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Patient information: Colon and rectal cancer screening (Beyond the Basics)

COLON CANCER SCREENING OVERVIEW

Colorectal cancer is a cancer that develops in the large intestine [colon] or rectum. The primary goal of colon cancer screening is to prevent deaths from colon cancer. Screening tests can help identify cancers at an early and potentially treatable stage. Some tests can also prevent the development of colorectal cancer by identifying precancerous abnormal growths called adenomatous polyps, which can be removed before they become malignant.

All adults should undergo colon cancer screening beginning at age 50 or earlier, depending upon their risk of developing colorectal cancer. Several tests are currently available, each of which has advantages and disadvantages. The optimal screening test depends upon your preferences and your risk of developing colon cancer.

This article discusses colon cancer risks, available screening tests, and recommendations for screening based upon your risks. There are additional topics about the screening tests themselves (see "[Patient information: Flexible sigmoidoscopy \(Beyond the Basics\)](#)" and "[Patient information: Colonoscopy \(Beyond the Basics\)](#)") as well as about particular conditions (see "[Patient information: Colon polyps \(Beyond the Basics\)](#)" and "[Patient information: Crohn disease \(Beyond the Basics\)](#)" and "[Patient information: Ulcerative colitis \(Beyond the Basics\)](#)").

EFFECTIVENESS OF COLON CANCER SCREENING

Most colorectal cancers develop from precancerous polyps. Polyps are growths that arise in the lining of the colon and are visible when the bowel is examined by endoscopy (colonoscopy or sigmoidoscopy). There are two types of polyps: adenomatous and hyperplastic. Adenomatous polyps can become cancerous over time; this progression takes at least 10 years in most people.

Colon cancer screening tests work by detecting polyps or by finding early stage cancers. Regular screening for and removal of polyps reduces your risk of developing colorectal cancer - by up to 90 percent with colonoscopy. Early detection of cancers that are already present in the colon increases the chances of successful treatment and decreases the chance of dying as a result of the cancer.

COLON CANCER RISK FACTORS

Several factors increase an individual's risk of developing colorectal cancer. Having one or more of these factors will determine the age when you should begin screening, the frequency of screening, and the screening tests that are most appropriate.

Factors that increase risk — Several characteristics increase the risk of colorectal cancer. While each individual risk factor adds some risk, risk is substantially increased if several are present together.

- Family history of colorectal cancer — Having colorectal cancer in a family member increases your risk of cancer if the family member is a first degree relative (a parent, brother or sister, or child), if several family members are affected, or if the cancers occurred at an early age (eg, before age 55 years). (See ['Family history of colorectal cancer'](#) below.)
- Prior colorectal cancer or polyps — People who have previously had colorectal cancer have an increased risk of developing a new colorectal cancer. People who have had adenomatous polyps before the age of 60 years are also at increased risk for developing colorectal cancer. Screening recommendations for these groups are discussed separately. (See ["Patient information: Colon polyps \(Beyond the Basics\)"](#) and ["Patient information: Colon and rectal cancer \(Beyond the Basics\)"](#).)
- Increasing age — Although the average person has a 5 percent lifetime risk of developing colorectal cancer, 90 percent of these cancers occur in people older than 50 years of age. Risk increases with age throughout life.
- Lifestyle factors — Several lifestyle factors increase the risk of colorectal cancer, including:
 - A diet high in fat and red meat and low in fiber
 - A sedentary lifestyle

Large increase in risk — Some conditions greatly increase the risk of colorectal cancer.

Familial adenomatous polyposis — Familial adenomatous polyposis (FAP) is an uncommon inherited condition that increases the risk of colorectal cancer. Nearly 100 percent of people with this condition will develop colorectal cancer during their lifetime, and most of these cancers occur before the age of 50 years. FAP causes hundreds of polyps to develop throughout the colon. (See ["Clinical manifestations and diagnosis of familial adenomatous polyposis"](#).)

Hereditary nonpolyposis colon cancer — Hereditary nonpolyposis colon cancer (HNPCC, also called Lynch syndrome) is another inherited condition associated with an increased risk of colorectal cancer. It is slightly more common than FAP, but is still uncommon, accounting for about 1 in 20 cases of colorectal cancer. About 70 percent of people with HNPCC will experience colorectal cancer by the age of 65. Cancer also tends to occur at younger ages. People with HNPCC are also at risk for other types of cancer, including cancer of the uterus, stomach, bladder, kidney, and ovary. (See ["Clinical features and diagnosis of Lynch syndrome \(hereditary nonpolyposis colorectal cancer\)"](#).)

Inflammatory bowel disease — People with Crohn's disease of the colon or ulcerative colitis have an increased risk of colorectal cancer. The amount of increased risk depends upon the amount of inflamed colon and the duration of disease; pancolitis (inflammation of the entire colon) and colitis of 10 years' duration or longer are associated with the greatest risk for colorectal cancer. The risk of colon cancer is not increased in people with irritable bowel disease.

Factors that may decrease risk — Factors that may decrease risk include:

- Calcium — Although a few studies have shown that people who have higher calcium intake also have a lower risk of colorectal cancer, it is not known if taking calcium supplements or eating a high calcium diet lowers the cancer risk.
- Aspirin, ibuprofen, and related nonsteroidal antiinflammatory medications may decrease the risk of developing colorectal cancer. However, there is not enough evidence that the benefits of aspirin or NSAIDs for cancer prevention outweigh the risks associated with side effects of the medicines. Aspirin can increase the risk for a hemorrhagic stroke or gastrointestinal bleeding, and NSAIDs are associated with increased risk for peptic ulcer, heart, and kidney disease.

COLON CANCER SCREENING TESTS

Several tests are available for colorectal cancer screening, including tests that can detect cancers at an early treatable stage (eg, stool tests), and tests that also detect pre-cancerous polyps (adenomas) and can lead to cancer prevention.

Guidelines from expert groups recommend that you and your healthcare provider discuss the available options and choose a testing strategy that makes sense for you. Tests that detect pre-cancerous polyps are preferable; these include colonoscopy, CT colonography, and flexible sigmoidoscopy. Stool tests that detect blood or abnormal DNA are another option [1]. Being screened with any test is more important than which test is used.

Colonoscopy — Colonoscopy allows a physician to see the lining of the rectum and the entire colon ([figure 1](#)). (See ["Patient information: Colonoscopy \(Beyond the Basics\)"](#).)

- Procedure — Colonoscopy requires that you prepare by cleaning out your entire colon and rectum. This usually involves consuming a liquid medication that causes temporary diarrhea. You are given a mild sedative drug before the procedure. During colonoscopy, a thin, lighted tube is used to directly view the lining of the rectum and the entire colon. Polyps and some cancers can be removed during this procedure.
- Effectiveness — Colonoscopy detects most small polyps and almost all large polyps and cancers [2].
- Risks and disadvantages — The risks of colonoscopy, while small, are greater than those of other screening tests. Colonoscopy may lead to serious bleeding or a tear of the intestinal wall in some individuals (about 1 in 1,000). Because the procedure usually requires sedation, you must be accompanied home after the procedure and you should not return to work or other activities on the same day.

Sigmoidoscopy — Sigmoidoscopy allows a physician to directly view the lining of the rectum and the lower part of the colon (the descending colon) ([figure 1](#)). This area accounts for about one-half of the total area of the rectum and colon. (See ["Patient information: Flexible sigmoidoscopy \(Beyond the Basics\)"](#).)

- Procedure — Sigmoidoscopy requires that you prepare by cleaning out the lower bowel. This usually involves consuming a clear liquid diet and using an enema shortly before the examination. Most people do not need sedative drugs and are able to return to work or other activities the same day. During the procedure, a thin, lighted tube is advanced into the rectum and through the left side of the colon to check for polyps and cancer; the procedure may cause

mild cramping. Biopsies (small samples of tissue) can be taken during sigmoidoscopy. Sigmoidoscopy may be performed in a doctor's office.

- Effectiveness — Sigmoidoscopy can identify polyps and cancers in the descending colon and rectum with a high degree of accuracy. Studies have shown that sigmoidoscopy reduces the incidence of colorectal cancer and overall mortality [3].
- Risks and disadvantages — The risks of sigmoidoscopy are small. The procedure creates a small tear in the intestinal wall in about 2 per every 10,000 people; death from this complication is rare. A major disadvantage of sigmoidoscopy is that it cannot detect polyps or cancers that are located in the right side of the colon.
- Additional testing — Finding polyps or cancers in the lower colon increase the likelihood that there are polyps or cancer in the remaining part of the colon. Thus, if sigmoidoscopy reveals polyps or cancer, colonoscopy is recommended to view the entire length of the colon.

CT colonography ("virtual colonoscopy") — Computed tomography colonography (CTC, sometimes called "virtual colonoscopy") is a test that uses a CT scanner to take images of the entire bowel. These images are in two- and three-dimensions, and are reconstructed to allow a radiologist to determine if polyps or cancers are present ([picture 1](#)). The major advantages of CTC are that it does not require sedation, it is non-invasive, the entire bowel can be examined, and abnormal areas (adenomas) can be detected about as well as with traditional (optical) colonoscopy.

There are several disadvantages of CTC. Like traditional colonoscopy, CTC usually requires a bowel prep to clean out the colon. If an abnormal area is found with CTC, a traditional colonoscopy will be needed at a later time to see the area and take a tissue sample (biopsy). CTC may detect abnormalities other than polyps and colorectal cancer. Many of these incidental findings will require further testing. This test may not be covered by health insurance plans in the United States. CTC, like many other imaging tests, exposes patients to radiation which may have long-term risks.

Stool tests — Colorectal cancers often release microscopic amounts of blood and abnormal DNA into the stool. Stool tests can detect blood or abnormal DNA makers.

Two types of tests, called guaiac tests (typically Hemoccult®) and immunochemical tests, evaluate the stool for blood, which may be present if there is bleeding from a colon cancer (or other source of blood).

- With guaiac testing, you collect two samples of stool from three consecutive bowel movements, which you apply to home collection cards. You mail the cards back to the healthcare provider.
- With immunochemical testing, you use a long handled tool to brush the surface of your stool in the toilet. You apply the brush to a card, and then mail the card to a laboratory. You do not have to change your diet or stop any medications with this test.

Guaiac testing, when performed once per year, reduces the risk of dying from colorectal cancer by as much as one-third [4]. However, because polyps seldom bleed, guaiac testing is less likely to detect polyps than other screening tests. In addition, only 2 to 5 percent of people with a positive stool test actually have colorectal cancer. If the stool test is positive, your entire colon should be examined with colonoscopy.

Fecal occult blood test and sigmoidoscopy — Combined screening with a fecal occult blood test (guaiac) and sigmoidoscopy is a possible screening strategy and may be more effective than either test done alone.

COLON CANCER SCREENING PLANS

The recommended colon cancer screening plan depends upon your risk of colorectal cancer.

Average risk of colorectal cancer — People with an average risk of colorectal cancer should begin screening at age 50. One of the following screening strategies is recommended [[1](#)]:

- Colonoscopy every 10 years
- Computed tomographic colonography every 5 years
- Flexible sigmoidoscopy every five years
- Stool testing every year (for guaiac and immunochemical occult blood tests)

Increased risk of colorectal cancer — Screening plans for people with an increased risk may entail screening at a younger age, more frequent screening, and/or the use of more sensitive screening tests (usually colonoscopy). The optimal screening plan depends upon the reason for increased risk.

Family history of colorectal cancer

- People who have one first-degree relative (parent, brother, sister, or child) with colorectal cancer or adenomatous polyps at a young age (before the age of 60 years), or two first-degree relatives diagnosed at any age, should begin screening for colon cancer earlier, typically at age 40, or 10 years younger than the earliest diagnosis in their family, whichever comes first. Screening usually includes colonoscopy, which should be repeated every five years.

(See ["Screening for colorectal cancer: Strategies in patients with possible increased risk due to family history"](#).)

- People who have one first-degree relative (parent, brother, sister, or child) who has experienced colorectal cancer or adenomatous polyps at age 60 or later, or two or more second degree relatives (grandparent, aunt, uncle) with colorectal cancer should begin screening by colonoscopy at age 50, and screening should be repeated as for average risk people.
- People with a second-degree relative (grandparent, aunt, or uncle) or third-degree relative (great-grandparent or cousin) with colorectal cancer are considered to have an average risk of colorectal cancer (see ["Average risk of colorectal cancer"](#) above).

Some people have known genetically-based colon cancer syndromes in their family, such as familial adenomatous polyposis (FAP) or hereditary nonpolyposis colon cancer (HNPCC). These less common conditions require aggressive screening and preventive treatments, and individuals with these conditions in their family should be managed by a clinician with clinical expertise in these syndromes. (See ["Familial adenomatous polyposis and MUTYH associated polyposis: Screening and management of patients and families"](#) and ["Lynch syndrome \(hereditary nonpolyposis colorectal cancer\): Screening and management of patients and families"](#) and ["Peutz-Jeghers syndrome and juvenile polyposis: Screening and management of patients and families"](#).)

Inflammatory bowel disease — People with ulcerative colitis or Crohn's disease have an increased risk of colon cancer. The best screening plan depends upon how much of the colon is affected and how long you have had the disease. (See ["Patient information: Crohn disease \(Beyond the Basics\)"](#) and ["Patient information: Ulcerative colitis \(Beyond the Basics\)"](#) and ["Colorectal cancer surveillance in inflammatory bowel disease".](#))

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient information: Colon and rectal cancer screening \(The Basics\)](#)

[Patient information: Colonoscopy \(The Basics\)](#)

[Patient information: Cancer screening \(The Basics\)](#)

[Patient information: Colon polyps \(The Basics\)](#)

[Patient information: Familial adenomatous polyposis \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient information: Flexible sigmoidoscopy \(Beyond the Basics\)](#)

[Patient information: Colonoscopy \(Beyond the Basics\)](#)

[Patient information: Colon polyps \(Beyond the Basics\)](#)

[Patient information: Crohn disease \(Beyond the Basics\)](#)

[Patient information: Ulcerative colitis \(Beyond the Basics\)](#)

[Patient information: Colon and rectal cancer \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Colorectal cancer surveillance in inflammatory bowel disease](#)

[Computed tomographic colonography](#)

[Gardner syndrome](#)

[Screening for colorectal cancer: Strategies in patients at average risk](#)

[Screening for colorectal cancer: Strategies in patients with possible increased risk due to family history](#)

[Clinical manifestations and diagnosis of familial adenomatous polyposis](#)
[Clinical features and diagnosis of Lynch syndrome \(hereditary nonpolyposis colorectal cancer\)](#)
[Familial adenomatous polyposis and MUTYH associated polyposis: Screening and management of patients and families](#)
[Peutz-Jeghers syndrome and juvenile polyposis: Screening and management of patients and families](#)
[Lynch syndrome \(hereditary nonpolyposis colorectal cancer\): Screening and management of patients and families](#)

The following organizations also provide reliable health information.

- National Cancer Institute

1-800-4-CANCER
(www.nci.nih.gov)

- The American Society of Clinical Oncology

(www.cancer.net/portal/site/patient)

- National Comprehensive Cancer Network

(www.nccn.com)

- American Cancer Society

1-800-ACS-2345
(www.cancer.org)

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- The American Gastroenterological Association

(www.gastro.org)

- The American College of Gastroenterology

(www.acg.gi.org)

Literature review current through: Oct 2013. | This topic last updated: Jan 10, 2013.

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References

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2. [Rex DK, Cutler CS, Lemmel GT, et al. Colonoscopic miss rates of adenomas determined by back-to-back colonoscopies. Gastroenterology 1997; 112:24.](#)
3. [Atkin WS, Edwards R, Kralj-Hans I, et al. Once-only flexible sigmoidoscopy screening in prevention of colorectal cancer: a multicentre randomised controlled trial. Lancet 2010; 375:1624.](#)
4. [Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. Minnesota Colon Cancer Control Study. N Engl J Med 1993; 328:1365.](#)