Colorectal Cancer

What Is Colorectal Cancer?

Colorectal cancer starts in the colon or the rectum. These cancers can also be called colon cancer or rectal cancer, depending on where they start. Colon cancer and rectal cancer are often grouped together because they have many features in common.

The colon and rectum

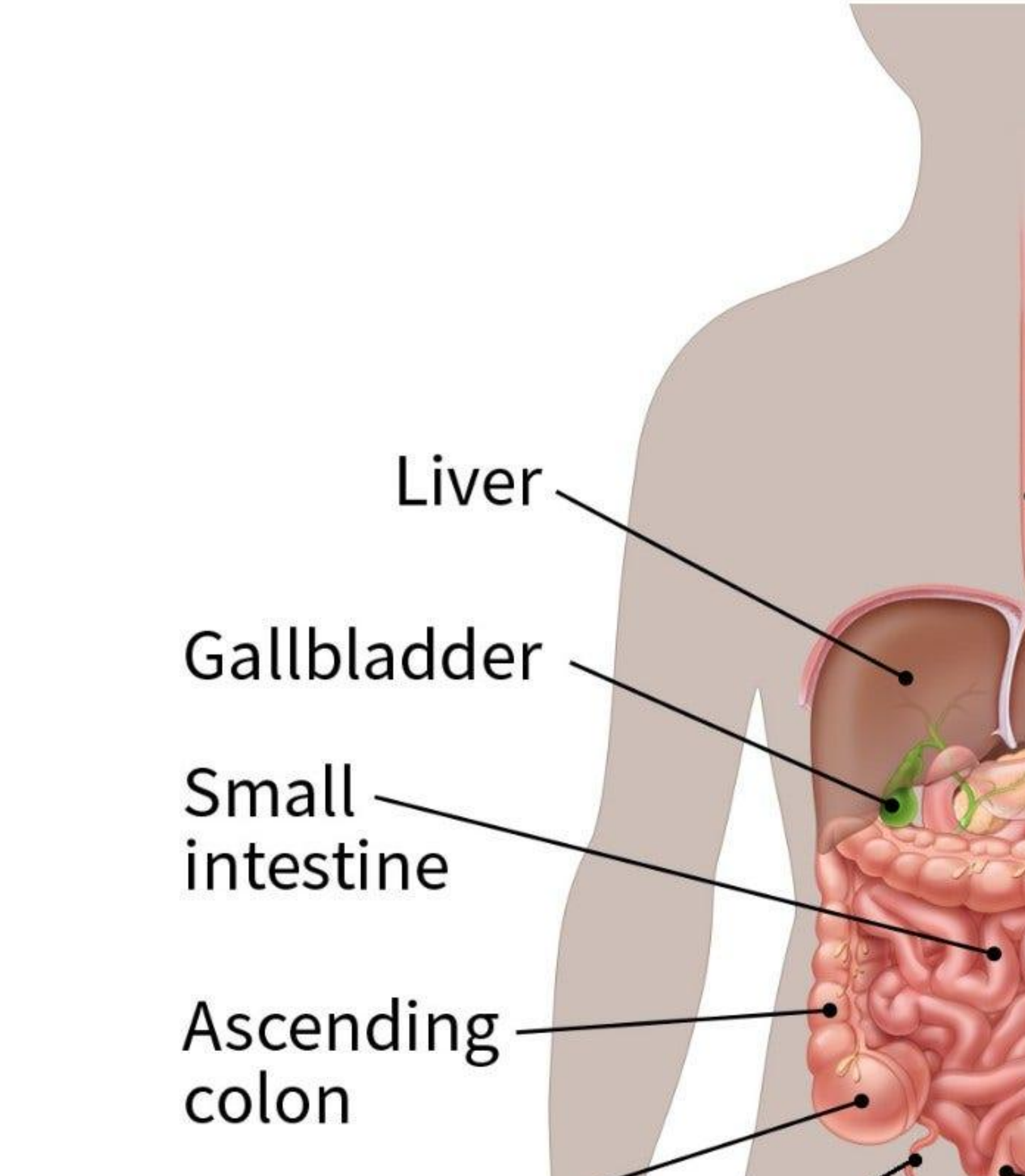
To understand colorectal cancer, it helps to know about the normal structure and function of the colon and rectum.

The colon and rectum make up the large intestine (or large bowel), which is part of the digestive system, also called the *gastrointestinal (GI) system* (see illustration below).

Most of the large intestine is made up of the colon, a muscular tube about 5 feet (1.5 meters) long. The parts of the colon are named by which way the food is traveling through them.

- The first section is called the **ascending colon**. It starts with a pouch called the cecum, where undigested food comes in from the small intestine. It continues upward on the right side of the abdomen (belly).
- The second section is called the **transverse colon**. It goes across the body from the right to the left side.
- The third section is called the **descending colon** because it descends (travels down) on the left side.
- The fourth section is called the **sigmoid colon** because of its “S” shape. The sigmoid colon joins the rectum, which then connects to the anus.

The ascending and transverse sections together are called the **proximal colon**. The descending and sigmoid colon are called the **distal colon**.


Liver
Gallbladder
Small intestine
Ascending colon

What Is Cancer?

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer cells. Learn more here.

Anatomy Gallery: Digestive System

Explore our 3D interactive tour of the digestive system.

How do the colon and rectum work?
The colon absorbs water and salt from the remaining food matter after it goes through the small intestine (small bowel). The waste matter that's left after going through the colon goes into the **rectum**, the final 6 inches (15cm) of the digestive system. It's stored there until it passes through the **anus**. Ring-shaped muscles (also called **sphincters**) around the anus keep stool from coming out until they relax during a bowel movement.

How does colorectal cancer start?
Polyps in the colon or rectum
Most colorectal cancers start as a growth on the inner lining of the colon or rectum. These growths are called **polyps.**

Polyps are quite common, especially as you get older. Most polyps are benign, or noncancerous. Some types of polyps can change into cancer over time (usually over many years). The chance of a polyp turning into cancer depends on the type of polyp it is. There are different types of polyps.

- **Adenomatous polyps (adenomas):** These polyps sometimes change into cancer. Because of this, adenomas are called a **precancerous condition.** The 3 types of adenomas are tubular, villous, and tubulovillous. Tubular adenomas are the most common type of adenomatous polyps. Villous adenomas are the least common type of adenomatous polyps, but are more likely to change into cancer.
- **Hyperplastic polyps and inflammatory polyps:** These polyps are more common, but in general they are not precancerous. Some people with large (more than 1cm) hyperplastic polyps might need colorectal cancer screening with colonoscopy more often.
- **Sessile serrated polyps (SSP) and traditional serrated adenomas (TSA):** These polyps are often treated like adenomas because they have a higher risk of changing into cancer.

Other factors that can make a polyp more likely to contain cancer or increase someone's risk of developing colorectal cancer include:

- Size: If a polyp larger than 1 cm
- Number: If more than 3 polyps are found
- Histology: If **dysplasia** is seen in the polyp. Dysplasia means that the cells look abnormal, but they haven't yet become cancer.

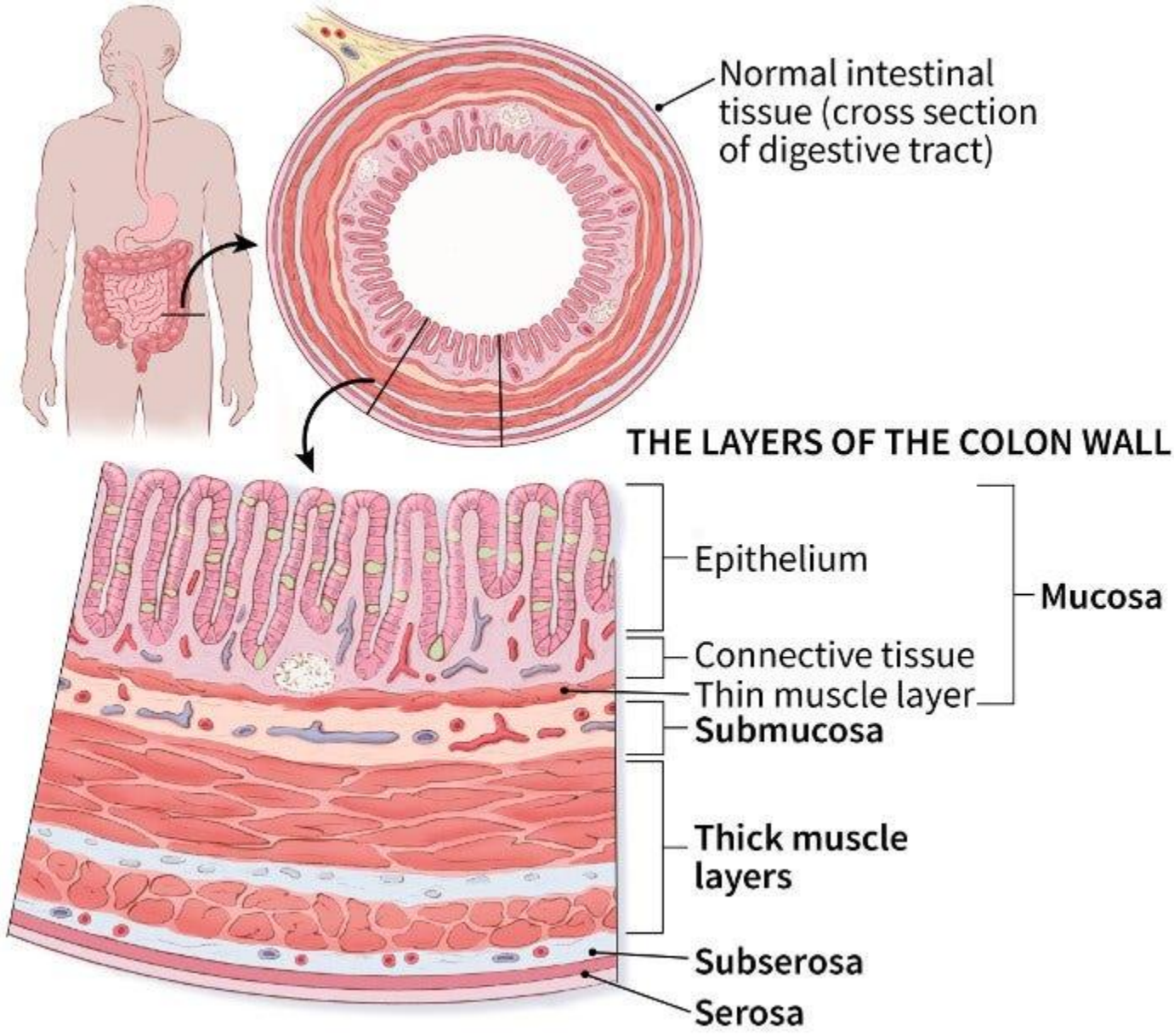
For more details on the types of polyps and conditions that can lead to colorectal cancer, see Your Colon or Rectal Pathology Report: Polyps.

How colorectal cancer spreads

If cancer forms in a polyp, it can grow into the wall of the colon or rectum over time. The wall of the colon and rectum is made up of many layers. Colorectal cancer starts in the innermost layer (the mucosa) and can grow outward through some or all of the other layers (see picture below).

When cancer cells are in the wall, they can then grow into blood vessels or lymph vessels (tiny channels that carry away waste and fluid). From there, they can travel to nearby lymph nodes or to distant parts of the body.

The stage (extent of spread) of a colorectal cancer depends on how deeply it grows into the wall and if it has spread outside the colon or rectum. For more on staging, see Colorectal Cancer Stages.



Types of cancer in the colon and rectum

Most colorectal cancers are **adenocarcinomas**. These cancers start in cells that make mucus to lubricate the inside of the colon and rectum. When doctors talk about colorectal cancer, they're almost always talking about this type. Some subtypes of adenocarcinoma, such as signet ring and mucinous, may have a worse prognosis (outlook) than other subtypes of adenocarcinoma.

Other, much less common types of tumors can also start in the colon and rectum. These include:

- **Carcinoid tumors.** These start from special hormone-making cells in the intestine. See Gastrointestinal Carcinoid Tumors.
- **Gastrointestinal stromal tumors (GISTs)** start from nerve cells in the wall of the gastrointestinal tract. Some are benign (not cancer). These tumors are most commonly found in the stomach and small intestine. They are not commonly found in the colon or rectum. See Gastrointestinal Stromal Tumor (GIST).
- **Lymphomas** are cancers of immune system cells. They mostly start in lymph nodes, but they can also start in the colon, rectum, or other organs. Information on lymphomas of the digestive system can be found in Non-Hodgkin Lymphoma.
- **Sarcomas** can start in blood vessels, muscle layers, or other connective tissues in the wall of the colon and rectum. Sarcomas of the colon or rectum are rare. See Soft Tissue Sarcoma.

Colorectal Cancer Risk Factors
Researchers have found several risk factors that might increase a person's chance of developing colorectal polyps or colorectal cancer.

What is a risk factor?
A risk factor is anything that raises your chances of getting a disease such as cancer.

Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history of cancer, can't be changed.

But having a risk factor, or even many, does not mean that you will get the disease. And some people who get the disease may not have any known risk factors.

Risk factors you can change
Many lifestyle-related factors have been linked to colorectal cancer. In fact, more than half of all colorectal cancers are linked to risk factors that can be changed.

Excess body weight
If you have excess body weight (overweight or obesity), your risk of developing and dying from colorectal cancer is higher. Excess weight raises the risk of colorectal cancer in people, but the link seems to be stronger in men. Getting to and staying at a healthy weight may help lower your risk.

Diabetes mellitus, Type 2
People with type 2 diabetes mellitus are more likely than people who don't to develop colorectal cancer. Researchers suspect that this higher risk may be due to high levels of insulin in people with diabetes mellitus. Both type 2 diabetes and colorectal cancer share some of the same risk factors (such as excess body weight and physical inactivity). But even after taking these factors into account, people with type 2 diabetes still have an increased risk. They also tend to have a less favorable prognosis (outlook) after diagnosis.

Certain types of diets

A long-term diet that's high in red meats (such as beef, pork, lamb, or liver) and processed meats (like hot dogs and some lunch meats) raises your colorectal cancer risk.

Cooking meats at very high temperatures (frying, broiling, or grilling) creates chemicals that might raise your cancer risk.

Having a low blood level of vitamin D may also increase your risk.

Following a healthy eating pattern that includes plenty of fruits, vegetables, and whole grains, and that limits or avoids red and processed meats and sugary drinks probably lowers risk.

Smoking

People who have smoked tobacco for a long time are more likely to develop and die from colorectal cancer than people who don't smoke. Smoking tobacco also increases the risk for people to develop colon polyps. Smoking is a well-known cause of lung cancer, but it's linked to a lot of other cancers, too. If you smoke and want to know more about quitting, see How to Quit Using Tobacco.

Alcohol use

Colorectal cancer has been linked to moderate to heavy alcohol use. Even light-to-moderate alcohol intake has been associated with some risk. It is best not to drink alcohol. If people do drink alcohol, they should have no more than 2 drinks a day for men and 1 drink a day for women. This could have many health benefits, including a lower risk of many kinds of cancer.

Colorectal cancer risk factors you cannot change

Your age

Your risk of colorectal cancer goes up as you age. Younger adults can get it, but it’s much more common after age 50. Colorectal cancer is rising among people who are younger than age 50, and the reason for this remains unclear.

Your racial and ethnic background

American Indian and Alaska Native people have the highest rates of colorectal cancer in the United States, followed by African American men and women.

Jews of Eastern European descent (Ashkenazi Jews) have one of the highest colorectal cancer risks of any ethnic group in the world.

Your sex at birth

Men who have colorectal cancer are more likely to die from it than women. The reasons are not fully clear. Women who have colorectal cancer are more likely to have right-sided colon cancer, particularly if they are no longer menstruating (postmenopausal).

Cholecystectomy

People who have had their gallbladder removed (cholecystectomy) have been found to have a mildly higher risk for right-sided colon cancer. It's not fully understood why this is. Research is ongoing.

A personal history of colorectal polyps or colorectal cancer

If you have a history of adenomatous polyps (adenomas), you are at increased risk of developing colorectal cancer. This is especially true if the polyps are large, if there are many of them, or if any of them show dysplasia.

If you've had colorectal cancer, even though it was completely removed, you are more likely to develop new cancers in other parts of the colon and rectum. The chances of this happening are greater if you had your first colorectal cancer when you were younger.

A personal history of inflammatory bowel disease

If you have inflammatory bowel disease (IBD), including either ulcerative colitis or Crohn's disease, your risk of colorectal cancer is increased.

IBD is a condition in which the colon is inflamed over a long period of time. People who have had IBD for many years, especially if untreated, often develop **dysplasia**. Dysplasia is a term used to describe cells in the lining of the colon or rectum that look abnormal, but are not cancer cells. They can change into cancer over time.

If you have IBD, you may need to start getting screened for colorectal cancer when you are younger and be screened more often.

Inflammatory bowel disease is different from irritable bowel syndrome (IBS), which does not appear to increase your risk for colorectal cancer.

A personal history of radiation to the abdomen or pelvis area

If you survived cancer in the past and as part of your treatment, received radiation to the area where your colon is (abdomen and pelvis area), your risk of colorectal cancer is increased. If you have received radiation to the abdomen or pelvis, especially as a child, you may need to start getting screened for colorectal cancer when you are younger and be screened more often.

Several studies suggest that men who had radiation therapy to treat prostate cancer might have a higher risk of rectal cancer because the rectum receives some radiation during treatment. Most of these studies are based on men treated in the 1980s and 1990s, when radiation treatments were less precise than they are today. The effect of more modern radiation methods on rectal cancer risk is not clear, but research continues to be done in this area.

A family history of colorectal cancer or adenomatous polyps

Most colorectal cancers are found in people without a family history of colorectal cancer. Still, as many as 1 in 3 people who develop colorectal cancer have other family members who have had it.

People with a history of colorectal cancer in a first-degree relative (parent, sibling, or child) are at increased risk. The risk is even higher if that relative was diagnosed with cancer when they were younger than age 50, or if more than one first-degree relative is affected.

The reasons for the increased risk are not clear in all cases. Cancers can “run in the family” because of inherited genes, shared environmental factors, or some combination of these.

Having family members who have had adenomatous polyps is also linked to a higher risk of colon cancer. (Adenomatous polyps are the kind of polyps that can become cancer.)

If you have a family history of adenomatous polyps or colorectal cancer, talk with your doctor about the possible need to start screening at a younger age. If you've had adenomatous polyps or colorectal cancer, it’s important to tell your close relatives so that they can pass along that information to their doctors and start screening at the right age.

Having an inherited syndrome

About 5% of people who develop colorectal cancer have inherited gene changes (mutations) that cause family cancer syndromes and can lead to them getting the disease.

The most common inherited syndromes linked with colorectal cancers are Lynch syndrome (hereditary non-polyposis colorectal cancer, or HNPCC) and familial adenomatous polyposis (FAP), but other rarer syndromes can increase colorectal cancer risk, too.

Lynch syndrome (hereditary non-polyposis colon cancer or HNPCC)

Lynch syndrome is the most common hereditary colorectal cancer syndrome. It accounts for about 2% to 4% of all colorectal cancers. In most cases, this disorder is caused by an inherited defect in either the *MLH1*, *MSH2,MSH6, PMS2, or EPCAM* gene, but changes in other genes can also cause Lynch syndrome. These genes, called DNA mismatch repair (MMR) genes, normally help repair DNA that has been damaged.

The cancers linked to this syndrome tend to develop when people are relatively young and tend to develop right-sided colon cancer. People with Lynch syndrome can have polyps, but they tend to have only a few. The lifetime risk of colorectal cancer in people with this condition may be as high as 50%, but this depends on which gene is affected.

Women with this condition also have a very high risk of developing cancer of the endometrium (lining of the uterus). Other cancers linked with Lynch syndrome include cancer of the ovary, stomach, small intestine, pancreas, kidney, prostate, breast, ureters (tubes that carry urine from the kidneys to the bladder), and bile duct. People with Turcot syndrome (a rare inherited condition) who have a defect in one of the Lynch syndrome genes are at a higher risk of colorectal cancer as well as a specific type of brain cancer called glioblastoma.

For more on Lynch syndrome, see What Causes Colorectal Cancer?, Can Colorectal Cancer Be Prevented?, and Family Cancer Syndromes.

Familial adenomatous polyposis (FAP)
FAP is caused by changes (mutations) in the *APC* gene that a person inherits from their parents. About 1% of all colorectal cancers are caused by FAP.

In the most common type of FAP, hundreds or thousands of polyps develop in a person's colon and rectum, often starting at ages 10 to 12. Cancer usually develops in 1 or more of these polyps as early as age 20. By age 40, almost all people with FAP will have colon cancer if their colon hasn't been removed to prevent it. People with FAP also have an increased risk for cancers of the stomach, small intestines, pancreas, liver, and some other organs.

There are 3 sub-types of FAP:

- In **attenuated FAP** or **AFAP**, patients have fewer polyps (less than 100), and colorectal cancer tends to occur at a later age (40s and 50s).
- **Gardner syndrome** is a type of FAP that also causes noncancerous tumors of the skin, soft tissue, and bones.
- In **Turcot syndrome**, people who have *APC* gene mutation are at a high risk of having many adenomatous polyps and colorectal cancer, but also a specific type of brain cancer called medulloblastoma.

Rare inherited conditions linked to colorectal cancer

- **Peutz-Jeghers syndrome (PJS):** People with this inherited condition tend to have freckles around the mouth (and sometimes on their hands and feet) and a special type of polyp called **hamartomas** in their digestive tract. These people are at a much higher risk for colorectal cancer, as well as other cancers, such as cancers of the breast, ovary, and pancreas. They usually are diagnosed at a younger than usual age. This syndrome is caused by mutations in the *STK11 (LKB1)* gene.
- **MUTYH-associated polyposis (MAP):** People with this syndrome develop many colon polyps. These tend to become cancer if not watched closely with routine colonoscopies. These people also have an increased risk of other cancers of the GI (gastrointestinal) tract, breast, ovary, bladder, and thyroid. This syndrome is

caused by mutations in the *MUTYH* gene (which is involved in “proofreading” the DNA and fixing any mistakes) and often leads to cancer at a younger age.
- **Cystic fibrosis (CF):** CF is an inherited condition in which the cells in some body organs make mucus that is thicker and stickier than normal. This can lead to health problems, especially in the lungs and pancreas. As better medical care has helped people with CF live longer, it’s become clear that people with CF are also at increased risk for colorectal cancer, which usually occurs at a much earlier age than in people without the condition. The risk for colorectal cancer is even higher in people who have had an organ transplant, such as a lung transplant. CF is caused by mutations in the *CFTR* gene.

Since many of these syndromes are linked to colorectal cancer at a young age and other types of cancer, identifying families with these inherited syndromes is important. It lets doctors recommend specific steps such as screening and other preventive measures when the person is younger. Information on risk assessment, and genetic counseling and testing for many of these syndromes can be found in Genetic Testing, Screening, and Prevention for People with a Strong Family History of Colorectal Cancer.

Colorectal Cancer Signs and Symptoms

Colorectal cancer might not cause symptoms right away, but if it does, it may cause one or more of these symptoms.

Common signs and symptoms of colorectal cancer

- A change in bowel habits, such as diarrhea, constipation, or narrowing of the stool, that lasts for more than a few days
- A feeling that you need to have a bowel movement that’s not relieved by having one
- Rectal bleeding with bright red blood
- Blood in the stool, which might make the stool look dark brown or black
- Cramping or abdominal (belly) pain
- Weakness and fatigue
- Unintended weight loss

Colorectal cancers can often bleed into the digestive tract. Sometimes the blood can be seen in the stool or make it look darker, but often the stool looks normal. But over time, the blood loss can build up and can lead to low red blood cell counts (anemia). Sometimes the first sign of colorectal cancer is a blood test showing a low red blood cell count.

Signs of colorectal cancer that has spread
Some people may have signs that the cancer has spread to the liver with a large liver felt on exam, jaundice (yellowing of the skin or whites of the eyes), or trouble breathing from cancer spread to the lungs.

Do colon polyps cause symptoms?
Most people with polyps will not have any symptoms. However, some people may have symptoms from polyps, such as:

- Bleeding from the rectum
- Change in stool color, either red or black
- Change in bowel movement, either prolonged constipation or diarrhea
- Low red blood cell count due to low iron (iron deficiency anemia)
- Abdominal (belly) pain

These symptoms can also be due to other causes, such as foods, medicines, or other medical conditions. If these symptoms are present, you should discuss further with your doctor.

Tests to Diagnose and Stage Colorectal Cancer
If you have symptoms that might be from colorectal cancer, or if a screening test shows something abnormal, your doctor will recommend one or more of the exams and tests below to find the cause.

Medical history and physical exam
Your doctor will ask about your medical history to learn about possible risk factors, including your family history. You will also be asked if you're having any symptoms and, if so, when they started and how long you've had them.

As part of a physical exam, your doctor will feel your abdomen for masses or enlarged organs, and also examine the rest of your body. You may also have a digital rectal exam (DRE). During this test, the doctor inserts a lubricated, gloved finger into your rectum to feel for any abnormal areas.

Tests to look for blood in your stool
If you are seeing the doctor because of anemia or symptoms you are having (other than obvious bleeding from your rectum or blood in your stools), a stool test might be recommended to check for blood that isn't visible to the naked eye (occult blood), which might be a sign of cancer. These types of tests – a fecal occult blood test (FOBT) or fecal immunochemical test (FIT) – are done at home and require you to collect 1 to 3 samples of stool from bowel movements. For more on how these tests are done, see Colorectal Cancer Screening Tests.

(A stool blood test should **not** be the next test done if you've already had an abnormal screening test, in which case you should have a diagnostic colonoscopy, which is described below.)

Blood tests
Your doctor might also order certain blood tests to help determine if you have colorectal cancer. These tests also can be used to help monitor your disease if you've been diagnosed with cancer.

Complete blood count (CBC): This test measures the different types of cells in your blood. It can show if you have anemia (too few red blood cells). Some people with colorectal cancer become anemic because the tumor has been bleeding for a long time.

Liver enzymes: You may also have a blood test to check your liver function, because colorectal cancer can spread to the liver.

Tumor markers: Colorectal cancer cells sometimes make substances called tumor markers that can be found in the blood. The most common tumor marker for colorectal cancer is the carcinoembryonic antigen (CEA).

Blood tests for this tumor marker can sometimes suggest someone might have colorectal cancer, but they can't be used alone to screen for or diagnose cancer. This is because tumor marker levels can sometimes be normal in someone who has cancer and can be abnormal for reasons other than cancer.

Tumor marker tests are used most often along with other tests to monitor patients who have already been diagnosed with colorectal cancer and are receiving treatment. They may help show how well treatment is working or provide an early warning that a cancer has returned.

Diagnostic colonoscopy

A diagnostic colonoscopy is just like a screening colonoscopy, but it's done because a person is having symptoms, or because something abnormal was found on another type of screening test.

For this test, the doctor looks at the entire length of the colon and rectum with a colonoscope, a thin, flexible, lighted tube with a small video camera on the end. It is inserted through the anus and into the rectum and the colon. Special instruments can be passed through the colonoscope to biopsy or remove any suspicious-looking areas such as polyps, if needed.

Colonoscopy may be done in a hospital outpatient department or in a surgery clinic.

To learn more about colonoscopy, how it's done, and what to expect if you have one, see Colonoscopy.

Proctoscopy

This test may be done if rectal cancer is suspected. For this test, the doctor looks inside the rectum with a proctoscope, a thin, rigid, lighted tube with a small video camera on the end. It's put in through the anus. The doctor can look closely at the inside lining of the rectum through the scope. The tumor can be seen, measured, and its exact location can be determined. For instance, the doctor can see how close the tumor is to the sphincter muscles that control the passing of stool.

Biopsy

If a suspected colorectal tumor is found during a screening or diagnostic test, it usually is biopsied. In a biopsy, the doctor removes a small piece of tissue with a special instrument passed through the scope. Less often, part of the colon may need to be surgically removed to make the diagnosis. See Biopsy and Cytology Tests for Cancer to learn more about the types of biopsies, how the tissue is used in the lab to diagnose cancer, and what the results may show.

Lab tests of biopsy samples

Biopsy samples (from colonoscopy or surgery) are sent to the lab where they are looked at closely. If cancer is found, other lab tests may also be done on the biopsy samples to help better classify the cancer and guide specific treatment options. These are biomarker tests that look for genes, proteins, and other substances that can reveal important details about a person's cancer. Learn more in Biomarker Tests and Cancer Treatment.

Molecular tests: If the cancer is advanced, the cancer cells will probably be tested for specific gene and protein changes that might help tell if targeted therapy drugs could be options for treatment. For example, the cancer cells are typically tested for changes (mutations) in the ***KRAS, NRAS*, and *BRAF* genes**, as well as other gene and protein changes.

- If the cancer cells are *not* found to have a mutation(s) in the *KRAS, NRAS*, or *BRAF* genes, then treatment with drugs that target EGFR proteins might be helpful.
- If the cancer cells are found to have a mutation in the *BRAF* gene, known as **BRAF V600E**, then treatment with drugs that target the BRAF and EGFR proteins might be helpful.
- Some colorectal cancers that don't have mutations in the *KRAS, NRAS,* or *BRAF* genes might be tested to see if they make too much of the **HER2 protein**. For these cancers, treatment with drugs that target HER2 might be helpful.
- Colorectal cancers that don't have mutations in the *KRAS, NRAS*, or *BRAF* genes might also be tested for changes in the ***NTRK* genes**. These gene changes can lead to abnormal cell growth. For cancers that have one of these gene changes, drugs that target the proteins coded for by the *NTRK* genes might be helpful.

For more on the targeted drugs that might be used, see Targeted Therapy Drugs for Colorectal Cancer.

MSI and MMR testing: Colorectal cancer cells are also typically tested to see if they have high numbers of gene changes called *microsatellite instability* (MSI). Testing might also be done to check for changes in any of the mismatch repair (MMR) genes (*MLH1*, *MSH2*, *MSH6*, and *PMS2*) or the proteins they encode. *EPCAM*, another gene, is also routinely checked.

Changes in MSI or in MMR genes (or both) are often seen in people with Lynch syndrome (HNPCC). Most colorectal cancers do not have high levels of MSI or changes in MMR genes. But most colorectal cancers that are linked to Lynch syndrome do.

There are 2 possible reasons to test colorectal cancers for MSI or for MMR gene changes:

- To determine if certain immunotherapy drugs might be options for treatment
- To identify people who should be tested for Lynch syndrome. People with Lynch syndrome are at higher risk for some other cancers, so they are typically advised to get other cancer screenings (for example, women with Lynch syndrome may need to be screened for endometrial cancer). Also, if a person has Lynch syndrome, their relatives could have it as well, and may want to be tested for it.

For more on lab tests that might be done on biopsy samples, see Colon and Rectal Pathology.

Imaging tests to look for colorectal cancer

Imaging tests use sound waves, x-rays, magnetic fields, or radioactive substances to create pictures of the inside of your body. Imaging tests may be done for a number of reasons, such as:

- To look at suspicious areas that might be cancer
- To learn how far cancer might have spread
- To help determine if treatment is working
- To look for signs of cancer coming back after treatment

Computed tomography (CT or CAT) scan

A CT scan uses x-rays to make detailed cross-sectional images of your body. This test can help tell if colorectal cancer has spread to nearby lymph nodes or to your liver, lungs, or other organs.

CT-guided needle biopsy: If a biopsy is needed to check for cancer spread, this test can also be used to guide a biopsy needle into the mass (lump) to get a tissue sample to check for cancer.

Ultrasound

Ultrasound uses sound waves and their echoes to create images of the inside of the body. A small microphone-like instrument called a **transducer** gives off sound waves and picks up the echoes as they bounce off organs. The echoes are converted by a computer into an image on a screen.

Abdominal ultrasound: For this exam, a technician moves the transducer along the skin over your abdomen. This type of ultrasound can be used to look for tumors in your liver, gallbladder, pancreas, or elsewhere in your abdomen, but it can’t look for tumors of the colon or rectum.

Endorectal ultrasound: This test uses a special transducer that is inserted into the rectum. It is used to see how far through the rectal wall a cancer has grown and whether it has reached nearby organs or lymph nodes.

Intraoperative ultrasound: This exam is done during surgery. The transducer is placed directly against the surface of the liver, making this test very useful for detecting the spread of colorectal cancer to the liver. This allows the surgeon to biopsy the tumor, if one is found, while the patient is asleep.

Magnetic resonance imaging (MRI) scan

Like CT scans, MRI scans show detailed images of soft tissues in the body. But MRI scans use radio waves and strong magnets instead of x-rays. A contrast material called *gadolinium* may be injected into a vein before the scan to get clear pictures.

MRI can be used to look at abnormal areas in the liver or the brain and spinal cord that could be cancer spread.

Endorectal MRI: An MRI scan of the pelvis can be used in patients with rectal cancer to see if the tumor has spread into nearby structures. To improve the accuracy of the test, some doctors use an endorectal MRI. For this test, the doctor places a probe, called an *endorectal coil*, inside the rectum. This stays in place for 30 to 45 minutes during the test and might be uncomfortable. The endorectal MRI helps stage rectal cancer and guides decision-making in regard to surgery and treatment.

Chest x-ray

An x-ray might be done after colorectal cancer has been diagnosed to see if cancer has spread to the lungs, but more often a CT scan of the lungs is done since it tends to give more detailed pictures.

Positron emission tomography (PET) scan

For a PET scan, a slightly radioactive form of sugar (known as FDG) is injected into the blood and collects mainly in cancer cells. PET scans are generally done to help see if the cancer has spread to other parts of the body, outside of the colon or rectum. However, they do not show if cancer has spread to the brain.

Angiography

Angiography is an x-ray test for looking at blood vessels. A contrast dye is injected into an artery, and then x-rays are taken. The dye outlines the blood vessels on x-rays.

If your cancer has spread to the liver, this test can show the arteries that supply blood to those tumors. This can help surgeons decide if the liver tumors can be removed and if so, it can help plan the operation. Angiography can also help in planning other treatments for cancer spread to the liver, like embolization.

Can Colorectal Cancer Be Prevented?

There's no sure way to prevent colorectal cancer, but screening can find abnormal cells before they become cancer. You might also be able to lower your risk for colorectal cancer by changing the risk factors that you can control.

Colorectal cancer screening

Screening is the process of looking for cancer or precancer in people who have no symptoms of the disease. Regular colorectal cancer screening is one of the most powerful tools for preventing colorectal cancer.

From the time the first abnormal cells start to grow into polyps, it usually takes about 10 to 15 years for them to develop into colorectal cancer. With regular screening, most polyps can be found and removed before they have the chance to turn into cancer. Screening can also find colorectal cancer early, when it's small, hasn't spread, and treatment is more likely to be successful.

If you're age 45 or older, you should start getting screened for colorectal cancer. Several types of tests can be used. Talk to your health care provider about which ones might be good options for you. No matter which test you choose, the most important thing is to get tested.

If you have a strong family history of colorectal polyps or cancer, talk with your doctor about your risk. You might benefit from genetic counseling to review your family medical tree to see how likely it is that you have a family cancer syndrome.

Body weight, physical activity, and diet

You might be able to lower your risk of colorectal cancer by managing your diet and physical activity.

Weight: Excess body weight (overweight or obesity) increases the risk of colorectal cancer in both men and women, but the link seems to be stronger in men. **Staying at a healthy weight may help lower your risk**.

Physical activity: Being more active lowers your risk of colorectal cancer and polyps. Regular moderate to vigorous activity can lower the risk. **Increasing the amount and intensity of your physical activity may help reduce your risk.**

Diet: Overall, diets that are high in vegetables, fruits, and whole grains, and low in red and processed meats, probably lower colorectal cancer risk, although it's not exactly clear which factors are important. Many studies have found a link between red meats (beef, pork, and lamb) or processed meats (such as hot dogs, sausage, and lunch meats) and increased colorectal cancer risk.

In recent years, some large studies have shown conflicting evidence that fiber in the diet lowers colorectal cancer risk. Research in this area is still under way.

Limiting red and processed meats and eating more vegetables, fruits, and whole grains may help lower your risk.

Alcohol: Several studies have found a higher risk of colorectal cancer with increased alcohol intake, especially among men. It is best not to drink alcohol. For people who do drink, they should have no more than 1 drink per day for women or two drinks per day for men. **Not drinking alcohol may help reduce your risk.**

For more about diet and physical activity, see the American Cancer Society Guidelines for Diet and Physical Activity for Cancer Prevention.

Quitting smoking

Long-term smoking is linked to an increased risk of colorectal cancer, as well as many other cancers and health problems. **Quitting smoking may help lower you risk of colorectal cancer and many other types of cancer, too.** If you smoke and would like help quitting, call the American Cancer Society at 1-800-227-2345.

Vitamins, calcium, and magnesium

Some studies suggest that taking a daily multivitamin containing folic acid may lower colorectal cancer risk, but not all studies have found this. In fact, some studies have hinted that folic acid might help existing tumors grow. More research is needed in this area.

Some studies have suggested that vitamin D, which you can get from sun exposure, in certain foods, or in a vitamin pill, might lower colorectal cancer risk. Studies have shown that low vitamin D levels are associated with an increased risk of colorectal cancer, as well as other cancers. Because of concerns that excess sun exposure can cause skin cancer, most experts do not recommend this as a way to lower colorectal cancer risk at this time. More studies are needed to determine if increasing vitamin D intake from a supplement can help prevent colorectal cancer. It is best to talk with your doctor about whether your vitamin D level should be tested.

Low levels of dietary calcium have been linked with an increased risk of colorectal cancer in some studies. Others suggest that increasing calcium intake may lower the risk for the recurrence of colorectal adenomas. Calcium is important for a number of health reasons aside from possible effects on cancer risk. But because of the possible increased risk of prostate cancer in men with high calcium/dairy product intake, and the possible lower risk of other cancers like colorectal cancer and breast cancer, the American Cancer Society does not have any specific recommendations regarding dairy food consumption for cancer prevention.

Calcium and vitamin D might work together to reduce colorectal cancer risk, as vitamin D aids in the body’s absorption of calcium. Still, not all studies have found that supplements of these nutrients reduce risk.

A few studies have found a possible link between a diet that's high in magnesium and reduced colorectal cancer risk, especially among women. More research is needed to determine if this link exists.

Nonsteroidal anti-inflammatory drugs (NSAIDs)

Many studies have found that people who regularly take aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil) and naproxen (Aleve), have a lower risk of colorectal cancer and polyps.

But aspirin and other NSAIDs can cause serious or even life-threatening side effects, such as bleeding from stomach irritation or stomach ulcers, which may outweigh the benefits of these medicines for the general public. For this reason, the American Cancer Society does not recommend taking NSAIDs just to lower colorectal cancer risk if you are at average risk.

Still, for some people in their 50s who have a high risk of heart disease, where low-dose aspirin is found to be beneficial, the aspirin may also have the added benefit of reducing the risk of colorectal cancer.

Because aspirin or other NSAIDs can have serious side effects, check with your doctor before starting any of them on a regular basis.

Hormone replacement therapy for women

Some studies have shown that taking estrogen and progesterone after menopause (sometimes called **menopausal hormone therapy** or **combined hormone replacement therapy**) may reduce a woman's risk of developing colorectal cancer, but other studies have not.

Because taking estrogen and progesterone after menopause can also increase a woman's risk of heart disease, blood clots, and cancers of the breast and lung, it's not commonly recommended just to lower colorectal cancer risk.

If you're considering using menopausal hormone therapy, be sure to discuss the risks and benefits with your doctor.