

## **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 adenomas, many of which are polyps that project into the colon or rectum, which can be removed before they become malignant.

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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

## **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 early stage cancers followed by removal of the abnormality. 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**

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**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). •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.

•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
- Cigarette smoking
- Alcohol use
- Obesity

**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 beginning in adolescence.

**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.

**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.

## **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. Some experts believe that tests that detect pre-cancerous polyps are preferable; these include colonoscopy, CT colonography, and flexible sigmoidoscopy [1]. Other experts believe that being screened with any test, including stool tests that detect blood or abnormal DNA, is more important than which test is used.

**Colonoscopy** — Colonoscopy allows a physician to see the lining of the rectum and the entire colon.

- **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 and substantially reduces the risk of developing and dying from colorectal cancer [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). This area accounts for about one-half of the total area of the rectum and colon.

- **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. You should avoid drugs that irritate the stomach, such as aspirin and NSAIDS, before collecting the stool.
- 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.
- 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.

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.