any BC public or private outpatient labs to obtain FIT kit.
- 2 PATIENT completes FIT at HOME Test instructions included in each kit.
 - ••••••••••••••••••••••
- 3 PATIENT drops off completed FIT at LAB
- 4 LAB RESULTS sent to HEALTH CARE PROVIDER and BC CANCER AGENCY

NORMAL FIT RESULT

• BC Cancer Agency sends results to patient and recalls patient for screening in two years.

ABNORMAL FIT RESULT

- BC Cancer Agency sends results to patient
- NOTE: Do not repeat FIT if positive. All patients should proceed to an assessment for colonoscopy.

* Patients are registered in the Colon Screening Program by the use of the Standard Outpatient Lab Requisition (selecting the 'Fecal occult blood, age 50-74, asymptomatic q2y (copy to Colon Screening Program)') or the Colon Screening Program Colonoscopy Referral Form.

The Program will refer your patient to the Health Authority for necessary follow up or recall them at the appropriate interval.

Colonoscopy

- **1** BC CANCER AGENCY facilitates referral to PATIENT'S Health Authority
- 2 PATIENT COORDINATOR completes pre-colonoscopy assessment with PATIENT

NOT ELIGIBLE FOR COLONOSCOPY

 Patient coordinator advises health care provider that colonoscopy is not proceeding.

ELIGIBLE FOR COLONOSCOPY

- Patient coordinator books patient for colonoscopy.
- 3 COLONOSCOPIST performs colonoscopy on PATIENT
- 4 HEALTH CARE PROVIDER receives colonoscopy results, pathology report and any recommendation for surveillance or follow-up

NORMAL / NO ADENOMAS FOUND

- BC Cancer Agency recalls average risk
 patient for FIT in 10 years.
- BC Cancer Agency recalls patients with family history for colonoscopy in five years.

ADENOMA IDENTIFIED

- Low risk adenoma: BC Cancer Agency recalls patient for colonoscopy in five years.
- High risk adenoma: BC Cancer Agency recalls patient for colonoscopy in three years.

CANCER OR IBD DETECTED

 Patient is no longer followed by the program.
 Colonoscopist arranges or refers back to health care provider for follow-up.

Appendix 3 - Performance Indicator Glossary

Incidence Rate

The number of new colorectal cancer cases occurring in a given population during a given year, expressed as the number of new cases per 100,000 population at risk.

Incidanca Pata -	Number of colorectal cancer detected in a given year	× 400 000
		X 100,000
	BC population in a given year	

Program Uptake

Program uptake is defined as the number of unique patients with either a successful FIT result or colonoscopy referral sent to the Colon Screening Program as a proportion of the estimated population at the end of the time period (December 2015). Projected population estimates are obtained from BC Statistics (P.E.O.P.L.E. file) and are provided as of 01 July each year. Linear interpolation between the yearly projected population estimates is used to calculate the estimated BC population as of December 2015.

Program Uptake =	Number of patients with a successful FIT or colonoscopy referral	
	Estimated BC population as of December 2015	X 100

FIT Positivity Rate

FIT positivity rate is defined as the number of satisfactory FIT tests with an abnormal result.

FIT Positivity Rate = ______ Number of FIT tests with an abnormal result x 100 Number of satisfactory FIT tests

FIT Positive Predicted Value (PPV)

FIT positive predicted value is defined as the proportion of satisfactory FIT tests resulting in pathological confirmation, where pathology result is some specified category of neoplasia.

Number of satisfactory FIT tests with pathologically confirmed neoplasia

X 100

Number of satisfactory FIT tests with pathological confirmation

Detection of Neoplasia (Higher Risk Patients)

Neoplasia detection date is defined as the proportion of colonoscopy procedures resulting in pathological confirmation, where the pathology result is some specified category of neoplasia.

Number of colonoscopies with pathologically confirmed neoplasia

Cecal Intubation Rate (Unadjusted)

Unadjusted cecal intubation rate is defined as proportion of colonoscopy procedures in which cecum was successfully intubated.

Unadjusted Cecal 😑	Number of procedures w/ a successful cecal intubation	X 100
Intubation Rate	Total number of procedures	X 100

Adequate Bowel Preparation Rate

Adequate bowel preparation rate is defined as the proportion of colonoscopy procedures where the bowel preparation was defined as either 'excellent', 'good', or 'fair' (i.e. not 'poor').

Adequate Bowel	=	umber of colonoscopy procedures w/ adequate bowel prep	X 100
Prep Rate		Total number of colonoscopy procedures	X 100

Wait Time to Follow-Up Colonoscopy

Wait time to follow-up colonoscopy is defined as the number of days elapsed between positive FIT result and date of follow-up colonoscopy, for patients who had a positive FIT result and have received a colonoscopy.

Appendix 4 - Publications and Presentations

November 15, 2013 to December 31, 2016

Publications

- BC Medical Journal, December 2013
 BC's full Colon Screening Program goes province-wide. Web log post Telford, J. J.
- BC Medical Journal, March 2014; 56(2), 97
 What an abnormal FIT result really means. Telford, J. J.
- Journal of Family Practice Oncology, Spring 2014; 2014(22), 1-2 Insight into BC's Colon Screening Program. Telford, J. J.
- Journal of Family Practice Oncology, Fall 2014; 2014(23), 2-3
 British Columbia's colon screening program. Telford, J. J.
- Journal of Family Practice Oncology, Spring 2015; 2015(24), 11
 Colon screening program update.
 Colon Screening Program
- Canadian Journal of Gastroenterology and Hepatology, October 2016; 2016(2016), doi: 10.1155/2016/5914048
 One versus Two Fecal Immunochemical Tests in the Detection of Colorectal Neoplasia in a Population-Based Colorectal Cancer Screening Program Moosavi, S., Enns, R., Gentile, L., Gondara, L., McGahan, C., and Telford, J. J.
- Canadian Medical Association Journal Open Access, November 2016; 4(4), doi: 10.9778/cmaj0.20160047
 Performance of a quantitative fecal immunochemical test in a colorectal cancer screening pilot program: a prospective cohort study.
 Telford, J.J., Gentile, L., Gondara, L., McGahan, C., and Coldman, A.
- Canadian Journal of Gastroenterology and Hepatology, November 2016; 2016(2016), doi: 10.1155/2016/4650471
 Correlating Quantitative Fecal Immunochemical Test Results with Neoplastic Findings on Colonoscopy in a Population-Based Colorectal Cancer Screening Program: A Prospective Study.
 Shahidi, N., Gentile, L., Gondara, L., Hamm, J., McGahan, C., Enns, R., Telford, J.J.

Conference Presentations

- June 8, 2014, Gastroenterology Advances, Whistler, BC What to do with a Positive FIT and a Negative Colonoscopy Telford, J. J.
- October 2, 2014, GI Forum, Vancouver, BC DOPS: Assessing Your Colleagues Telford, J. J.
- June 15, 2015, National Colorectal Cancer Screening Initiative Meeting, Vancouver, BC
 British Columbia Colon Screening Program Quality Initiatives Telford, J. J.
- October 22, 2015, GI Forum, Vancouver, BC
 Colon Screening Program Where are We and Where are We Going? Telford, J. J.
- October 22, 2015, GI Forum, Vancouver, BC
 Preparation Keys for Colonoscopy
 Telford, J. J.
- 6. November 26, 2015, St. Paul's Hospital CME Conference for Primary Care Physicians, Vancouver, BC
 Was the FIT Test Fit for Colon Screening in Primary Care? Telford, J. J.

Webinars

- October 2, 2013
 Colon Screening Program Colonoscopy Standards Telford, J. J.
- May 9, 2013, Vancouver, BC
 Colon Screening Program Pathology Specimen Handling and Reporting Protocols
 Owen, D. A.
- February 20, 2014
 Family Practice Oncology Network Continuing Medical Education BC Colorectal Screening Program and Guideline Telford, J. J.

