

Issue

Colorectal cancer is the second leading cause of cancer related deaths and the third most commonly diagnosed cancer in Alberta. Many of these deaths and cases are preventable. There is good evidence that colorectal cancer screening can effectively reduce the mortality and morbidity of colorectal cancer.

Guideline Goals

- To list uniform and consistent evidence-based recommendations for colorectal cancer screening and for colorectal cancer screening maneuvers
- To assist health care providers and patients in the implementation of colorectal cancer screening to ultimately decrease the incidence, mortality and morbidity from colorectal cancer

Definitions

Screening is intended for asymptomatic individuals. Any patient with symptoms or signs suggestive of the presence of colorectal cancer falls outside the domain of screening and requires a diagnostic workup.

PRACTICE POINTS

- An individual's risk level of colorectal cancer determines when screening should be initiated and what tests and frequency are appropriate
- Any patient with symptoms or signs suggestive of the presence of colorectal cancer requires a diagnostic workup

Three factors largely affect an individual's risk of colorectal cancer: age, personal medical history and family history. An individual's risk determines when screening should be initiated and what tests and frequency are appropriate.

Low Risk

- Under age 50 years, *AND*
- No personal history of colorectal adenomatous polyps or colorectal cancer or inflammatory bowel disease, *AND*
- No family history of colorectal cancer

Average Risk

- Age 50 years and over, *AND*
- No personal history of colorectal adenomatous polyps or colorectal cancer or inflammatory bowel disease, *AND*
- No family history of colorectal cancer

Note: Individuals with affected relatives who are more distant than first degree, can be considered to be at average risk

The above recommendations are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. They should be used as an adjunct to sound clinical decision making.

Screening for Colorectal Cancer

Moderate Risk

- One or more first degree relative(s) (parent, sibling, child) with colorectal cancer
- Personal history of colorectal adenomatous polyps or colorectal cancer

High Risk

- Strong family history of colorectal cancer with multiple individuals affected but no genetic syndrome identified
- Family history of Hereditary Non-Polyposis Colorectal Cancer (also known as HNPCC or Lynch Syndrome) or Familial Adenomatous Polyposis (FAP)
- Personal history of inflammatory bowel disease

Summary

Recommendations

To determine the appropriate approach to screening an individual for colorectal cancer, it is important to stratify an individual's risk based on age, and personal and family medical history.

Screening of Individuals at Low Risk

About ten percent of cases of colorectal cancer occur in patients under the age of 50 years. Most of these cases are in individuals with a personal or family history that places them at high risk. In an asymptomatic person under the age of 50 years without a personal or family history that would increase risk for colorectal cancer, there is no evidence to support screening.

- Asymptomatic individuals at low risk are unlikely to have colorectal cancer and screening is *NOT* recommended
- Individuals in this group can reduce their risk of developing colorectal cancer through primary prevention strategies (see Appendix A)

Screening of Individuals at Average Risk (see Algorithm 1)

About 70-80% of colorectal cancer occurs in this group. Individuals at average risk should begin colorectal cancer screening at age 50 years and continue until at least age 74 years. In people over 74 years of age, colorectal cancer screening should be discussed taking into account individual health factors and estimated life expectancy.

There are four screening options for individuals at average risk, and each has its own advantages and disadvantages with regard to evidence of effectiveness, magnitude of effectiveness, risks, and up-front costs (see Table 1). Personal choice as well as the availability and access to tests (which varies across health regions) will also affect decision making.

PRACTICE POINTS

- Screening using any of the recommended methods is better than no screening
- If an individual has recently undergone screening using one of the recommended methods (i.e., colonoscopy) then no further screening is recommended until the appropriate interval

Screening for Colorectal Cancer

- **Fecal Occult Blood Test (FOBT) every 1 to 2 years.** A guaiac-based home test kit should be used. If FOBT is positive, colonoscopy is recommended as the follow-up test. If follow-up colonoscopy is negative, then further screening tests are not required for 10 years.

FOBT PRACTICE POINTS

- A single, in-office FOBT in combination with a digital rectal examination is *NOT* a recommended screening option
- If there is a positive FOBT, the patient should be referred for colonoscopy
- If the patient presents with rectal bleeding, do not use FOBT. Refer the patient for diagnostic evaluation
- Evidence shows that diet and medication (including ASA) restrictions have an insignificant impact on FOBT results. However, there is evidence that Vitamin C at 250 mg/day may affect FOBT results

Other Screening Modalities

- *Flexible Sigmoidoscopy every five years (may be in combination with FOBT every 1 to 2 years).* Colonoscopy is recommended as the follow-up test for patients with abnormal results
- *Double Contrast Barium Enema every five years (see future directions).* This test is now uncommonly used for colorectal cancer screening in Alberta. Colonoscopy is recommended as the follow-up test for patients with abnormal results
- *Colonoscopy every ten years* If colonoscopy is negative, further screening tests are not required for 10 years.

CT colonography is emerging as a promising option for colorectal cancer screening. CT colonography is now available in some Alberta sites. However, patients should be advised, that at this time, Alberta Health and Wellness does not cover the costs of this modality as a screening tool.

It is recommended that individuals at average risk be encouraged to participate in organized, population based screening programs to maximize the participation rate and the cancer detection rate.

PRACTICE POINTS

- Digital rectal examination (DRE) is often included as part of a routine physical examination but is *NOT* recommended as a screening test for colorectal cancer
- Carcinoembryonic antigen (CEA) is *NOT* recommended for use as a screening test for colorectal cancer
- Rigid sigmoidoscopy is *NOT* recommended as a screening tool for colorectal cancer

Screening of Individuals at Moderate Risk (see Algorithm 2)

Individuals with:

- Any first degree relative (parent, sibling or child) with colorectal cancer diagnosed at age < 60 years or in two or more first degree relatives at any age (if not a hereditary syndrome)
 - *Colonoscopy every 5 years*, beginning at age 40 years, or 10 years younger than the earliest case in the family, whichever comes first.
- One first degree relative affected with colorectal cancer aged 60 years or older
 - *Same as at average risk* but starting at age 40 years

PRACTICE POINTS

Individuals with affected relatives who are more distant than first degree, can be considered to be at average risk.

Screening of Individuals at High Risk (See Algorithm 3)

Family history of Hereditary Non Polyposis Colorectal Cancer (also known as HNPCC or Lynch Syndrome)

Individuals with family history of HNPCC are at increased risk of developing colorectal cancer. In those diagnosed with HNPCC the lifetime risk of colorectal cancer is estimated to be about 80%. Two-thirds of these cancers occur in the proximal colon, and cancers occur at a younger age (mean age about 45 years).

- *Genetic counselling and testing*
- *Colonoscopy every 1-2 years*, beginning at age 20 years or 10 years younger than the earliest case in the family, whichever comes first
- Physicians should have a high index of suspicion for other cancers that also occur with increased frequency in patients with HNPCC such as ovarian, gastric, and urethral cancers

Family history of Familial Adenomatous Polyposis (FAP)

People with family history of the classic type of Familial Adenomatous Polyposis may begin to develop multiple benign colorectal polyps in their early teenage years. The average age at which an individual develops colorectal cancer in classic Familial Adenomatous Polyposis is about 40 years. Appropriate management of an individual with FAP is total proctocolectomy.

- *Genetic counselling and testing*
- *Flexible Sigmoidoscopy annually*, beginning at age 10-12 years

Personal history of Inflammatory Bowel Disease

Patients should be made aware that long standing inflammatory bowel disease (IBD) involving the colon increases their risk for colorectal cancer and that appropriate follow-up with their healthcare provider is essential.

- *Screening colonoscopy* at 8-10 years after disease onset
- Regular surveillance colonoscopy every 1- 2 years, beginning 8-10 years after onset of pancolitis or Crohn's colitis, or 12-15 years after onset of left sided colitis

Surveillance of Individuals with a Personal History of Colorectal Cancer or Adenomatous Polyps (see Algorithm 4)

People with one or two small (<1cm) adenoma

- Surveillance colonoscopy 5 years after the initial polypectomy
 - If normal, repeat in 5 years

People with a large (>1cm) adenoma, multiple adenomas (3 or more), or adenomas with high grade dysplasia or villous change

- Surveillance colonoscopy within 3 years after the initial polypectomy
 - If normal, repeat in 3 years

Personal History of Curative Intent Resection of Colorectal Cancer (see guideline for Surveillance of Patients with Early Stage Colorectal Cancer)

- Surveillance colonoscopy within one year after cancer resection
 - If normal, repeat colonoscopy in 3 years
 - If normal at 3 years, repeat colonoscopy every 5 years

Endoscopists may shorten the surveillance interval based on other factors, such as location and histopathology of the polyps or the quality of the bowel preparation at the time of colonoscopy.

Screening for Colorectal Cancer

Table 1
Performance Characteristics of Colorectal Cancer Screening Options

Screening Method	Advantages	Disadvantages	Sensitivity	Specificity
FOBT	<ul style="list-style-type: none"> • Easy, safe, inexpensive, convenient and simple to complete • Strong evidence from randomized controlled trials of reduction in colorectal cancer mortality with screening 	<ul style="list-style-type: none"> • Requires patient action for completion of test (stool collection) • Patients may find test unpleasant to do • No direct visualization of the colorectum • May miss many polyps 	35 - 50% for cancer (one-time FOBT)	98 - 99%
Flexible Sigmoidoscopy	<ul style="list-style-type: none"> • Usually well tolerated without sedation • Moderate cost • Good evidence of reduction in mortality with screening 	<ul style="list-style-type: none"> • Requires bowel preparation • Patients may find test uncomfortable or embarrassing • Small risk of perforation or bleeding • Screens only about half the colon. 	50 - 70% of advanced adenomas and cancer	
Double Contrast Barium Enema	<ul style="list-style-type: none"> • Screens full colorectum • Sedation is not required • Relatively safe 	<ul style="list-style-type: none"> • Requires bowel preparation • Exposure to radiation • Patients may find test uncomfortable or embarrassing • No controlled trials evaluate its effectiveness for CRC screening 	48% for large adenomas (> 1cm) 55 - 85% for cancer	85% for cancer
Colonoscopy	<ul style="list-style-type: none"> • Direct visualization of the entire colorectum • Allows for removal of polyps at the same time • Reduction in CRC mortality in FOBT trials is attributable to follow-up diagnostic colonoscopy 	<ul style="list-style-type: none"> • Requires bowel preparation • Patients need to be escorted home and are advised not to go back to work the same day • Small risk of bleeding and perforation • Patients may find test uncomfortable or embarrassing 	90% for polyps > 1cm > 90% for cancer	99%.

Advice to Patients

The Toward Optimized Practice Program supports the right of the patient to make an informed decision about his/her health care options. Patient decisions will vary as a result of individual fear of cancer (which may be associated with family history), the potential impact of iatrogenic complications on the quality of life, and individual interpretation of the evidence relative to health benefits. Patient education is paramount in decisions surrounding colorectal cancer screening. It is important for asymptomatic patients to be aware of the consequences of their decisions to be screened or not screened (see Appendix B).

Background

Colorectal cancer is a significant health issue in Alberta. It ranks second only to lung cancer in leading causes of cancer deaths. In 2004, more than 1500 people were diagnosed with colorectal cancer and approximately 650 died from it in Alberta (1). It is estimated that the lifetime risk of an individual developing colorectal cancer is about 1 in 14 men and 1 in 17 women in Alberta (2). In Canada, approximately 20,800 new cases will be diagnosed in 2007, with approximately 8,700 Canadians deaths from colorectal cancer (3).

Modest improvements have been made in treatment for colorectal cancer over the past years in Alberta. The five-year survival is now nearly 60%, an increase from about 55% several years ago (1). However, this means that about 40% of patients diagnosed with colorectal cancer die within five years of diagnosis. Without further intervention, the numbers of new cases and deaths from colorectal cancer are predicted to continue rising in Alberta.

Colorectal cancer screening has been proven to be effective in reducing the morbidity and mortality associated with colorectal cancer. Screening activities are already happening in Alberta, but at a low rate estimated to be less than 20% of those at average risk (4). It is important, therefore, to increase this rate of uptake currently achieved through opportunistic screening. In March 2007, Alberta announced a plan to establish a province-wide, organized colorectal cancer screening program to improve early detection of the disease and save the lives of Albertans who may be at risk (5).

This clinical practice guideline is intended to list consistent recommendations for colorectal cancer screening, and to assist health care providers and patients in the implementation of colorectal cancer screening to ultimately decrease the incidence, mortality and morbidity from colorectal cancer.

Natural History

Colorectal cancer arises through complex interactions between genetic and non-genetic (environmental) influence. In general, colorectal cancer has a long pre-symptomatic stage. Most colorectal cancers begin as benign polyps on the inner wall of the colon or rectum and can take up to ten years or more to become malignant (6). Most polyps occur sporadically and the probability that invasive cancer contains within an adenomatous polyp increases with the size of the adenoma, the degree of dysplasia and the degree of villous content (7).

Screening for Colorectal Cancer

As colorectal cancer grows slowly, symptoms may not appear until a later stage of the cancer. When symptoms are present, they vary depending on the location, type, and extent of the tumor and may include:

- Rectal bleeding or blood in the stool
- Changes in bowel habits such as diarrhea, constipation, or stools that are narrower than usual
- Persistent bloating, feelings of fullness, cramps and steady pain in the abdominal region
- Weakness and fatigue
- Anorexia, vomiting, and weight loss

The single most important prognostic indicator is the stage at which colorectal cancer is diagnosed. When the disease is diagnosed at an early, localized stage, five year survival is over 90%. However, the 5 year survival falls significantly once the disease has spread, and this is typically the stage when symptoms develop (8). By detecting and removing polyps before they become cancerous, or by identifying and removing cancerous lesions before they spread, screening can reduce colorectal cancer incidence and mortality.

Risk Factors for Colorectal Cancer

Researchers have identified some factors that increase a person's risk of colorectal cancer. The risk for developing colorectal cancer increases with age. Although colorectal cancer can occur at any age, about 90% of people who develop the disease are older than 50 years (1). At age 30 years, it is estimated that the risk of developing colorectal cancer over the next ten years is less than one in 1,000 for men and women, but increases to about 1 in 125 in the 50-59 year old age group (9).

Most colorectal cancers occur in people without a family history of colorectal cancer. However, those with a family history of colorectal cancer in first-degree relatives are more likely to develop colorectal cancer. The level of increased risk largely depends on the number of affected first degree relatives and the age at which they were diagnosed with colorectal cancer: the more relatives with the disease, the greater the risk (10). The increased risk may be due to a potentially definable inherited cause, or may also result from shared exposure to an environmental carcinogen or from diet or lifestyle factors. Some studies have suggested that those with a family history of colorectal adenomatous polyps in first degree relatives may be at higher risk of developing colorectal cancer. However, this risk is less well characterized.

About 5% of colorectal cancers are associated with genetically defined family syndromes (11). Familial Adenomatous Polyposis (FAP) is a rare inherited condition accounting for 1% of all colorectal cancers; Hereditary Non-Polyposis Colorectal Cancer (HNPCC or Lynch Syndrome) is also a clearly defined genetic syndrome in which a small number of rapidly growing polyps develop in the colon and rectum at a relatively young age. It accounts for 3-4% of all colorectal cancers.

Chronic inflammatory bowel diseases, ulcerative colitis and Crohn's colitis, are associated with an increased risk of developing colorectal cancer (12).

Screening for Colorectal Cancer

People who have previously had colorectal cancer are more likely to develop new cancers in other areas of the colon and rectum, even if the colorectal cancer was completely removed, especially if the first colorectal cancer developed before the age of 60 years (13).

Certain non genetic factors, including a high fat diet, excessive caloric and alcohol intake, obesity, sedentary lifestyle and smoking, are associated with an increased risk of colorectal cancer. In Japan, for example, there has been a recent increase in colorectal cancer rates reflecting changes in dietary habits (14). Many of these factors can be modified to reduce the risk of developing colorectal cancer.

Risk Stratification

Screening is intended for asymptomatic individuals. Any patient with symptoms or signs suggestive of the presence of colorectal cancer requires a diagnostic workup.

To determine the appropriate approach to screening an individual for colorectal cancer, it is important to stratify individual patient's risk based on patient's age, personal medical history, as well as genetic and non genetic factors.

For the purposes of this guideline, individuals are stratified into one of four risk levels based on patient's age, personal medical history and family history: low risk, average risk, moderate risk and high risk. Individual's risk determines when screening should be initiated and what tests and frequency are appropriate.

Colorectal cancer is uncommon before the age of 50 years. Individuals younger than 50 years of age and with no identified family or personal risk factors for colorectal cancer are determined to be "Low Risk." Those who are 50 years or older with no identified family or personal risk factors are defined as "Average Risk." The majority of colorectal cancers are found in the "Average Risk" population.

Some groups are at increased risk for colorectal cancer. These include individuals at "Moderate Risk" who have a personal history of colorectal cancer or adenomas or one first degree relative with colorectal cancer. Individuals at "High Risk" are those with a family history of HNPCC (Lynch syndrome), familial adenomatous polyposis (FAP), or strong family history of colorectal cancer with multiple individuals affected but no genetic syndrome identified or personal history of inflammatory bowel disease.

Screening Modalities

(a) Fecal Occult Blood Test (FOBT)

Fecal occult blood test refers to the implementation of the protocol for collecting and testing six samples from three consecutive stools at home. A single test of a stool sample in the clinical setting is not an adequate substitute. Several studies have shown that the sensitivity of a single test of a stool sample is much lower (24). This is because colorectal cancers often bleed intermittently and /or because blood is often not present throughout the entire stool. FOBT is by far the best studied screening test for colorectal cancer screening. There have been four large randomized trials done in the US, the UK, and Denmark and Sweden which included a total of over 250,000 participants aged 50-75 (25, 26, 27, 28). Guaiac based FOBT was used in these studies.

Screening for Colorectal Cancer

There was a 14%-18% reduction in colorectal cancer deaths with biennial screening (26, 27) and a 33% reduction in deaths with annual screening (25).

Screening with FOBT has also been demonstrated to reduce the incidence of colorectal cancer by about 20% over 18 years of follow-up in the American trial (29). The test had a sensitivity of 35% - 50% and a specificity of 98% - 99% (unrehydrated) (30, 31, 32). The cancers detected at screening tended to be at an earlier stage than those presenting symptomatically (Dukes's A classification: 26% screen detected v 11% in controls).

(b) Flexible Sigmoidoscopy

Flexible sigmoidoscopy can detect colorectal cancers located in the left colon and rectum. It is highly sensitive and specific for lesions within its reach. Generally, the 60 cm flexible scope can reach the proximal end of the sigmoid colon in 80% of cases and therefore should be able to detect 40 - 60% of adenomatous polyps and colorectal cancers (33). If any adenoma is detected, a follow up colonoscopy should be offered to the patients.

The combination of both screening methods (FOBT and flexible sigmoidoscopy) may correct some of the limitations of each method used alone. Evidence that these two modalities together are more effective than either one alone comes from a non-randomised controlled trial of FOBT in patients who had had a screening sigmoidoscopy. Adding FOBT to above strategy increases sensitivity to 75% (32)

(c) Barium Enema

Barium enema examines the whole colon and rectum. The sensitivity for detection of colorectal cancer is approximately 82% for double contrast barium enemas (34). Although it is cheaper and has a lower complication rate than colonoscopy, it is invasive and requires full bowel preparation. Whereas colonoscopy may be therapeutic (polypectomy), barium enema does not allow removal or biopsy of lesions seen. In Alberta double contrast barium enema is uncommonly used for screening and there are no population screening studies using barium enema.

(d) Colonoscopy

Colonoscopy allows direct visual examination of the entire colon and rectum. The sensitivity for large adenomas and colorectal cancer exceeds 90% (35). Colonoscopy requires full bowel preparation and sedation. Patients need to be escorted home and are advised not to go back to work the same day. There is a small risk of perforation of the colon (up to 1/1000). Colonoscopy requires sedation which may also cause cardiopulmonary complications (36). Colonoscopy is, however, the investigation of choice for screening high risk patients. While the ability of colonoscopy to prevent colorectal cancer or death has not been measured in a screening trial, reduction in colorectal cancer mortality in FOBT trials is attributable to follow-up diagnostic colonoscopy.

Future Directions

Potential Future Screening Methods

Several new screening options are being studied and hold promise for colorectal cancer screening in the future.

CT Colonography

CT colonography, also known as, virtual colonoscopy, uses a Computer Assisted Tomography (CAT) scanner with low dose multidetector-row (multislice) helical computed tomography. The image processing computers allow radiologists to view a 3-D image of the inner surface of the colon. The procedure requires bowel preparation but no sedation. Recent studies showed that the sensitivity of the test can be as high as 85% for polyps larger than 1 cm and 90% for colorectal cancer (37). The specificity is estimated to be up to 90% for colorectal cancer (38). However, the reported performance characteristics have been widely variable in different studies. Access to CT colonography is limited in Alberta but is improving, since every new scanner purchased in the province will have this capability. The expected lifetime additional risk of developing cancer from the radiation dose involved with this modality is 0.14%. Using new low dose techniques, this risk is reduced by 5 - 10 times (39). The risk of colon perforation is extremely low (no perforation recorded in 11,000 study subjects). Although CT colonography has not been used in any colorectal cancer screening program, it is evolving as a very promising option for colorectal cancer screening in the future.

This guideline will be reviewed and updated when evidence becomes available relating to the performance characteristics of CT colonography as a screening modality.

Other Potential Tests

- Fecal immunochemical test (FIT) is a type of FOBT that specially detects human hemoglobin and therefore eliminates the need for dietary and medication restriction (40). FIT has been successfully used in a number of population based colorectal cancer screening pilots with improved accuracy and acceptance (41). Its automated technology and adjustable detection limits are some of its advantages over guaiac based FOBT.
- Recent advances in molecular and cell biology have provided an excellent opportunity to develop and validate biomarkers for colorectal cancer screening and risk assessment. Preliminary study findings show *stool-based DNA* may prove a useful strategy (42). The test measures DNA markers in stool samples that are specific to cancerous and pre-cancerous cells.

Organized, Population based Colorectal Cancer Screening Program

Alberta is in the process of implementing an organized, population based colorectal cancer screening program. The program targets Albertans aged 50-74 years old at average risk of developing colorectal cancer. Annual fecal occult blood test (FOBT) is recommended as the primary screening test and colonoscopy is recommended as the follow-up test for those who have positive FOBT results. It will be phased in over the next five years. The program will be evidence driven and have five key components, including recruitment and retention strategies, screening and clinical services, information management, quality assurance as well as monitoring, evaluation and research.

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To Provide Feedback

The Guideline Working Group for Colorectal Cancer Screening is a multi-disciplinary team comprised of family physicians, a gastroenterologist, a community health specialist, a radiologist and a general surgeon. The working group encourages your feedback. If you have difficulty applying this guideline, if you find the recommendations problematic, or if you need more information on this guideline, please contact:

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Alberta Cancer Board Colorectal Screening Program

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Algorithm 1: Screening of individuals at Average Risk

Asymptomatic¹ Men and Women Ages 50-74 Years

No personal history of :

- colorectal adenomatous polyps
- colorectal cancer
- inflammatory bowel disease

AND

No family history of colorectal cancer

- FOBT every 1-2 years
 - If positive refer for colonoscopy²
- OR**
- Flexible sigmoidoscopy³ every 5 years
 - colonoscopy² is recommended as the follow-up test for patients with abnormal results
- OR**
- Double contrast barium enema⁴ every 5 years
 - Colonoscopy² is recommended as the follow-up test for patients with abnormal results
- OR**
- Colonoscopy² every 10 years

Algorithm 2: Screening of individuals at Moderate Risk

Asymptomatic¹ Men and Women

Any 1st degree relative with colorectal cancer diagnosed <60 years
OR
2 or more 1st degree relatives with colorectal cancer diagnosed at any age (if not a hereditary syndrome)

Colonoscopy every 5 years commencing at age 40 or 10 years younger than the earliest case in the family, whichever comes first

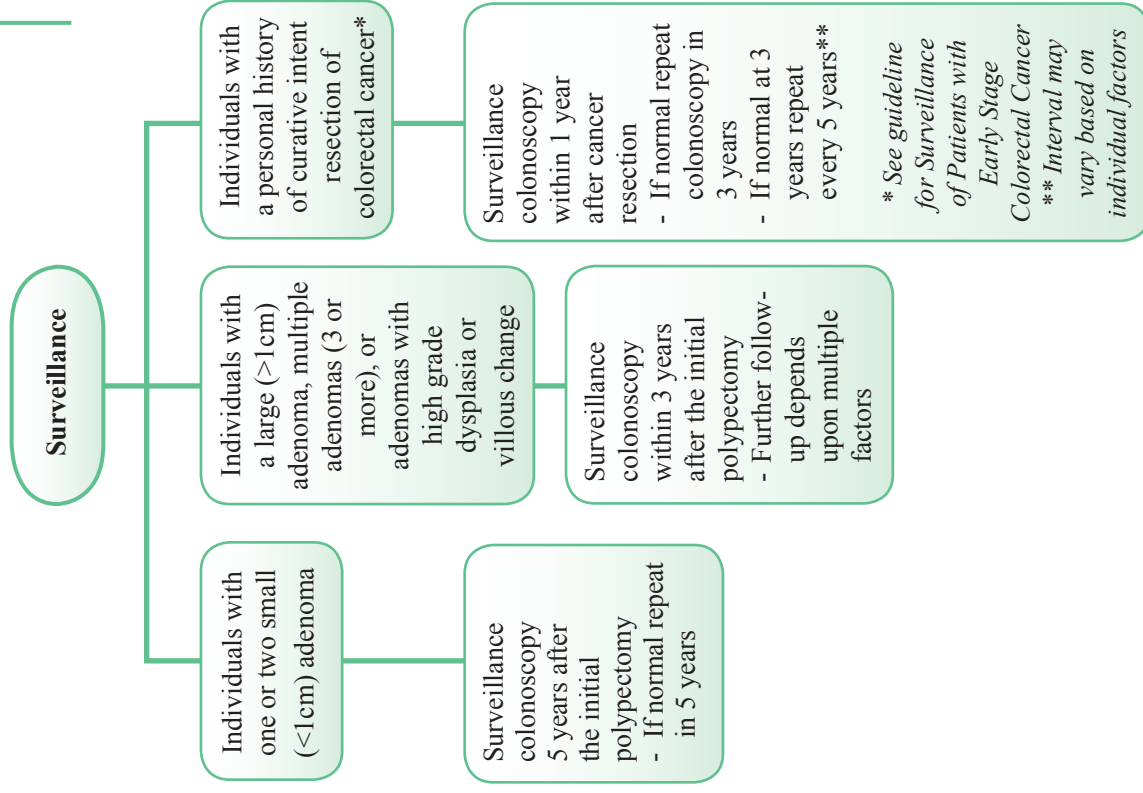
One 1st degree relative with colorectal cancer diagnosed 60 years or older

Same as for average risk but commencing at age 40

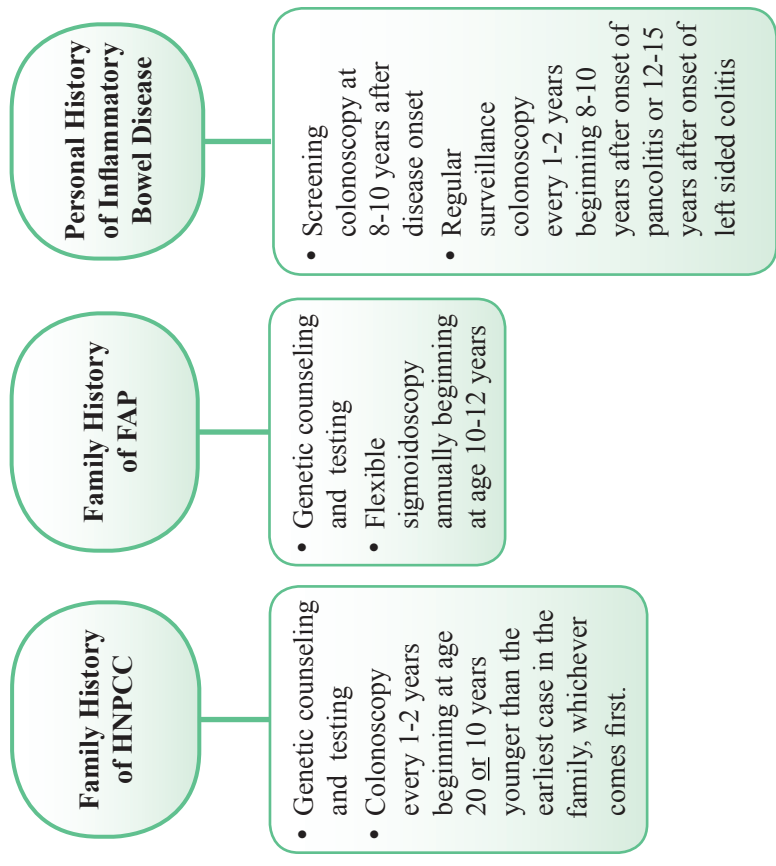
Notes

1. If the patient is symptomatic, diagnostic workup is recommended.
2. If colonoscopy is negative then no further screening tests are required for the next ten years
3. Flexible sigmoidoscopy may be used in conjunction with FOBT every 1-2 years.
4. This test is now uncommonly used for colorectal cancer screening in Alberta.

Algorithm 4: Surveillance of Individuals with a Personal History of Colorectal Cancer/Polyps



Algorithm 3: Screening of Individuals at High Risk for Colorectal Cancer



CANCER GENETICS CLINIC

Contact Information

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Appendix A: RISK REDUCTION

Diet

Diet has long been regarded as one of the most important environmental influences on colorectal cancer (15, 16). There has been extensive research with regard to diet and colorectal cancer, but much still remains unclear about the extent of the role that diet plays. It is important to focus on the health effect of a balanced diet, rather than on a single nutrient or food. In general, the dietary factors that have been suggested as potentially beneficial in prevention of colorectal cancer are similar to those in many other dietary recommendations. They include increasing dietary fiber, eating plenty of fruit and vegetables, lowering refined sugars and animal fats and having low alcohol consumption.

Physical Activity

There have now been over 60 studies conducted worldwide that have examined physical activity and its relation to colon cancer (but not rectal cancer). The majority of these studies have shown that colon cancer risk is reduced by 30-40% among the study participants who are the most physically active. The level of activity required for a risk reduction is about 45-60 minutes of at least moderate intensity activity for 5 days per week (17). An even greater risk reduction is found with vigorous intensity activity and activity of longer duration. However, risk decreases can be observed with levels of activity that are achievable for most of the general population. Hence, incorporating physical activity into daily lifestyle is an effective means of reducing colon cancer risk.

Body Weight

People who are very overweight have an increased risk of developing colorectal cancer (18). Obese men seem to be more at risk for colorectal cancer than obese women.

Smoking

Smoking has consistently been associated with an increased risk of developing and dying from many cancers including colorectal cancer (19). It is estimated that 12% of fatal colorectal cancers are related to smoking tobacco. Risk increases especially when smoking begins early in life and continues over many years.

Chemoprevention

Studies have shown some factors may be potentially protective against polyps or cancer, including non-steroidal anti-inflammatory drugs and hormone replacement therapy.

(a) *NSAIDS*

A moderately reduced risk for colorectal cancer has been found in people who regularly use aspirin and other NSAIDS, especially with prolonged use (20). So far, the information on this reduced risk has been from observational studies and interventional studies with high risk individuals. However, studies also showed that side effects are associated with taking aspirin or NSAIDS at doses that might prevent colorectal cancer. These side effects include gastrointestinal bleeding and cardiovascular disease. One expert group recently recommended AGAINST the routine use of aspirin or NSAIDS to prevent colorectal cancer in people at average risk for the disease (21).

(b) *Hormone Replacement Therapy (HRT)*

Since the publication in 2002 of results from the Women's Health Initiative (indicating a potential increased risk of breast cancer, blood clots, heart disease and uterine cancer), the use of hormone replacement therapy has declined. HRT use does result in a reduction in the risk of developing colorectal cancer (22). However, the use of HRT specifically to prevent colorectal cancer is NOT recommended (23).

Appendix B: ADVICE TO PATIENTS

What is Colorectal Cancer?

Colorectal cancer is cancer that develops on the inner wall of the colon and rectum (also known as the large bowel). The colon and the rectum are part of the digestive system. Colorectal polyps are small growths on the inner wall of the colon and rectum. These can grow slowly and may take ten years or more to develop into colorectal cancer.

Colorectal cancer is the second leading cause of cancer-related deaths and the third most commonly diagnosed cancer in Alberta. Approximately 1 in 14 men and 1 in 17 women in Alberta will develop colorectal cancer during their lifetime.

Who Gets Colorectal Cancer?

There is no single cause of colorectal cancer. Men and women of any ethnic, racial or age group are at risk of colorectal cancer. The risk increases with age and approximately 90% of people who develop the disease are over the age of 50. Most people over 50 years of age are considered to be at average risk. You may be at higher risk of developing colorectal cancer if you have a family history of colorectal cancer or personal history of colorectal cancer / polyps or inflammatory bowel disease.

Who Should be Screened for Colorectal Cancer?

Anyone over the age of 50 or those with a personal or family history that places them at increased risk.

Why Should I be Screened for Colorectal Cancer?

Colorectal cancer can develop and exist over a long period of time without any signs or symptoms. Screening is the only way to detect colorectal cancer at its early stages when treatment is most effective. Screening can also detect polyps, which can be removed before they become cancerous, thereby preventing colorectal cancer.

In 2004, more than 1500 people were diagnosed with colorectal cancer and approximately 650 died from it in Alberta. With routine colorectal cancer screening, many of these deaths could have been prevented.

What Tests are Used to Screen for Colorectal Cancer?

There are several tests that can be used to screen for colorectal cancer. Each test has its pros and cons.

- **Fecal Occult Blood Test (FOBT):** a non-invasive test which can be done at home. Three small stool samples are tested for hidden (occult) blood. If the test is positive, colonoscopy is needed to determine if there are polyps, cancer or other causes of bleeding
- **Flexible Sigmoidoscopy:** A flexible lighted instrument is inserted through the anus to examine the rectum and the lower portion of the colon. About half of colorectal cancer occurs within reach of the flexible sigmoidoscope
- **Double Contrast Barium Enema:** a radiological procedure that examines the contours of the lining of the entire colon and rectum. This test is now uncommonly used as a screening test
CT colonography, also known as Virtual Colonoscopy, is an imaging examination of the entire colon and rectum and could potentially be used to screen for colorectal cancer. However, this test has not been routinely recommended for this purpose and is only available in a few sites in Alberta. It is important to note that the costs for virtual colonoscopy is not covered by the Alberta Health & Wellness.
- **Colonoscopy:** A flexible lighted instrument is inserted through the anus to examine the entire colon. It is considered the most accurate test for diagnosing colorectal cancer and polyps.

All tests, except fecal occult blood tests, require the bowel to be specially cleansed. FOBT can be done at home whereas flexible sigmoidoscopy, barium enema and colonoscopy are often done in a hospital. Complications from flexible sigmoidoscopy, double contrast barium enema, or colonoscopy include bleeding or puncture of the colon. These complications, though rare, are more common with colonoscopy than with other two tests. Colonoscopy requires sedation which may also cause cardiopulmonary complications. The waiting time for colonoscopy vary in each health region and can be long in some areas.