

Colorectal Cancer

What is colorectal cancer?

Colorectal cancer is a cancer that starts in the colon or the rectum. These cancers can also be named 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.

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer, and can spread to other areas of the body. To learn more about how cancers start and spread, see *What Is Cancer?*

How does colorectal cancer start?

Most colorectal cancers begin as a growth on the inner lining of the colon or rectum called a *polyp*. Some types of polyps can change into cancer over the course of several years, but not all polyps become cancer. The chance of changing into a cancer depends on the kind of polyp. The 2 main types of polyps are:

- Adenomatous polyps (adenomas): These polyps sometimes change into cancer. Because of this, adenomas are called a *pre-cancerous condition*.
- Hyperplastic polyps and inflammatory polyps: These polyps are more common, but in general they are not pre-cancerous.

Dysplasia, another pre-cancerous condition, is an area in a polyp or in the lining of the colon or rectum where the cells look abnormal (but not like true cancer cells).

For more detailed information on the types of polyps and conditions that can lead to colorectal cancer, see *Understanding Your Pathology Report: Colon Polyps*

If cancer forms in a polyp, it can eventually begin to grow into the wall of the colon or rectum.

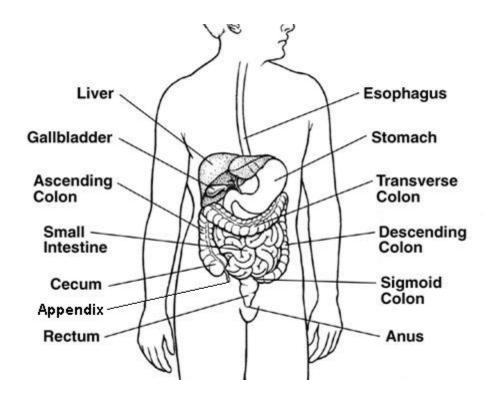
The wall of the colon and rectum is made up of several layers. Colorectal cancer starts in the innermost layer (the mucosa) and can grow through some or all of the other layers. When cancer cells are in the wall, they can then grow into blood vessels or lymph vessels (tiny channels that carry away waste 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 information on staging, see "Colorectal cancer stages"

The normal colon and rectum

The colon and rectum are parts of the digestive system, which is also called the *gastrointestinal (GI) system* (see illustration). The colon and rectum make up the large intestine (or large bowel). Most of the large intestine is made up of the colon, a muscular tube about 5 feet long. The colon absorbs water and salt from the remaining food matter after it goes through the small intestine (small bowel).

The waste matter that is left after going through the colon goes into the *rectum*, the final 6 inches of the digestive system, where it is stored until it passes out of the body through the *anus*.



Types of cancer in the colon and rectum

Adenocarcinomas make up more than 95% of colorectal cancers. These cancers start in cells that form glands that make mucus to lubricate the inside of the colon and rectum. When doctors talk about colorectal cancer, they are almost always talking about this type.

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

Carcinoid tumors start from specialized hormone-making cells in the intestine. They are discussed in *Gastrointestinal Carcinoid Tumors*.

Gastrointestinal stromal tumors (GISTs) start from specialized cells in the wall of the colon called the *interstitial cells of Cajal*. Some are non-cancerous (benign). These tumors can be found anywhere in the digestive tract, but it is unusual to find them in the colon. They are discussed in *Gastrointestinal Stromal Tumor (GIST)*.

Lymphomas are cancers of immune system cells that typically start in lymph nodes, but they can also start in the colon, rectum, or other organs. Information on lymphomas of the digestive system is included 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. They are discussed in *Sarcoma - Adult Soft Tissue Cancer*.

Key statistics for colorectal cancer

How common is colorectal cancer?

Excluding skin cancers, colorectal cancer is the third most common cancer diagnosed in both men and women in the United States. The American Cancer Society's estimates for the number of colorectal cancer cases in the United States for 2016 are:

- 95,270 new cases of colon cancer
- 39,220 new cases of rectal cancer

Lifetime risk of colorectal cancer

Overall, the lifetime risk of developing colorectal cancer is: about 1 in 21 (4.7%) for men and 1 in 23 (4.4%) for women. This risk is slightly lower in women than in men. A number of other factors (described in Colorectal cancer risk factors) can also affect your risk for developing colorectal cancer.

Deaths from colorectal cancer

Colorectal cancer is the third leading cause of cancer-related deaths in the United States when men and women are considered separately, and the second leading cause when both sexes are combined. It is expected to cause about **49,190 deaths during 2016**.

The death rate (the number of deaths per 100,000 people per year) from colorectal cancer has been dropping in both men and women for several decades. There are a number of likely reasons for this. One is that colorectal polyps are now being found more often by screening and removed before they can develop into cancers or are being found earlier when the disease is easier to treat. In addition, treatment for colorectal cancer has improved over the last few decades. As a result, there are now more than 1 million survivors of colorectal cancer in the United States.

Statistics related to survival among people with colorectal cancer are discussed in What are the survival rates for colorectal cancer, by stage?

Visit the American Cancer Society's Cancer Statistics Center for more key statistics.

Colorectal cancer risk factors

A risk factor is anything that affects your chance 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, 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.

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

Colorectal cancer risk factors you can change

Several lifestyle-related factors have been linked to colorectal cancer. In fact, the links between diet, weight, and exercise and colorectal cancer risk are some of the strongest for any type of cancer.

Being overweight or obese

If you are overweight or obese (very overweight), your risk of developing and dying from colorectal cancer is higher. Being overweight raises the risk of colon cancer in both men and women, but the link seems to be stronger in men.

Physical inactivity

If you are not physically active, you have a greater chance of developing colorectal cancer. Being more active might help lower your risk.

Certain types of diets

A diet that is high in red meats (such as beef, pork, lamb, or liver) and processed meats (such as hot dogs and some luncheon meats) can raise your colorectal cancer risk.

Cooking meats at very high temperatures (frying, broiling, or grilling) creates chemicals that might raise your cancer risk, but it's not clear how much this might increase your colorectal cancer risk.

Diets high in vegetables, fruits, and whole grains have been linked with a **lower** risk of colorectal cancer, but fiber supplements have not been shown to help.

It's not clear if other dietary components (for example, certain types of fats) affect colorectal cancer risk.

Smoking

People who have smoked for a long time are more likely than non-smokers to develop and die from colorectal cancer. Smoking is a well-known cause of lung cancer, but it is also linked to other cancers, like colorectal cancer. If you smoke and want to know more about quitting, see *Guide to Quitting Smoking*.

Heavy alcohol use

Colorectal cancer has been linked to heavy alcohol use. Limiting alcohol use to no more than 2 drinks a day for men and 1 drink a day for women could have many health benefits, including a lower risk of colorectal cancer.

Colorectal cancer risk factors you cannot change

Being older

Younger adults can develop colorectal cancer, but your chances increase markedly after you turn 50.

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 or if there are many of them.

If you have had colorectal cancer, even though it has been completely removed, you are more likely to develop new cancers in other areas 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 often develop *dysplasia*. Dysplasia is a term used to describe cells in the lining of the colon or rectum that look abnormal (but not like true cancer cells) when seen with a microscope. These cells can change into cancer over time.

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

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

A family history of colorectal cancer or adenomatous polyps

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 45, 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.

Most people with colorectal cancer have no family history of colorectal cancer. Still, as many as 1 in 5 people who develop colorectal cancer have other family members who have been affected by this disease.

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 cancerous.)

If you have a family history of adenomatous polyps or colorectal cancer, talk with your doctor about the possible need to begin screening before age 50. If you have 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% to 10% of people who develop colorectal cancer have inherited gene defects (mutations) that can cause family cancer syndromes and lead to them getting the disease. The most common inherited syndromes linked with colorectal cancers are familial adenomatous polyposis (FAP) and Lynch syndrome (hereditary non-polyposis colorectal cancer, or HNPCC), but other rarer syndromes can also increase colorectal cancer risk.

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

In the most common type of FAP, hundreds or thousands of polyps develop in a person's colon and rectum, usually in their teens or early adulthood. Cancer usually develops in 1 or more of these polyps as early as age 20. By age 40, almost all people with this disorder will have developed colon cancer if the colon isn't removed first to prevent it. People with FAP are also at increased risk for cancers of the stomach, small intestines, and some other organs.

In **attenuated FAP**, which is a subtype of this disorder, patients have fewer polyps (less than 100), and colorectal cancer tends to occur at a later age.

Gardner syndrome is a type of FAP that also has non-cancerous tumors of the skin, soft tissue, and bones.

Lynch syndrome (hereditary non-polyposis colon cancer, or HNPCC): Lynch syndrome 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* or *MSH2* gene, but changes in other genes can also cause Lynch syndrome. These genes normally help repair DNA damage. (See Do we know what causes colorectal cancer? for more details.)

People with this syndrome develop cancers when they are relatively young, although not as young as in FAP. People with Lynch syndrome may have polyps, but they tend to only have a few, not hundreds as in FAP. The lifetime risk of colorectal cancer in people with this condition may be as high as 80%, although 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, brain, ureters (tubes that carry urine from the kidneys to the bladder), and bile duct.

For more information on Lynch syndrome, see Do we know what causes colorectal cancer? and Can colorectal cancer be prevented?

Turcot syndrome: This is a rare inherited condition in which people have a higher risk of adenomatous polyps and colorectal cancer, as well as brain tumors. There are actually 2 types of Turcot syndrome:

- One is caused by gene changes similar to those seen in FAP, in which cases the brain tumors are medulloblastomas.
- The other is caused by gene changes similar to those seen in Lynch syndrome, in which cases the brain tumors are glioblastomas.

Peutz-Jeghers syndrome: People with this rare inherited condition tend to have freckles around the mouth (and sometimes on the hands and feet) and a special type of polyp in their digestive tracts (called *hamartoma*). These people are at greatly increased risk for colorectal cancer, as well as several other cancers, which usually appear at a younger than normal age. This syndrome is caused by mutations in the *STK1* gene.

MUTYH-associated polyposis: People with this syndrome develop colon polyps which will become cancerous if the colon is not removed. These people also have an increased risk of cancers of the small intestine, skin, ovary, and bladder. This syndrome is caused by mutations in the *MUTYH* gene.

These syndromes often lead to cancer at a younger age than is usual. They are also linked to some other types of cancer. Identifying families with these inherited syndromes is important because 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 these syndromes can be found in *Colorectal Cancer Prevention and Early Detection*.

Your racial and ethnic background

African Americans have the highest colorectal cancer incidence and mortality rates of all racial groups in the United States. The reasons for this are not yet understood.

Jews of Eastern European descent (Ashkenazi Jews) have one of the highest colorectal cancer risks of any ethnic group in the world. Several gene mutations leading to an increased risk of colorectal cancer have been found in this group. The most common of these gene changes, called the *I1307K APC mutation*, is present in about 6% of American Jews.

Having type 2 diabetes

People with type 2 (usually non-insulin dependent) diabetes have an increased risk of colorectal cancer. Both type 2 diabetes and colorectal cancer share some of the same risk factors (such as being overweight or obese). 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.

Factors with unclear effects on colorectal cancer risk

Night shift work

Results of one study suggested working a night shift at least 3 nights a month for at least 15 years may increase the risk of colorectal cancer in women. The study authors suggested this might be due to changes in levels of melatonin (a hormone that responds to changes in light) in the body. More research is needed to confirm or refute this finding.

Previous treatment for certain cancers

Some studies have found that men who survive testicular cancer seem to have a higher rate of colorectal cancer and some other cancers. This might be because of the treatments they have received.

Several studies have suggested 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.

Do we know what causes colorectal cancer?

Researchers have found several factors that can increase a person's risk of colorectal cancer, but it's not yet clear exactly how all of these factors might cause this cancer.

Cancer is caused by changes in the DNA inside cells. DNA is the chemical in our cells that makes up our genes, which control how our cells function. We usually look like our parents because they are the source of our DNA. But DNA affects more than just how we look.

Some genes help control when our cells grow, divide into new cells, and die:

- Certain genes that help cells grow, divide, and stay alive are called *oncogenes*.
- Genes that help keep cell division under control or cause cells to die at the right time are called *tumor suppressor genes*.

Cancers can be caused by DNA mutations (defects) that turn on oncogenes or turn off tumor suppressor genes. Changes in several different genes are usually needed to cause colorectal cancer.

Inherited gene mutations

Some DNA mutations can be passed from generation to generation and are found in all cells in the body. When this happens, we say the mutations are *inherited*. A small portion of colorectal cancers are caused by inherited gene mutations. Many of these DNA changes and their effects on the growth of cells are now known. For example:

- Familial adenomatous polyposis (FAP) and Gardner syndrome are caused by inherited changes in the APC gene. The APC gene is a tumor suppressor gene; it normally helps keep cell growth in check. In people with inherited changes in the APC gene, this "brake" on cell growth is turned off, causing hundreds of polyps to form in the colon. Over time, cancer will nearly always develop in one or more of these polyps because new gene mutations occur in the cells of the polyps.
- Lynch syndrome (hereditary non-polyposis colon cancer, or HNPCC) is caused by changes in genes that normally help a cell repair faulty DNA. A mutation in one of the DNA repair enzyme genes like *MLH1*, *MSH2*, *MLH3*, *MSH6*, *PMS1*, or *PMS*, can allow DNA errors to go uncorrected. These errors will sometimes affect growth-regulating genes, which may lead to the development of cancer. *TGFBR2* is another gene linked to HNPCC. It helps regulate cell growth.
- **Peutz-Jeghers syndrome** is caused by inherited changes in the *STK11* gene. This seems to be a tumor suppressor gene.

Genetic tests can detect gene mutations associated with these inherited syndromes. If you have a family history of colorectal polyps or cancer or other symptoms linked to these syndromes, you may want to ask your doctor about genetic counseling and genetic testing. The American Cancer Society recommends discussing genetic testing with a qualified cancer genetics professional before any genetic testing is done. For more on this, see *Genetic Testing: What You Need to Know*.

Acquired gene mutations

Some gene mutations happen during a person's lifetime and are not passed on. They affect only cells that come from the original mutated cell. These DNA changes are due to *acquired* mutations.

In most cases of colorectal cancer, the DNA mutations that lead to cancer are acquired during a person's life rather than having been inherited. Certain risk factors probably play a role in causing these acquired mutations, but so far it's not known what causes most of them.

There doesn't seem to be a single genetic pathway to colorectal cancer that is the same in all cases. In many cases, the first mutation occurs in the *APC* gene. This leads to an increased growth of colorectal cells because of the loss of this "brake" on cell growth. Further mutations may then occur in genes such as *KRAS*, *TP53*, and *SMAD4*. These changes can

lead the cells to grow and spread uncontrollably. Other genes that aren't known yet are probably involved as well.

For more about how genes changes can lead to cancer, see Genes and Cancer.

Can colorectal cancer be prevented?

There is no sure way to prevent colorectal cancer. But there are things you can do that might help lower your risk, such as changing the risk factors that you can control.

Colorectal cancer screening

Screening is the process of looking for cancer or pre-cancer in people who have no symptoms of the disease. Regular colorectal cancer screening is one of the most powerful weapons 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 is highly curable.

Screening is recommended starting at age 50 for people who are not at increased risk of colorectal cancer. There are several different screening options available. People at higher risk, such as those with a strong family history of colorectal cancer, might benefit from starting screening at a younger age.

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.

For more about screening (including the American Cancer Society guidelines for the early detection of colorectal cancer) and genetic counseling and testing, see *Colorectal Cancer Prevention and Early Detection*.

Body weight, physical activity, and diet

At this time, the best advice about diet and activity to possibly reduce your risk of colorectal cancer is to:

- Avoid obesity and weight gain around the midsection.
- Increase the intensity and amount of your physical activity.
- Limit red and processed meats.
- Eat more vegetables and fruits.

- Get the recommended levels of calcium and vitamin D (see below).
- Avoid excess alcohol.

Weight: Being overweight or obese increases the risk of colorectal cancer in both men and women, but the link seems to be stronger in men. Having more belly fat (that is, a larger waistline) has also been linked to colorectal cancer.

Physical activity: Increasing your level of activity lowers your risk of colorectal cancer and polyps. Regular moderate activity (doing things that make you breathe as hard as you would during a brisk walk) lowers the risk, but vigorous activity might have an even greater benefit.

Diet: Overall, diets that are high in vegetables, fruits, and whole grains (and low in red and processed meats) have been linked with 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 suggested that fiber in the diet, especially from whole grains, may lower colorectal cancer risk. Research in this area is still under way.

Alcohol: Several studies have found a higher risk of colorectal cancer with increased alcohol intake, especially among men.

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

Not smoking

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

Vitamins, calcium, and magnesium

Some studies suggest that taking a daily multi-vitamin containing folic acid, or folate, 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. 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.

Other studies suggest that increasing calcium intake may lower colorectal cancer risk. 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 intake, the American Cancer Society does not recommend increasing calcium intake specifically to try to lower cancer risk.

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 is high in magnesium and reduced colorectal cancer risk, especially among women. More research is needed to determine if this link exists.

You should talk with your doctor or a member of your health care team if you want to know more about taking these supplements.

Non-steroidal anti-inflammatory drugs (NSAIDs)

Many studies have found that people who regularly take aspirin or other non-steroidal antiinflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil) and naproxen (Aleve), have a lower risk of colorectal cancer and polyps. Most of these studies looked at people who took these medicines for reasons such as to treat arthritis or prevent heart attacks. Other, stronger studies have provided evidence that aspirin can help prevent the growth of polyps in people who were previously treated for early stages of colorectal cancer or who had polyps removed.

But aspirin and other NSAIDs can cause serious or even life-threatening side effects such as bleeding from stomach irritation, which may outweigh the benefits of these medicines for the general public. For this reason, most experts don't recommend taking NSAIDs just to lower colorectal cancer risk if you are someone at average risk. However, the other possible benefits of aspirin, such as lowering the risk of some types of heart disease, might outweigh the risks in certain groups of people, such as those at higher risk for heart disease.

The value of aspirin and similar drugs for people at increased colorectal cancer risk is being studied. Celecoxib (Celebrex) has been approved by the US Food and Drug Administration (FDA) for reducing polyps in people with familial adenomatous polyposis (FAP). This drug may cause less bleeding in the stomach than other NSAIDs, but it may increase the risk of heart attacks and strokes.

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

Hormone replacement therapy for women

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 cancers found in women taking these hormones after menopause may be at a more advanced stage.

Taking estrogen and progesterone after menopause also lowers the risk of osteoporosis (bone thinning). But it can also increase a woman's risk of heart disease, blood clots, and cancers of the breast and lung.

If you are considering using menopausal hormone therapy, be sure to discuss the pros and cons with your doctor.

Can colorectal polyps and cancer be found early?

Why is it important to find colorectal cancer early?

Screening is the process of looking for cancer or pre-cancer in people who have no symptoms of the disease. Regular screening can often find colorectal cancer early, when it is most likely to be curable.

In many people, screening can also prevent colorectal cancer by finding and removing polyps before they have the chance to turn into cancer.

What tests are used to screen for colorectal cancer?

Tests used to screen for colorectal cancer include:

- Guaiac-based fecal occult blood test (gFOBT) and fecal immunochemical test (FIT): Samples of stool (feces) are checked for blood, which might be a sign of a polyp or cancer.
- **Stool DNA test:** A sample of stool is checked for certain abnormal sections of DNA (genetic material) from cancer or polyp cells.
- **Sigmoidoscopy:** A flexible, lighted tube is put into the rectum and lower colon to check for polyps and cancer.
- Colonoscopy: A longer, flexible tube is used to look at the entire colon and rectum.
- **Double-contrast barium enema:** This is an x-ray test of the colon and rectum.
- **CT colonography** (**virtual colonoscopy**): This is a type of CT scan of the colon and rectum.

gFOBT, FIT, and stool DNA testing mainly find cancer, but can find some polyps.

Sigmoidoscopy, colonoscopy, double contrast barium enema, and CT colonography are good at finding both cancer and polyps. These tests are preferred if they are available and you are willing to have them.

For most adults, the American Cancer Society recommends starting screening with one of these tests at age 50. Some people at higher risk for colorectal cancer might need to start screening earlier.

For more about these tests and their use in finding colorectal cancer early, see *Colorectal Cancer Prevention and Early Detection*.

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:

- 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 is not relieved by doing so
- Rectal bleeding
- Blood in the stool, which may make it look dark
- Cramping or abdominal (belly) pain
- Weakness and fatigue
- Unintended weight loss

Colorectal cancers can often bleed into the digestive tract. While sometimes the blood can be seen in the stool or make it look darker, 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.

Most of these problems are more often caused by conditions other than colorectal cancer, such as infection, hemorrhoids, or irritable bowel syndrome. Still, if you have any of these problems, it's important to see your doctor right away so the cause can be found and treated, if needed.

Tests for colorectal cancer

Colorectal cancer is often found after symptoms appear, but most people with early colorectal cancer don't have symptoms of the disease. This is why it's important to get the

recommended screening tests (described in *Colorectal Cancer Prevention and Early Detection*) before any symptoms develop.

If your doctor finds something suspicious during a screening exam, or if you have possible symptoms of colorectal cancer, your doctor will recommend exams and tests 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. He or she may also test your stool to see if it contains blood that isn't visible to the naked eye (occult blood).

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 markers for colorectal cancer are carcinoembryonic antigen (CEA) and CA 19-9.

Blood tests for these tumor markers can sometimes suggest someone might have colorectal cancer, but they can't be used alone to 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 markers are used most often along with other tests to monitor patients who already have been diagnosed with colorectal cancer. They may help show how well treatment is working or provide an early warning of a cancer that has returned.

If symptoms or the results of the physical exam or blood tests suggest that you might have colorectal cancer, your doctor could recommend more tests. This most often is colonoscopy, but sometimes other tests may be done first.

Colonoscopy

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, in a clinic, or in a doctor's office.

To learn more about colonoscopy, how it's done, and what to expect if you have one, see Frequently Asked Questions About Colonoscopy and Sigmoidoscopy

Biopsy

Usually if a suspected colorectal cancer is found by any screening or diagnostic test, it is biopsied during a colonoscopy. 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 *Testing Biopsy and Cytology Specimens 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 under a microscope. Other tests may suggest that colorectal cancer is present, but the only way to be sure is to look at the biopsy samples under a microscope.

If cancer is found, other lab tests may also be done on the biopsy specimens to help better classify the cancer.

Gene tests: Doctors may look for specific gene changes in the cancer cells that might affect how the cancer is best treated. For example, doctors now typically test the cells for changes in the *KRAS* and *NRAS* genes. Some doctors may also test for changes in the *BRAF* gene. Patients whose cancers have mutations in these genes do not benefit from treatment with certain targeted anti-cancer drugs.

MSI testing: Sometimes the cancer cells will be tested to see if they show gene changes called *microsatellite instability* (MSI). Most colorectal cancers do not have high levels of MSI. But most colorectal cancers that are linked to Lynch syndrome (HNPCC) do.

There are 2 possible reasons to test colorectal cancers for MSI:

- To identify patients who should be tested for Lynch syndrome. A diagnosis of Lynch syndrome can help plan other cancer screenings for the patient (for example, women with Lynch syndrome may need to be screened for uterine cancer). Also, if a patient has Lynch syndrome, their relatives could also have it, and may want to be tested for it.
- Knowing an early-stage colorectal cancer has MSI may change the way it is treated.

Some doctors suggest MSI testing only if a patient meets certain criteria. Others test all colorectal cancers for MSI, and still others decide based on the age of the patient or the stage of the cancer.

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 has spread
- To help determine if treatment is working

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 colon cancer has spread into your liver or other organs.

CT with portography: In this type of CT scan, contrast material is injected into the portal vein, the large vein leading into the liver from the intestine, to get a better look at colorectal cancer that has spread to the liver.

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 test 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.

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 penetrated and whether it has spread to nearby organs or tissues such as 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.

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 better see details.

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

Endorectal MRI: MRI scans can be used in patients with rectal cancers to see if the tumor has spread into nearby structures. This can help plan surgery and other treatments. To improve the accuracy of the test, some doctors use 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 can be uncomfortable.

Chest x-ray

An x-ray may be done after colorectal cancer has been diagnosed to see if cancer has spread to the lungs.

Positron emission tomography (PET) scan

For a PET scan, you are injected with a slightly radioactive form of sugar, which collects mainly in cancer cells. A special camera is then used to create a picture of areas of radioactivity in the body.

The picture from a PET scan is not as detailed as a CT or MRI scan, but it provides helpful information about whether abnormal areas seen on these other tests are likely to be cancerous or not.

If you have already been diagnosed with cancer, your doctor may use this test to see if the cancer has spread to lymph nodes or other parts of the body. A PET scan can also be useful if your doctor thinks the cancer may have spread but doesn't know where.

PET/CT scan: Some machines can do both a PET and CT scan at the same time. This lets the doctor compare areas of higher radioactivity on the PET scan with the more detailed picture of that area on the CT scan.

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.

Colorectal cancer stages

The *stage* of a cancer describes the extent of the cancer in the body. The stage is one of the most important factors in deciding how to treat the cancer and determining how successful treatment might be. For colorectal cancer, the stage is based on:

- How far the cancer has grown into the wall of the intestine
- If it has reached nearby structures
- If it has spread to the nearby lymph nodes or to distant organs

The stage of colorectal cancer is based on the results of physical exams, biopsies, and imaging tests (CT or MRI scan, x-rays, PET scan, etc.), which are described in "Tests for colorectal cancer," as well as the results of surgery.

- If the stage is based on the results of the physical exam, biopsy, and any imaging tests you have had, it is called a **clinical stage**.
- If you have surgery, the results can be combined with the factors used for the clinical stage to determine the **pathologic stage**.

Sometimes during surgery the doctor finds more cancer than was seen on imaging tests. This can lead to the pathologic stage being more advanced than the clinical stage.

Most patients with colorectal cancer have surgery, so the pathologic stage is most often used when describing the extent of this cancer. Pathologic staging is likely to be more accurate than clinical staging, as it allows your doctor to get a firsthand impression of the extent of your disease.

Understanding your colorectal cancer stage

The staging system most often used for colorectal cancer is the American Joint Committee on Cancer (AJCC) **TNM** system. The TNM system is based on 3 key pieces of information:

- How far the main (primary) **tumor** (**T**) has grown into the wall of the intestine and whether it has grown into nearby areas.
- If the cancer has spread to nearby (regional) lymph **nodes** (N). Lymph nodes are small bean-shaped collections of immune system cells to which cancers often spread first.
- If the cancer has spread (**metastasized**) to other organs of the body (**M**). Colorectal cancer can spread almost anywhere in the body, but the most common sites of spread are the liver and lungs.

Numbers or letters after T, N, and M provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once a person's T, N, and M categories have been determined, usually after surgery, this information is combined in a process called *stage grouping*, and an overall stage of 0, I, II, III, or IV is assigned. Some stages are subdivided with letters.

| Stage | Stage | Stage description |
|-------|-------------|---|
| | grouping | |
| 0 | Tis, N0, M0 | The cancer is in its earliest stage. This stage is also known as carcinoma in |
| | | situ or intramucosal carcinoma (Tis). It has not grown beyond the inner |
| | | layer (mucosa) of the colon or rectum. |
| 1 | T1 or T2, | The cancer has grown through the muscularis mucosa into the submucosa |
| | N0, M0 | (T1), and it may also have grown into the muscularis propria (T2). It has not |
| | | spread to nearby lymph nodes (N0). It has not spread to distant sites (M0). |
| IIA | T3, N0, M0 | The cancer has grown into the outermost layers of the colon or rectum but |
| | | has not gone through them (T3). It has not reached nearby organs. It has |
| | | not yet spread to nearby lymph nodes (N0) or to distant sites (M0). |
| IIB | T4a, N0, M0 | The cancer has grown through the wall of the colon or rectum but has not |
| | | grown into other nearby tissues or organs (T4a). It has not yet spread to |
| | | nearby lymph nodes (N0) or to distant sites (M0). |
| IIC | T4b, N0, M0 | The cancer has grown through the wall of the colon or rectum and is |
| | | attached to or has grown into other nearby tissues or organs (T4b). It has |
| | | not yet spread to nearby lymph nodes (N0) or to distant sites (M0). |
| | T1 or T2, | The cancer has grown through the mucosa into the submucosa (T1), and it |
| | N1, M0 | may also have grown into the muscularis propria (T2). It has spread to 1 to |
| | | 3 nearby lymph nodes (N1a/N1b) or into areas of fat near the lymph nodes |
| | | but not the nodes themselves (N1c). It has not spread to distant sites (M0). |
| IIIA | | OR |
| | T1, N2a, M0 | The cancer has grown through the mucosa into the submucosa (T1). It has |
| | | spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant sites (M0). |
| | T3 or T4a, | The cancer has grown into the outermost layers of the colon or rectum (T3) |
| | N1, M0 | or through the visceral peritoneum (T4a) but has not reached nearby |
| | | organs. It has spread to 1 to 3 nearby lymph nodes (N1a or N1b) or into |

| areas of fat near the lymph nodes but not the nodes themselves (N1c). I has not spread to distant sites (M0). OR T2 or T3, N2a, M0 The cancer has grown into the muscularis propria (T2) or into the outermost layers of the colon or rectum (T3). It has spread to 4 to 6 neallymph nodes (N2a). It has not spread to distant sites (M0). OR T1 or T2 N2b, M0 The cancer has grown through the mucosa into the submucosa (T1), and may also have grown into the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant sites (M0). |
|---|
| T2 or T3, N2a, M0 The cancer has grown into the muscularis propria (T2) or into the outermost layers of the colon or rectum (T3). It has spread to 4 to 6 nearlymph nodes (N2a). It has not spread to distant sites (M0). OR T1 or T2 N2b, M0 The cancer has grown through the mucosa into the submucosa (T1), and may also have grown into the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant sites (M0). |
| T2 or T3, N2a, M0 The cancer has grown into the muscularis propria (T2) or into the outermost layers of the colon or rectum (T3). It has spread to 4 to 6 neallymph nodes (N2a). It has not spread to distant sites (M0). OR T1 or T2 N2b, M0 The cancer has grown through the mucosa into the submucosa (T1), and may also have grown into the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant sites (M0). |
| OR T1 or T2 N2b, M0 T4a, N2a, M0 T4a, N2a, M0 The cancer has grown through the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant sites (M0). |
| Iymph nodes (N2a). It has not spread to distant sites (M0). OR T1 or T2 N2b, M0 T4a, N2a, M0 The cancer has grown through the mucosa into the submucosa (T1), and more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant significant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant significant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant significant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). |
| T1 or T2 N2b, M0 T4a, N2a, M0 The cancer has grown through the mucosa into the submucosa (T1), and more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant significant forms. |
| T1 or T2 N2b, M0 T4a, N2a, M0 The cancer has grown through the mucosa into the submucosa (T1), and may also have grown into the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant spread to 4 to 6 nearby lymph nodes (N2a). |
| M2b, M0 may also have grown into the muscularis propria (T2). It has spread to 7 more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant s (M0). |
| more nearby lymph nodes (N2b). It has not spread to distant sites (M0). T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant s (M0). |
| T4a, N2a, M0 The cancer has grown through the wall of the colon or rectum (including the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant s (M0). |
| the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant s (M0). |
| the visceral peritoneum) but has not reached nearby organs (T4a). It has spread to 4 to 6 nearby lymph nodes (N2a). It has not spread to distant s (M0). |
| (M0). |
| |
| |
| OR OR |
| T3 or T4a, The cancer has grown into the outermost layers of the colon or rectum (|
| IIIC N2b, M0 or through the visceral peritoneum (T4a) but has not reached nearby |
| organs. It has spread to 7 or more nearby lymph nodes (N2b). It has not |
| spread to distant sites (M0). |
| OR |
| T4b, N1 or The cancer has grown through the wall of the colon or rectum and is |
| N2, M0 attached to or has grown into other nearby tissues or organs (T4b). It has |
| spread to at least one nearby lymph node or into areas of fat near the |
| lymph nodes (N1 or N2). It has not spread to distant sites (M0). |
| IVA Any T, Any The cancer may or may not have grown through the wall of the colon or |
| N, M1a rectum (Any T). It might or might not have spread to nearby lymph node |
| (Any N). It has spread to 1 distant organ (such as the liver or lung) or dist |
| set of lymph nodes (M1a). |
| IVB Any T, Any The cancer might or might not have grown through the wall of the color |
| N, M1b rectum. It might or might not have spread to nearby lymph nodes. It has |
| spread to more than 1 distant organ (such as the liver or lung) or distant |
| of lymph nodes, or it has spread to distant parts of the peritoneum (the |
| lining of the abdominal cavity) (M1b). |

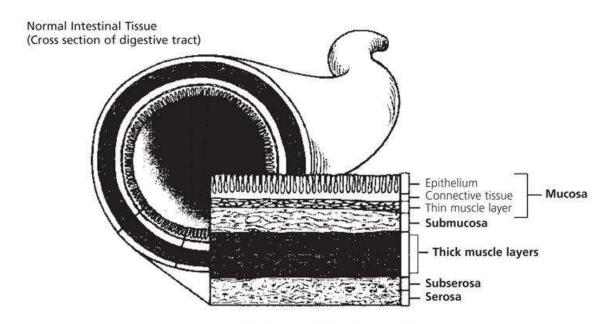
Colorectal cancer staging can be complex. If you have any questions about your stage, please ask your doctor to explain it to you in a way you understand.

Explaining the TNM system

T categories for colorectal cancer

T categories of colorectal cancer describe the extent of spread through the layers that form the wall of the colon and rectum. These layers, from the inner to the outer, include:

- The inner lining (mucosa), which is the layer in which nearly all colorectal cancers start. This includes a thin muscle layer (muscularis mucosa).
- The fibrous tissue beneath this muscle layer (submucosa)
- A thick muscle layer (muscularis propria)
- The thin, outermost layers of connective tissue (subserosa and serosa) that cover most of the colon but not the rectum



The layers of the colon wall

Tx: No description of the tumor's extent is possible because of incomplete information.

Tis: The cancer is in the earliest stage (in situ). It is only in the mucosa and has not grown beyond the muscularis mucosa (thin inner muscle layer).

T1: The tumor has grown through the muscularis mucosa and extends into the submucosa.

T2: The tumor has grown through the submucosa and extends into the muscularis propria (thick outer muscle layer).

T3: The tumor has grown through the muscularis propria and into the outermost layers of the colon or rectum but not through them. It has not reached any nearby organs or tissues.

T4a: The cancer has grown through the serosa (also known as the visceral peritoneum), the outermost lining of the intestines.

T4b: The cancer has grown through the wall of the colon or rectum and is attached to or invades into nearby tissues or organs.

N categories for colorectal cancer

N categories indicate if the cancer has spread to nearby lymph nodes and, if so, how many lymph nodes are involved. To get an accurate idea about lymph node involvement, most doctors recommend that at least 12 lymph nodes be removed during surgery and looked at under a microscope.

Nx: No description of lymph node involvement is possible because of incomplete information.

N0: No cancer in nearby lymph nodes.

N1: Cancer cells are found in or near 1 to 3 nearby lymph nodes

- N1a: Cancer cells are found in 1 nearby lymph node.
- N1b: Cancer cells are found in 2 to 3 nearby lymph nodes.
- N1c: Small deposits of cancer cells are found in areas of fat near lymph nodes, but not in the lymph nodes themselves.

N2: Cancer cells are found in 4 or more nearby lymph nodes

- N2a: Cancer cells are found in 4 to 6 nearby lymph nodes.
- N2b: Cancer cells are found in 7 or more nearby lymph nodes.

M categories for colorectal cancer

M categories indicate whether or not the cancer has spread (metastasized) to distant organs, such as the liver, lungs, or distant lymph nodes.

M0: No distant spread is seen.

M1a: The cancer has spread to 1 distant organ or set of distant lymph nodes.

M1b: The cancer has spread to more than 1 distant organ or set of distant lymph nodes, or it has spread to distant parts of the peritoneum (the lining of the abdominal cavity).

Colorectal cancer grades

Another factor that can affect your treatment and your outlook is the grade of your cancer. The grade describes how closely the cancer looks like normal tissue when seen under a microscope.

The scale used for grading colorectal cancers is from 1 to 4.

- Grade 1 (G1) means the cancer looks much like normal colorectal tissue.
- Grade 4 (G4) means the cancer looks very abnormal.
- Grades 2 and 3 (G2 and G3) fall somewhere in between.

The grade is often simplified as either low grade (G1 or G2) or high grade (G3 or G4).

Low-grade cancers tend to grow and spread more slowly than high-grade cancers. Most of the time, the outlook is better for low-grade cancers than it is for high-grade cancers of the same stage. Doctors sometimes use the grade to help decide whether a patient should get additional (adjuvant) treatment with chemotherapy after surgery (discussed in more detail in "Chemotherapy for colorectal cancer").

What are the survival rates for colorectal cancer, by stage?

Survival rates tell you what portion of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding about how likely it is that your treatment will be successful. Some people will want to know the survival rates for their cancer type and stage, and some people won't. If you don't want to know, you don't have to.

What is a 5-year survival rate?

Statistics on the outlook for a certain type and stage of cancer are often given as 5-year survival rates, but many people live longer – often much longer – than 5 years. The 5-year survival rate is the percentage of people who live at least 5 years after being diagnosed with cancer. For example, a 5-year survival rate of 90% means that an estimated 90 out of 100 people who have that cancer are still alive 5 years after being diagnosed. Keep in mind, however, that many of these people live much longer than 5 years after diagnosis.

Relative survival rates are a more accurate way to estimate the effect of cancer on survival. These rates compare people with colorectal cancer to people in the overall population. For example, if the 5-year relative survival rate for a specific type and stage of cancer is 90%, it means that people who have that cancer are, on average, about 90% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

But remember, the 5-year relative survival rates are estimates – your outlook can vary based on a number of factors specific to you.

Cancer survival rates don't tell the whole story

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can't predict what will happen in any particular person's case. There are a number of limitations to remember:

- The numbers below are among the most current available. But to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. As treatments are improving over time, people who are now being diagnosed with colorectal cancer may have a better outlook than these statistics show.
- These statistics are based on the stage of the cancer when it was first diagnosed. They do not apply to cancers that later come back or spread, for example.
- The outlook for people with colorectal cancer varies by the stage (extent) of the cancer in general, the survival rates are higher for people with earlier stage cancers. But many other factors can affect a person's outlook, such as age and overall health, and how well the cancer responds to treatment. The outlook for each person is specific to his or her circumstances.

Your doctor can tell you how these numbers may apply to you, as he or she is familiar with your particular situation.

Colon cancer survival rates, by stage

The numbers below come from the National Cancer Institute's SEER database, looking at people diagnosed with colon cancer between 2004 and 2010.

- The 5-year relative survival rate for people with stage I colon cancer is about 92%.
- For people with stage IIA colon cancer, the 5-year relative survival rate is about 87%. For stage IIB cancer, the survival rate is about 63%.
- The 5-year relative survival rate for stage IIIA colon cancers is about 89%. For stage IIIB cancers the survival rate is about 69%, and for stage IIIC cancers the survival rate is about 53%.
- Colon cancers that have spread to other parts of the body are often harder to treat and tend to have a poorer outlook. Metastatic, or stage IV colon cancers, have a 5-year relative survival rate of about 11%. Still, there are often many treatment options available for people with this stage of cancer.

These statistics are based on a previous version of the TNM staging system. In that version, there was no stage IIC (those cancers were considered stage IIB). Also, some cancers that are now considered stage IIIC were classified as stage IIIB, while some other cancers that are now considered stage IIIB were classified as stage IIIC.

Remember, these survival rates are only estimates – they can't predict what will happen to any individual person. We understand that these statistics can be confusing and may lead you to have more questions. Talk to your doctor to better understand your specific situation.

Rectal cancer survival rates, by stage

The numbers below come from the National Cancer Institute's SEER database, looking at people diagnosed with rectal cancer between 2004 and 2010.

- The 5-year relative survival rate for people with stage I rectal cancer is about 87%.
- For people with stage IIA rectal cancer, the 5-year relative survival rate is about 80%. For stage IIB cancer, the survival rate is about 49%.
- The 5-year relative survival rate for stage IIIA rectal cancers is about 84%. For stage IIIB cancers the survival rate is about 71%, and for stage IIIC cancers the survival rate is about 58%.
- Rectal cancers that have spread to other parts of the body are often harder to treat and tend to have a poorer outlook. Metastatic, or stage IV rectal cancers, have a 5-year relative survival rate of about 12%. Still, there are often many treatment options available for people with this stage of cancer.

These statistics are based on a previous version of the TNM staging system. In that version, there was no stage IIC (those cancers were considered stage IIB). Also, some cancers that are now considered stage IIIC were classified as stage IIIB, while some other cancers that are now considered stage IIIB were classified as stage IIIC.

Remember, these survival rates are only estimates – they can't predict what will happen to any individual person. We understand that these statistics can be confusing and may lead you to have more questions. Talk to your doctor to better understand your specific situation.

Colorectal cancer treatment

If you've been diagnosed with colorectal cancer, your cancer care team will discuss your treatment options with you. It's important that you think carefully about each of your

choices. You will want to weigh the benefits of each treatment option against the possible risks and side effects.

Which treatments are used for colorectal cancer?

There are several ways to treat colorectal cancer, depending on its type and stage.

- Surgery (the type of surgery will depend on whether it is for colon or rectal cancer)
- Radiation therapy
- Chemotherapy
- Targeted therapy

For advanced colon and rectal cancer, ablation or embolization may also be used.

Depending on the stage of the cancer and other factors, different types of treatment may be combined at the same time or used after one another. To learn about the most common approaches to treating these cancers, see Treatment of colon cancer, by stage or Treatment of rectal cancer, by stage.

Which doctors treat colorectal cancer?

Based on your treatment options, you might have different types of doctors on your treatment team. These doctors could include:

- A **gastroenterologist**: a doctor who treats disorders of the gastrointestinal (digestive) tract
- A surgical oncologist (oncologic surgeon): a doctor who uses surgery to treat cancer
- A **colorectal surgeon**: a doctor who uses surgery to treat diseases of the colon and rectum
- A radiation oncologist: a doctor who treats cancer with radiation therapy
- A **medical oncologist**: a doctor who treats cancer with medicines such as chemotherapy or targeted therapy

You might have many other specialists on your treatment team as well, including physician assistants (PAs), nurse practitioners (NPs), nurses, nutrition specialists, social workers, and other health professionals. See *Health Professionals Associated With Cancer Care* for more on this.

Making treatment decisions

It's important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. It's also very important to ask questions if there is anything you're not sure about. See What should you ask your doctor about colorectal cancer? for ideas.

Getting a second opinion

You may also want to get a second opinion. This can give you more information and help you feel more certain about the treatment plan you choose. If you aren't sure where to go for a second opinion, ask your doctor for help.

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service at 1-800-303-5691 for a list of studies that meet your medical needs, or see Clinical Trials to learn more.

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. See Complementary and Alternative Medicine to learn more.

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or

not you continue treatment, there are still things you can do to help maintain or improve your quality of life. Learn more in *If Cancer Treatments Are No Longer Working*.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk this through with your doctors before you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

Help getting through colorectal cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, support groups, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists on call 24 hours a day, every day.

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Surgery for colon cancer

Surgery is often the main treatment for earlier-stage colon cancers. The type of surgery used depends on the stage (extent) of the cancer, where it is, and the goal of the surgery.

Polypectomy and local excision

Some early colon cancers (stage 0 and some early stage I tumors) or polyps can be removed during a colonoscopy, where a long flexible tube with a small video camera on the end is inserted through the person's rectum and into the colon. When done this way, the doctor does not have to cut into the abdomen.

- For a **polypectomy**, the cancer is removed as part of the polyp, which is cut at its stalk (the area that resembles the stem of a mushroom). This is usually done by passing a wire loop through the colonoscope to cut the polyp from the wall of the colon with an electric current.
- A **local excision** is a slightly more extensive procedure that can be used to remove superficial cancers and a small amount of nearby tissue from the wall of colon.

Colectomy

A colectomy is surgery to remove all or part of the colon. Nearby lymph nodes are removed as well.

- If part of the colon is removed, it is called a **hemicolectomy**, **partial colectomy**, or **segmental resection**.
- If the entire colon is removed, it is called a **total colectomy**.

Total colectomy is not often needed to treat colon cancer. It is generally used only if there is disease in the part of the colon without the cancer, such as hundreds of polyps (in someone with familial adenomatous polyposis) or, sometimes, inflammatory bowel disease.

A colectomy can be done in 2 ways:

- Open colectomy: The surgery is done through a single long incision (cut) in the abdomen.
- Laparoscopic-assisted colectomy: The surgery uses several smaller incisions and a laparoscope, a thin lighted tube with a small video camera on the end that lets the surgeon see inside the abdomen. Special long instruments are inserted through the other incisions to remove part of the colon and lymph nodes.

Because the incisions are smaller in a laparoscopic-assisted colectomy than in an open colectomy, patients often recover faster and may be able to leave the hospital sooner than they would after an open colectomy. But this type of surgery requires special expertise, and it might not be the best approach for everyone. If you are considering this type of surgery, be sure to look for a skilled surgeon who has done many of these operations.

For a partial colectomy, the surgeon removes the part of the colon with the cancer and a small segment of normal colon on either side of the cancer. Usually, about one-fourth to one-third of your colon is removed, but this depends on the size and location of the cancer. The remaining sections of your colon are then reattached. Nearby lymph nodes are removed at this time as well. Most experts feel that taking out as many nearby lymph nodes as possible is important, but at least 12 should be removed.

This is major surgery, so it's important for you to be as healthy as possible if you are having it. If the tumor is large and has blocked your colon, the doctor may use a colonoscope to put a **stent** (a hollow metal or plastic tube) inside the colon to keep it open and relieve the blockage for a short time to help prepare for surgery a few days later.

If a stent can't be placed for a blocked colon or if the tumor has caused a hole in the colon, surgery may be needed right away. This usually is the same type of colectomy that's done to remove the cancer, but instead of reconnecting the segments of the colon, the top end of the colon is attached to an opening (stoma) in the skin of the abdomen to allow body wastes out. This is known as a *colostomy* and is usually temporary. Sometimes the end of the small

intestine (the ileum) instead of the colon is connected to a stoma in the skin. This is called an *ileostomy*. Either way, a removable collecting bag is attached to the stoma to hold the waste.

Once you are healthier, another operation (known as a *colostomy reversal* or *ileostomy reversal*) can be done to attach the ends of the colon back together or to attach the ileum to the colon. Rarely, if a tumor can't be removed or a stent placed, the colostomy or ileostomy may need to be permanent. For more information, see *Colostomy: A Guide* and *Ileostomy: A Guide*.

Diverting colostomy

Some patients have colon cancers that have spread but also have tumors blocking the colon. For patients with this problem, sometimes surgery is done to relieve the blockage without removing the part of the colon containing the cancer. Instead, the colon is cut above the tumor and attached to a stoma (an opening in the skin of the abdomen) to allow body wastes out. This is known as a *diverting colostomy*. It can often help the patient recover enough to start other treatments (such as chemotherapy).

Surgery for colon cancer spread

If the cancer has spread to only one or a few spots in the lungs or liver (and nowhere else), surgery may be used to remove it. This is generally done only if the cancer in the colon or rectum is being removed as well (or was already removed). Depending on the extent of the disease, this might help you live longer, or it could even cure you. Deciding if surgery is an effective option to remove areas of cancer spread depends on their size, number, and location.

Side effects of colon surgery

Possible risks and side effects of surgery depend on several factors, including the extent of the operation and your general health before surgery. Problems during or shortly after the operation can include:

- Reactions to anesthesia
- Bleeding from the surgery
- Blood clots in the legs
- Damage to nearby organs
- Infections at the surgery site.

When you wake up after surgery, you will have some pain and probably will need pain medicines for a few days. For the first couple of days, you may not be able to eat or you may

be allowed limited liquids, as the colon needs some time to recover. Most patients are able to eat solid food again in a few days.

Rarely, the new connections between the ends of the intestine may not hold together completely and may leak, which can lead to infection and might require further surgery. It's also possible that the incision in the abdomen might open up, becoming an open wound.

After the surgery, you might develop scar tissue in your abdomen that can cause organs or tissues to stick together. These are called *adhesions*. Sometimes, adhesions can block the bowel, requiring further surgery.

Colostomy or ileostomy: Some people need a temporary or permanent colostomy (or ileostomy) after surgery. This can take some time to get used to and might require some lifestyle adjustments. If you have a colostomy or ileostomy, you will need help learning how to manage it. Specially trained ostomy nurses or enterostomal therapists can do this. They will usually see you in the hospital before your operation to discuss the ostomy and to mark a site for the opening. After the operation they may come to your house or an outpatient setting to give you more training. For more information, see *Colostomy: A Guide* and *Ileostomy: A Guide*.

Surgery for rectal cancer

Surgery is usually the main treatment for rectal cancer, although radiation and chemotherapy will often be given before or after surgery. The type of surgery used depends on the stage (extent) of the cancer, where it is, and the goal of the surgery.

Polypectomy and local excision

These procedures can be used to remove superficial cancers or polyps. They are done with instruments inserted through the anus (often during a colonoscopy), without cutting into the skin of the abdomen.

- For a **polypectomy**, the cancer is removed as part of the polyp, which is cut at its stalk (the area that resembles the stem of a mushroom). This is usually done by passing a wire loop through the colonoscope to cut the polyp from the wall of the rectum with an electric current.
- A **local excision** is a slightly more extensive procedure that can be used to remove superficial cancers and a small amount of nearby tissue from the rectum wall.

Local transanal resection (full thickness resection)

As with polypectomy and local excision, local transanal resection (also known as *transanal excision*) is done with instruments inserted through the anus, without making an opening in the skin of the abdomen.

In this operation, the surgeon cuts through all layers of the rectal wall to remove cancer as well as some surrounding normal rectal tissue, and then closes the hole in the rectal wall. This procedure can be used to remove some early stage I rectal cancers that are relatively small and not too far from the anus. It is usually done with local anesthesia (numbing medicine) – you are not asleep during the operation.

Transanal endoscopic microsurgery (TEM)

This operation can sometimes be used for early stage I cancers that are higher in the rectum than could be reached using the standard transanal resection (see above). A specially designed magnifying scope is inserted through the anus and into the rectum, allowing the surgeon to do a transanal resection with great precision and accuracy. This operation requires special equipment and surgeons with special training and experience, so it is only done at certain centers.

Low anterior resection (LAR)

Some stage I rectal cancers and most stage II or III cancers in the upper part of the rectum (close to where it connects with the colon) can be removed by low anterior resection (LAR). In this operation, the part of the rectum containing the tumor is removed. The colon is then attached to the remaining part of the rectum (either right away or sometime later) so that you will move your bowels in the usual way.

A low anterior resection is done with general anesthesia, which puts you into a deep sleep. The surgeon makes an incision (or several small incisions) in the abdomen. Then the surgeon removes the cancer and a margin of normal tissue on either side of the cancer, along with nearby lymph nodes and other tissues around the rectum.

The colon is then reattached to the remaining rectum so that a permanent colostomy is not needed. If radiation and chemotherapy have been given before surgery, it is common for a temporary ileostomy to be made (where the end of the ileum, the last part of the small intestine, is connected to a hole in the abdominal wall). This gives the rectal area some time to heal from treatment before food matter moves through it again. Usually the ileostomy can be reversed (the intestines reconnected) about 8 weeks later.

You will probably spend several days in the hospital after a low anterior resection, depending on how the surgery was done and your overall health. You might need 3 to 6 weeks to recover at home.

Proctectomy with colo-anal anastomosis

Some stage I and most stage II and III rectal cancers in the middle and lower third of the rectum require removing the entire rectum (proctectomy). The rectum has to be removed to do a total mesorectal excision (TME), which is needed to remove all of the lymph nodes near the rectum. The colon is then connected to the anus (colo-anal anastomosis) so that you will still move your bowels in the usual way.

Sometimes when a colo-anal anastomosis is done, a small pouch is made by doubling back a short segment of colon (colonic J-pouch) or by enlarging a segment (coloplasty). This small reservoir of colon then functions as a storage space for fecal matter like the rectum did before surgery. When special techniques are needed to avoid a permanent colostomy, you may need to have a temporary ileostomy (where the end of the ileum, the last part of the small intestine, is connected to a hole in the abdominal wall) for about 8 weeks while the bowel heals. A second operation is then done to reconnect the intestines and close the ileostomy opening.

You will have general anesthesia (you are asleep) for this operation. You will probably spend several days in the hospital after surgery, depending on how it was done and your overall health. You might need 3 to 6 weeks recovery time at home.

Abdominoperineal resection (APR)

This operation is more extensive than a low anterior resection. It can be used to treat some stage I cancers and many stage II or III cancers in the lower part of the rectum (the part nearest to the anus), especially if the cancer is growing into the sphincter muscle (the muscle that keeps the anus closed and prevents stool leakage).

Here, the surgeon makes an incision (or several small incisions) in the abdomen, and another in the perineal area around the anus. This incision allows the surgeon to remove the anus and the tissues surrounding it, including the sphincter muscle. Because the anus is removed, you will need a permanent colostomy (the end of the colon is connected to a hole in the abdominal wall) to allow stool to leave the body.

You will have general anesthesia (you are asleep) for this operation. You will probably spend several days in the hospital after an APR, depending on how the surgery is done and your overall health. Recovery time at home may be 3 to 6 weeks.

Pelvic exenteration

If the rectal cancer is growing into nearby organs, a pelvic exenteration may be recommended. This is an extensive operation. The surgeon will remove the rectum as well as nearby organs such as the bladder, prostate (in men), or uterus (in women) if the cancer has spread to these organs.

You will need a colostomy after pelvic exenteration. If the bladder is removed, you will also need a urostomy (an opening in the front of the abdomen where urine leaves the body and is held in a portable pouch).

Diverting colostomy

Some patients have rectal cancers that have spread but also have tumors blocking the rectum. For patients with this problem, sometimes surgery is done to relieve the blockage without removing the part of the rectum containing the cancer. Instead, the colon is cut above the tumor and attached to a stoma (an opening in the skin of the abdomen) to allow body wastes out. This is known as a *diverting colostomy*. It can often help the patient recover enough to start other treatments (such as chemotherapy).

Surgery for rectal cancer spread

If the cancer has spread to just one or a few spots in the lungs or liver (and nowhere else), surgery may be used to remove it. This is generally done only if the main cancer in the rectum is being removed as well (or was already removed). Depending on the extent of the disease, this might help you live longer, or it may even cure you. Deciding if surgery is an option to remove areas of cancer spread depends on their size, number, and location.

Side effects of rectal surgery

Possible risks and side effects of surgery depend on several factors, including the extent of the operation and a person's general health before surgery. Problems during or shortly after the operation can include:

- Reactions to anesthesia
- Bleeding from the surgery
- Blood clots in the legs
- Damage to nearby organs
- Infections at the surgery site

When you wake up after surgery, you will have some pain and probably will need pain medicines for a few days. For the first couple of days, you may not be able to eat or you may be allowed limited liquids, as the colon needs some time to recover. Most patients are able to eat solid food again in a few days.

Rarely, the new connections between the ends of the intestine may not hold together completely and may leak, which can lead to infection and might require further surgery. It's also possible that the incision in the abdomen might become an open wound. After the

surgery, you might develop scar tissue in the abdomen that can cause organs or tissues to stick together. These are called *adhesions*. In some cases, adhesions can block the bowel, and you will need further surgery.

Colostomy or ileostomy

Some people need a temporary or permanent colostomy (or ileostomy) after surgery. This may take some time to get used to and may require some lifestyle adjustments. If you have a colostomy or ileostomy, you will need to learn how to manage it. Specially trained ostomy nurses or enterostomal therapists can help you with this. They will usually see you in the hospital before your operation to discuss the ostomy and to mark a site for the opening. After your surgery they may come to your house or an outpatient setting to give you more training. For more information, see *Colostomy: A Guide* and *Ileostomy: A Guide*.

Sexual function and fertility

If you are a man, an AP resection may stop your erections or ability to reach orgasm. In other cases, your pleasure at orgasm may become less intense. Normal aging may cause some of these changes, but they may be made worse by the surgery.

An AP resection can also affect fertility. Talk with your doctor if you think you might want to father a child in the future, as there may still be ways to do this. For more on this topic, see *Fertility and Men With Cancer*.

If you are a woman, rectal surgery (except pelvic exenteration) usually does not cause any loss of sexual function. Abdominal adhesions (scar tissue) may sometimes cause pain or discomfort during sex. If your uterus is removed, it will not be possible for you to get pregnant.

A colostomy can have an impact on body image and sexual comfort level in both men and women. While it may require some adjustments, it should not keep you from having an enjoyable sex life.

For more on dealing with the sexual impact of cancer surgery, see *Sexuality for the Man With Cancer* and *Sexuality for the Woman With Cancer*.

Ablation and embolization for colorectal cancer

When colorectal cancer has spread to other organs such as the liver, the metastases can sometimes be removed by surgery or destroyed by other techniques, such as ablation or embolization. This might help a person live longer.

Ablation and embolization can often be good options for people whose cancer can't be cured with surgery or who can't have surgery for other reasons. Typically, you will not need to stay in the hospital for these treatments.

Ablation

Ablation refers to treatments that destroy tumors without removing them. These are most often used to treat cancer spread in the liver, but they can be used to treat tumors in other places.

Radiofrequency ablation

Radiofrequency ablation (RFA) uses high-energy radio waves to kill tumors. A thin, needle-like probe is placed through the skin and into the tumor using CT or ultrasound guidance. An electric current is then run through the tip of the probe, releasing high-frequency radio waves that heat the tumor and destroy the cancer cells.

Ethanol (alcohol) ablation

In this procedure, also known as *percutaneous ethanol injection (PEI)*, concentrated alcohol is injected directly into the tumor to kill cancer cells. This is usually done through the skin using a needle, which is guided by ultrasound or CT scans.

Cryosurgery (cryotherapy)

Cryosurgery destroys the tumor by freezing it with a thin metal probe. The probe is guided through the skin and into the tumor using ultrasound. Then very cold gasses are passed through the probe to freeze the tumor, killing the cancer cells. This method can treat larger tumors than the other ablation techniques, but it sometimes requires general anesthesia (you are in a deep sleep).

Side effects of ablation therapy

Possible side effects after ablation therapy include:

- Abdominal (belly) pain
- Infection
- Bleeding into the chest cavity or abdomen

Serious complications are uncommon, but they are possible.

Embolization

During an embolization procedure, substances are injected to try to block or reduce the blood flow to cancer cells in the liver.

The liver is unusual in that it has 2 blood supplies. Most normal liver cells get blood from branches of the portal vein, whereas cancer cells in the liver usually get their blood supply from branches of the hepatic artery. Blocking the branch of the hepatic artery feeding the tumor helps kill off the cancer cells, but it leaves most of the healthy liver cells unharmed.

Embolization can be used for tumors that are too large to be treated with ablation – usually larger than 5 cm (about 2 inches) across. It can also be used with ablation. Embolization does reduce some of the blood supply to the normal liver tissue, so it may not be a good option for patients with liver damage from diseases such as hepatitis or cirrhosis.

There are 3 main types of embolization procedures used to treat cancer in the liver:

Arterial embolization

In this procedure a catheter (a thin, flexible tube) is put into an artery through a small cut in the inner thigh and threaded up into the hepatic artery in the liver. A dye is usually injected into the blood at this time to help the doctor monitor the path of the catheter via angiography, a special type of x-ray. Once the catheter is in place, small particles are injected into the artery to plug it up. Arterial embolization is also called trans-arterial embolization (or TAE).

Chemoembolization

This treatment, also called trans-arterial chemoembolization (or TACE), combines embolization with chemotherapy. Most often, this is done by using tiny beads that give off a chemotherapy drug for the embolization. TACE can also be done by giving chemotherapy through the catheter directly into the artery, then plugging up the artery.

Radioembolization

This treatment is a combination of embolization and radiation therapy. In the United States, this is done by injecting small beads (called *microspheres*) coated with radioactive yttrium-90 into the hepatic artery. Brand names for these beads include TheraSphere® and SIR-Spheres®. The beads lodge in the blood vessels near the tumor, where they give off small amounts of radiation to the tumor site for several days. The radiation travels a very short distance, so its effects are limited mainly to the tumor.

Side effects of embolization

Possible complications after embolization include:

- Belly (abdominal) pain
- Fever
- Nausea

- Infection in the liver
- Gallbladder inflammation
- Blood clots in the main blood vessels of the liver

Because healthy liver tissue can be affected, there is a risk that liver function will get worse after embolization. This risk is higher if a large branch of the hepatic artery is embolized. Serious complications don't happen often, but they are possible.

Radiation therapy for colorectal cancer

Radiation therapy uses high-energy rays (such as x-rays) or particles to destroy cancer cells. Chemotherapy can make radiation therapy more effective against some colon and rectal cancers. Using these 2 treatments together is called **chemoradiation** or **chemoradiotherapy**.

When is radiation therapy used for colorectal cancer?

For **colon cancer**, radiation therapy may be used:

- After surgery, if the cancer has attached to an internal organ or the lining of the abdomen. If this occurs, the surgeon can't be certain that all the cancer has been removed. Radiation therapy may be used to try to kill any cancer cells that may have been left behind.
- To help control cancers in people who are not healthy enough for surgery or to ease (palliate) symptoms in people with advanced cancer causing intestinal blockage, bleeding, or pain.
- To help treat cancer that has spread to other areas, such as the bones or brain.

For **rectal cancer**, radiation therapy may be used:

- Either before or after surgery to help prevent the cancer from coming back. In this case, it is often given along with chemotherapy. Many doctors now favor giving radiation therapy before surgery, as it may make it easier to remove the cancer, especially if the cancer's size and/or position might make surgery difficult.
- To help control rectal cancers in people who are not healthy enough for surgery or to ease (palliate) symptoms in people with advanced cancer causing intestinal blockage, bleeding, or pain.
- To help treat cancer that has spread to other areas, such as the bones or brain.

Types of radiation therapy

Different types of radiation therapy can be used to treat colon and rectal cancers.

External-beam radiation therapy

This is the type of radiation therapy used most often for people with colorectal cancer. The radiation is focused on the cancer from a machine outside the body. It is much like getting an x-ray, but the radiation is more intense. Most often, radiation treatments are given 5 days a week for several weeks, but this depends on the reason the radiation is being given and other factors.

Internal radiation therapy (brachytherapy)

This type of radiation therapy can be used to treat some rectal cancers. For this treatment, a radioactive source is put inside your rectum next to or into the tumor. The advantage of this approach is that the radiation reaches the rectum without passing through the skin and other tissues of the abdomen, which means it is less likely to cause side effects.

Endocavitary radiation therapy: For this treatment, a small device is placed through the anus and into the rectum to deliver high-intensity radiation for a few minutes. This is typically done in 4 treatments (or less), with about 2 weeks between each treatment. This can let some patients, particularly elderly patients, avoid major surgery and a colostomy. This type of treatment is used for some small rectal cancers. Sometimes external-beam radiation therapy is also given.

Interstitial brachytherapy: For this treatment, a tube is placed into the rectum and directly into the cancer. Small pellets of radioactive material are then put into the tube for several minutes. The radiation travels only a short distance, limiting the effects on surrounding healthy tissues. It is sometimes used to treat people with rectal cancer, particularly people who are not healthy enough for surgery. This can be done a few times a week for a couple of weeks, but it can also be just a one-time procedure.

Radioembolization

Radiation can also be given during an embolization procedure. This is covered in more detail in "Ablation and embolization to treat colorectal cancer."

Side effects of radiation therapy

If you are going to get radiation therapy, it's important to ask your doctor beforehand about the possible side effects so that you know what to expect. Possible side effects of radiation therapy for colon and rectal cancer can include:

- Skin irritation at the site where radiation beams were aimed, which can range from redness to blistering and peeling
- Nausea

- Rectal irritation, which can cause diarrhea, painful bowel movements, or blood in the stool
- Bowel incontinence (stool leakage)
- Bladder irritation, which can cause problems like feeling like you have to go often (called frequency), burning or pain while urinating, or blood in the urine
- Fatigue/tiredness
- Sexual problems (erection issues in men and vaginal irritation in women)

Most side effects should lessen after treatments are completed, but some problems may not go away completely. If notice any side effects, talk to your doctor right away so steps can be taken to reduce or relieve them.

You can learn more about radiation treatments in the Radiation Therapy section of our website, or in *A Guide to Radiation Therapy*.

Chemotherapy for colorectal cancer

Chemotherapy (chemo) is treatment with anti-cancer drugs.

How is chemotherapy given?

You can get chemotherapy in different ways.

Systemic chemotherapy: Drugs are injected into your vein or you take them by mouth. These drugs enter your bloodstream and reach all areas of your body. This treatment is useful for cancers that have spread (metastasized).

Regional chemotherapy: Drugs are injected directly into an artery that leads to a part of the body with a tumor. This method concentrates the dose of chemo reaching the cancer cells in that area. It reduces side effects by limiting the amount of drug reaching the rest of your body.

Hepatic artery infusion, or chemo given directly into the hepatic artery, is an example of regional chemotherapy sometimes used for cancer that has spread to the liver. This is used less often than systemic chemo.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to give the body time to recover. Chemotherapy cycles generally last about 2 to 4 weeks, and people usually get at least several cycles of treatment.

When is chemotherapy used for colorectal cancer?

Chemo may be used at different times during treatment for colorectal cancer.

Adjuvant chemo: Chemo can be given after surgery. The goal is to kill any cancer cells that may have been left behind at surgery because they were too small to see, as well as cancer cells that might have escaped from the main tumor and settled in other parts of the body (but are too small to see on imaging tests). This helps lower the chance that the cancer will come back.

Neoadjuvant chemo: For some cancers, chemo is given (sometimes with radiation) before surgery to try to shrink the cancer and make surgery easier. This is often used in treating rectal cancer.

Chemo for advanced cancers: For cancers that have spread to other organs, such as the liver, chemo can also be used to help shrink tumors and relieve symptoms. Although it is not likely to cure the cancer, it often helps people live longer.

Drugs used to treat colorectal cancer

The drugs most often used for colorectal cancer include:

- 5-Fluorouracil (5-FU), which is often given with the vitamin-like drug leucovorin (also called folinic acid) or a similar drug called levo-leucovorin, which helps it work better.
- Capecitabine (Xeloda), which is in pill form. Once in the body, it is changed to 5-FU when it gets to the tumor site.
- Irinotecan (Camptosar)
- Oxaliplatin (Eloxatin)
- Trifluridine and tipiracil (Lonsurf), a combination drug in pill form

Often, 2 or more of these drugs are combined to try to make them more effective. Sometimes, chemo drugs are given along with a targeted therapy drug.

Side effects of chemo

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, are also dividing quickly. These cells can be affected by chemo too, which can lead to side effects.

The side effects of chemo depend on the type and dose of drugs given and how long you take them. Common side effects of chemo drugs can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea
- Increased chance of infections (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue (from having too few red blood cells)

Along with these, some side effects are specific to certain drugs. For example:

- Hand-foot syndrome. During treatment with capecitabine or 5-FU (when given as an infusion), this can start out as redness in the hands and feet, and then progress to pain and sensitivity in the palms and soles. If it worsens, blistering or skin peeling can occur, sometimes leading to painful sores. It's important to tell your doctor right away about any early symptoms, such as redness or sensitivity, so that steps can be taken to keep things from getting worse.
- Neuropathy (nerve damage). This is a common side effect of oxaliplatin. Symptoms include numbness, tingling, and even pain in the hands and feet. It can also cause intense sensitivity to hot and cold in the throat and esophagus (the tube connecting the throat to the stomach). This can cause problems swallowing liquids. If you will be getting oxaliplatin, talk with your doctor about side effects beforehand, and let him or her know right away if you develop numbness and tingling or other side effects.
- Allergic or sensitivity reactions. Some people can have reactions while getting the drug oxaliplatin. Symptoms can include skin rash, chest tightness and trouble breathing, back pain, or feeling dizzy, lightheaded, or weak. Be sure to tell your nurse right away if you notice any of these symptoms while you are getting chemo.
- **Diarrhea.** This is a common side effect with many of these drugs, but can be particularly bad with irinotecan. It needs to be treated right away at the first loose stool to prevent severe dehydration. This often means taking drugs like loperamide (Imodium). If you are on a chemo drug that is likely to cause diarrhea, your doctor will give you instructions on what drugs to take and how often to take them to control this symptom.

Most of these side effects tend to go away after treatment is finished. Some, such as hand and foot numbness, may last for a long time. There are often ways to lessen these side effects. For example, you can be given drugs to help prevent or reduce nausea and vomiting.

Be sure to discuss any questions about side effects with your cancer care team, and report any side effects or changes you notice while getting chemo so that they can be treated promptly. In some cases, the doses of the chemo drugs may need to be reduced or treatment may need to be delayed or stopped to prevent the effects from getting worse.

Older people seem to be able to tolerate some types of chemo for colorectal cancer fairly well. Age is no reason to withhold treatment in otherwise healthy people.

To learn more about chemo, see the <u>Chemotherapy</u> section on our website or <u>A Guide to Chemotherapy</u>.

Targeted therapy drugs for colorectal cancer

As researchers have learned more about the gene and protein changes in cells that cause cancer, they have developed newer drugs to specifically target these changes. Targeted drugs work differently from standard chemotherapy (chemo) drugs. They sometimes work when standard chemo drugs don't, and they often have different (and less severe) side effects. They can be used either along with chemo or by themselves if chemo is no longer working.

Drugs that target blood vessel formation (VEGF)

Vascular endothelial growth factor (VEGF) is a protein that helps tumors form new blood vessels to get nutrients (a process known as *angiogenesis*). Drugs that stop VEGF from working can be used to treat some colon or rectal cancers. These include:

- Bevacizumab (Avastin)
- Ramucirumab (Cyramza)
- Ziv-aflibercept (Zaltrap)

These drugs are given as infusions into your vein (IV) every 2 or 3 weeks, typically along with chemotherapy. When combined with chemo, these drugs can often help patients with advanced colon or rectal cancers live longer.

Possible side effects of drugs that target VEGF

Common side effects of these drugs include high blood pressure, tiredness, bleeding, low white blood cell counts (with increased risk of infections), headaches, mouth sores, loss of appetite, and diarrhea.

Rare but possibly serious side effects include blood clots, severe bleeding, holes forming in the colon (called *perforations*), heart problems, and slow wound healing. If a hole forms in the colon it can lead to severe infection and may require surgery to correct.

Another rare but serious side effect of these drugs is an allergic reaction during the infusion, which could cause problems with breathing and low blood pressure.

Drugs that target cells with EGFR changes

Epidermal growth factor receptor (EGFR) is a protein that often appears in high amounts on the surface of cancer cells and helps them grow. Drugs that target EGFR can be used to treat some advanced colon or rectal cancers. These include:

- Cetuximab (Erbitux)
- Panitumumab (Vectibix)

Both of these drugs are given by IV infusion, either once a week or every other week.

About 4 out of 10 colorectal cancers have mutations (defects) in the *KRAS* or *NRAS* gene, which make these drugs ineffective. Doctors now commonly test the tumor for these gene changes before treatment, and only use these drugs in people who do not have these mutations. Doctors may also test for a mutation in the *BRAF* gene, which would also indicate that these drugs would not work.

Possible side effects of drugs that target EGFR

The most common side effects of these drugs are skin problems such as an acne-like rash on the face and chest during treatment, which can sometimes lead to infections. The skin problems with panitumumab can be more serious and might lead to the skin peeling off. Other side effects can include headache, tiredness, fever, and diarrhea.

A rare but serious side effect of these drugs is an allergic reaction during the infusion, which could cause problems with breathing and low blood pressure. You may be given medicine before treatment to help prevent this.

Other targeted therapy drugs

Regorafenib (**Stivarga**) is a type of targeted therapy known as a *kinase inhibitor*. Kinases are proteins on or near the surface of a cell that transmit important signals to the cell's control center. Regorafenib blocks several kinase proteins that either help tumor cells grow or help form new blood vessels to feed the tumor. Blocking these proteins can help stop the growth of cancer cells.

This drug is used to treat advanced colorectal cancer, typically when other drugs are no longer helpful. It is taken in pill form.

Common side effects include:

• Fatigue

- Loss of appetite
- Hand-foot syndrome (redness and irritation of the hands and feet)
- Diarrhea
- Sores in the mouth and throat
- Weight loss
- Voice change
- Infections
- High blood pressure

Less common but more serious side effects can include

- Liver damage
- Severe bleeding
- Perforations in the stomach or intestines

To learn more about targeted drugs, see *Targeted Therapy*.

Treatment of colon cancer, by stage

Treatment for colon cancer is based largely on the stage (extent) of the cancer, but other factors can also be important.

People with colon cancers that have not spread to distant sites usually have surgery as the main or first treatment. Adjuvant (additional) chemotherapy may also be used. Most adjuvant treatment is given for about 6 months.

Treating stage 0 colon cancer

Since stage 0 colon cancers have not grown beyond the inner lining of the colon, surgery to take out the cancer is typically all that is needed. This can be done in most cases by removing the polyp (polypectomy) or local excision through a colonoscope. Removing part of the colon (partial colectomy) may occasionally be needed if a tumor is too big to be removed by local excision.

Treating stage I colon cancer

Stage I colon cancers have grown into the layers of the colon wall, but they have not spread outside the colon wall itself (or into the nearby lymph nodes).

Stage I includes cancers that were part of a polyp. If the polyp is removed completely during colonoscopy, with no cancer cells at the edges (margins) of the removed sample, no other treatment may be needed.

If the cancer in the polyp is high grade (see Colorectal cancer stages) or there are cancer cells at the edges of the polyp, more surgery may be advised. You may also be advised to have more surgery if the polyp couldn't be removed completely or if it had to be removed in many pieces, making it hard to see if cancer cells were at the edges.

For cancers not in a polyp, partial colectomy — surgery to remove the section of colon that has cancer and nearby lymph nodes — is the standard treatment. You typically will not need any additional treatment.

Treating stage II colon cancer

Many stage II colon cancers have grown through the wall of the colon, and possibly into nearby tissue, but they have not yet spread to the lymph nodes.

Surgery to remove the section of the colon containing the cancer along with nearby lymph nodes (partial colectomy) may be the only treatment needed. But your doctor may recommend adjuvant chemotherapy (chemo after surgery) if your cancer has a higher risk of coming back (recurring) because of certain factors, such as:

- The cancer looks very abnormal (is high grade) when viewed under a microscope.
- The cancer has grown into nearby blood or lymph vessels.
- The surgeon did not remove at least 12 lymph nodes.
- Cancer was found in or near the margin (edge) of the surgical specimen, meaning that some cancer may have been left behind.
- The cancer had blocked off (obstructed) the colon.
- The cancer caused a perforation (hole) in the wall of the colon.

Not all doctors agree on when chemo should be used for stage II colon cancers. It's important for you to discuss the pros and cons of chemo with your doctor, including how much it might reduce your risk of recurrence and what the likely side effects will be.

If chemo is used, the main options include 5-FU and leucovorin, or capecitabine, but other combinations may also be used.

If your surgeon is not sure all of the cancer was removed because it was growing into other tissues, he or she may advise radiation therapy to try to kill any remaining cancer cells in the area of your abdomen where the cancer was growing.

Treating stage III colon cancer

Stage III colon cancers have spread to nearby lymph nodes, but they have not yet spread to other parts of the body.

Surgery to remove the section of the colon with the cancer along with nearby lymph nodes (partial colectomy) followed by adjuvant chemo is the standard treatment for this stage.

For chemo, either the **FOLFOX** (5-FU, leucovorin, and oxaliplatin) or **CapeOx** (capecitabine and oxaliplatin) regimens are used most often, but some patients may get 5-FU with leucovorin or capecitabine alone based on their age and health needs.

Your doctors may also advise radiation therapy if your surgeon thinks some cancer cells might have been left behind after surgery.

Radiation therapy and/or chemo may be options for people who aren't healthy enough for surgery.

Treating stage IV colon cancer

Stage IV colon cancers have spread from the colon to distant organs and tissues. Colon cancer most often spreads to the liver, but it can also spread to other places such as the lungs, peritoneum (the lining of the abdominal cavity), or to distant lymph nodes.

In most cases surgery is unlikely to cure these cancers. However, if there are only a few small areas of cancer spread (metastases) in the liver or lungs and they can be removed along with the colon cancer, surgery may help you live longer and may even cure you. This would mean having a partial colectomy to remove the section of the colon containing the cancer along with nearby lymph nodes, plus surgery to remove the areas of cancer spread. Chemo is typically given as well, before and/or after surgery. In some cases, hepatic artery infusion may be used if the cancer has spread to the liver.

If the metastases cannot be removed because they are too large or there are too many of them, chemo may be given before any surgery (neoadjuvant chemo). Then, if the tumors shrink, surgery to remove them may be tried. Chemo would then be given again after surgery. For tumors in the liver, another option may be to destroy them with ablation or embolization.

If the cancer has spread too much to try to cure it with surgery, chemo is the main treatment. Surgery might still be needed if the cancer is blocking the colon (or is likely to do so). Sometimes, such surgery can be avoided by inserting a stent (a hollow metal or plastic tube) into the colon during a colonoscopy to keep it open. Otherwise, operations such as a

colectomy or diverting colostomy (cutting the colon above the level of the cancer and attaching the end to an opening in the skin on the abdomen to allow waste out) may be used.

If you have stage IV cancer and your doctor recommends surgery, it's very important to understand the goal of the surgery — whether it is to try to cure the cancer or to prevent or relieve symptoms of the disease.

Most patients with stage IV cancer will get chemo and/or targeted therapies to control the cancer. Some of the most commonly used regimens include:

- FOLFOX: leucovorin, 5-FU, and oxaliplatin (Eloxatin)
- FOLFIRI: leucovorin, 5-FU, and irinotecan (Camptosar)
- CapeOX: capecitabine (Xeloda) and oxaliplatin
- FOLFOXIRI: leucovorin, 5-FU, oxaliplatin, and irinotecan
- One of the above combinations plus either a drug that targets VEGF (bevacizumab [Avastin], ziv-aflibercept [Zaltrap], or ramucirumab [Cyramza]), or a drug that targets EGFR (cetuximab [Erbitux] or panitumumab [Vectibix])
- 5-FU and leucovorin, with or without a targeted drug
- Capecitabine, with or without a targeted drug
- Irinotecan, with or without a targeted drug
- Cetuximab alone
- Panitumumab alone
- Regorafenib (Stivarga) alone
- Trifluridine and tipiracil (Lonsurf)

The choice of regimens depends on several factors, including any previous treatments you've had and your overall health. If one of these regimens is no longer effective, another may be tried.

For advanced cancers, radiation therapy can also be used to help prevent or relieve symptoms such as pain. While it may shrink tumors for a time, it is very unlikely to result in a cure. If your doctor recommends radiation therapy, it's important that you understand the goal of treatment.

Treating recurrent colon cancer

Recurrent cancer means that the cancer has returned after treatment. The recurrence may be local (near the area of the initial tumor), or it may be in distant organs.

Local recurrence

If the cancer comes back locally, surgery (often followed by chemo) can sometimes help you live longer and may even cure you. If the cancer can't be removed surgically, chemo may be tried first. If it shrinks the tumor enough, surgery may be an option. This would again be followed by more chemo.

Distant recurrence

If the cancer comes back in a distant site, it is most likely to appear first in the liver. Surgery may be an option for some patients. If not, chemo may be tried first to shrink the tumor(s), which may then be followed by surgery to remove them. Ablation or embolization techniques might also be an option to treat some liver tumors.

If the cancer has spread too much to be treated with surgery, chemo and/or targeted therapies may be used. Possible regimens are the same as for stage IV disease. Your options depend on which, if any, drugs you received before the cancer came back and how long ago you received them, as well as on your health. You may still need surgery at some point to relieve or prevent blockage of the colon or other local complications. Radiation therapy may be an option to relieve symptoms as well.

Recurrent cancers can often be hard to treat, so you might also want to ask your doctor if you might be eligible for clinical trials of newer treatments.

For more on dealing with a recurrence, see *When Your Cancer Comes Back: Cancer Recurrence*.

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Treatment of rectal cancer, by stage

Treatment for rectal cancer is based largely on the stage (extent) of the cancer, although other factors can also be important.

People with rectal cancers that have not spread to distant sites are usually treated with surgery. Additional treatment with radiation and chemotherapy (chemo) may also be used before or after surgery.

Treating stage 0 rectal cancer

Stage 0 rectal cancers have not grown beyond the inner lining of the rectum. Removing or destroying the cancer is typically all that is needed. You can usually be treated with surgery such as a polypectomy (removing the polyp), local excision, or transanal resection and should need no further treatment.

Treating stage I rectal cancer

Stage I rectal cancers have grown into deeper layers of the rectal wall but have not spread outside the rectum itself.

This stage includes cancers that were part of a polyp. If the polyp is removed completely during colonoscopy, with no cancer in the edges, no other treatment may be needed. If the cancer in the polyp was high grade (see Colorectal cancer stages) or if there were cancer cells at the edges of the polyp, you might be advised to have more surgery. More surgery may also be advised if the polyp couldn't be removed completely or if it had to be removed in many pieces, making it hard to see if there were cancer cells at the edges (margins).

For other stage I cancers, surgery is usually the main treatment. Some small stage I cancers can be removed through the anus without cutting the abdomen, using transanal resection or transanal endoscopic microsurgery (TEM). For other cancers, a low anterior resection (LAR), proctectomy with colo-anal anastomosis, or an abdominoperineal resection (APR) may be done, depending on exactly where the cancer is within the rectum. (These operations are discussed in detail in the surgery section).

Additional therapy typically is not needed after these operations, unless the surgeon finds the cancer is more advanced than was thought before surgery. If it is more advanced, a combination of chemo and radiation therapy is usually given. 5-FU is the chemo drug most often used.

If you are too sick to have surgery, you may be treated with radiation therapy, although this has not been proven to be as effective as surgery.

Treating stage II rectal cancer

Many stage II rectal cancers have grown through the wall of the rectum and might extend into nearby tissues. They have not yet spread to the lymph nodes.

Most people with stage II rectal cancer will be treated with chemotherapy, radiation therapy, and surgery, although the order of these treatments might be different for some people. For example, here's a common approach to treating these cancers:

- Many people get both chemo and radiation therapy (called *chemoradiation*) as their first treatment. The chemo given with radiation is usually either 5-FU or capecitabine (Xeloda).
- This is usually followed by surgery, such as a low anterior resection (LAR), proctectomy with colo-anal anastomosis, or abdominoperineal resection (APR), depending on where the cancer is in the rectum. If the chemo and radiation therapy shrink the tumor enough, sometimes a transanal resection can be done instead of a more invasive LAR or APR. This might avoid having to do a colostomy. But not all doctors agree with this method, as it doesn't let the surgeon check the nearby lymph nodes for cancer.
- Additional chemo is then given after surgery, usually for a total of about 6 months. The chemo may be the FOLFOX regimen (oxaliplatin, 5-FU, and leucovorin), 5-FU and leucovorin, CapeOx (capecitabine plus oxaliplatin) or capecitabine alone, based on what's best suited to your health needs.

Another option might be to get chemotherapy alone first, followed by chemo plus radiation therapy, and then followed by surgery.

If someone can't have chemo plus radiation for some reason, surgery (such as an LAR, proctectomy with colo-anal anastomosis, or APR) might be done first. This might be followed by chemotherapy, and sometimes radiation therapy.

Treating stage III rectal cancer

Stage III rectal cancers have spread to nearby lymph nodes but not to other parts of the body.

Most people with stage III rectal cancer will be treated with chemotherapy, radiation therapy, and surgery, although the order of these treatments might differ for some.

Most often, chemo is given along with radiation therapy (called chemoradiation) first. This may shrink the cancer, often making surgery more effective for larger tumors. It also lowers the chance that the cancer will come back in the pelvis. Giving radiation before surgery also tends to lead to fewer problems than giving it after surgery.

This is followed by surgery to remove the rectal tumor and nearby lymph nodes, usually by low anterior resection (LAR), proctectomy with colo-anal anastomosis, or abdominoperineal resection (APR), depending on where the cancer is in the rectum. If the cancer has reached nearby organs, a more extensive operation known as pelvic exenteration may be needed.

After surgery, chemo is given, usually for about 6 months. The most common regimens include FOLFOX (oxaliplatin, 5-FU, and leucovorin), 5-FU and leucovorin, CapeOx (capecitabine plus oxaliplatin), or capecitabine alone. Your doctor may recommend one of these if it is better suited to your health needs.

Another option might be to get chemotherapy alone first, followed by chemo plus radiation therapy, and then followed by surgery.

For people who can't have chemo plus radiation for some reason, surgery (such as an LAR, proctectomy with colo-anal anastomosis, or APR) might be the first treatment. This might be followed by chemotherapy, sometimes along with radiation therapy.

Treating stage IV rectal cancer

Stage IV rectal cancers have spread to distant organs and tissues such as the liver or lungs. Treatment options for stage IV disease depend to some extent on how widespread the cancer is.

If there's a chance that all of the cancer can be removed (for example, there are only a few tumors in the liver or lungs), the most common treatment options include:

- Surgery to remove the rectal lesion and distant tumors, followed by chemo (and radiation therapy in some cases)
- Chemo, followed by surgery to remove the rectal lesion and distant tumors, usually followed by chemo and radiation therapy (chemoradiation)
- Chemo, followed by chemo and radiation therapy (chemoradiation), followed by surgery to remove the rectal lesion and distant tumors. This might be followed by more chemotherapy.
- Chemo and radiation therapy, followed by surgery to remove the rectal lesion and distant tumors. This might be followed by chemotherapy.

These approaches may help you live longer and in some cases may even cure you. Surgery to remove the rectal tumor would usually be a low anterior resection (LAR), proctectomy with colo-anal anastomosis, or abdominoperineal resection (APR), depending on where it's located.

If the only site of cancer spread is the liver, you may be treated with chemo given directly into the artery leading to the liver (hepatic artery infusion). This may shrink the cancers in the liver more effectively than if the chemo is given into a vein (IV) or by mouth.

If the cancer is more widespread and can't be removed completely by surgery, treatment options depend on whether the cancer is causing a blockage of the intestine. If it is, surgery may be needed right away. If not, the cancer will likely be treated with chemo and/or targeted therapy drugs (without surgery). Some of the options include:

- FOLFOX: leucovorin, 5-FU, and oxaliplatin (Eloxatin)
- FOLFIRI: leucovorin, 5-FU, and irinotecan (Camptosar)
- CapeOX: capecitabine (Xeloda) and oxaliplatin
- FOLFOXIRI: leucovorin, 5-FU, oxaliplatin, and irinotecan

- One of the above combinations, plus either a drug that targets VEGF (bevacizumab [Avastin], ziv-aflibercept [Zaltrap], or ramucirumab [Cyramza]), or a drug that targets EGFR (cetuximab [Erbitux] or panitumumab [Vectibix])
- 5-FU and leucovorin, with or without a targeted drug
- Capecitabine, with or without a targeted drug
- Irinotecan, with or without a targeted drug
- Cetuximab alone
- Panitumumab alone
- Regorafenib (Stivarga) alone
- Trifluridine and tipiracil (Lonsurf)

The choice of regimens depends on several factors, including any previous treatments and your overall health and ability to withstand treatment.

If chemo shrinks the tumors, in some cases it may be possible to consider surgery to try to remove all of the cancer at this point. Chemo may then be given again after surgery.

For cancers that don't shrink with chemo and widespread cancers that are causing symptoms, treatment is done to relieve symptoms and avoid long-term complications such as bleeding or blockage of the intestines. Treatments may include one or more of the following:

- Removing the rectal tumor with surgery
- Surgery to create a colostomy and bypass the rectal tumor (a diverting colostomy)
- Using a special laser to destroy the tumor within the rectum
- Placing a stent (hollow plastic or metal tube) within the rectum to keep it open; this does not require surgery
- Chemo and radiation therapy
- Chemo alone

If tumors in the liver can't be removed by surgery because they are too large or there are too many of them, it may be possible to destroy them with ablation or embolization.

Treating recurrent rectal cancer

Recurrent cancer means that the cancer has come back after treatment. It may come back near the area of the initial rectal tumor (locally) or in distant organs, like the lungs or liver. If the cancer does recur, it is usually in the first 2 to 3 years after surgery.

Local recurrence

If the cancer comes back in the pelvis (locally), it is treated with surgery to remove the cancer, if possible. This surgery is often more extensive than the initial surgery. In some cases radiation therapy may be given during the surgery (this is called intraoperative radiotherapy) or afterward. Chemo may also be given after surgery (as well as radiation therapy aimed at the tumor if it was not used before).

Distant recurrence

If the cancer comes back in a distant part of the body, the treatment will depend on whether it can be removed by surgery.

If the cancer can be removed, surgery is done. Chemo may be given **before** surgery (see "Treating stage IV rectal cancer" for a list of possible drug regimens). Chemo is given **after** surgery as well. When the cancer has spread to the liver, chemo may be given through the hepatic artery leading to the liver.

If the cancer can't be removed by surgery, chemo and/or targeted therapy drugs may be used. The regimen used will depend on what a person has received previously and on their overall health. If the cancer doesn't shrink with chemo, a different drug combination may be tried.

As with stage IV rectal cancer, surgery, radiation therapy, or other approaches may be used at some point to relieve symptoms and avoid long-term complications such as bleeding or blockage of the intestines.

These cancers can often be hard to treat, so you might also want to ask your doctor if you are eligible for any clinical trials of newer treatments.

For more on dealing with a recurrence, see *When Your Cancer Comes Back: Cancer Recurrence*.

What should you ask your doctor about colorectal cancer?

It's important to have frank, open discussions with your cancer care team. They want to answer all of your questions, so that you can make informed treatment and life decisions. For instance, consider these questions:

When you're told you have colorectal cancer

- Where is the cancer located?
- Has the cancer spread beyond where it started?

- What is the cancer's stage (extent), and what does that mean?
- Will I need other tests before we can decide on treatment?

Do I need to see any other doctors or health professionals?

• If I'm concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?

When deciding on a treatment plan

- What are my treatment options?
- What do you recommend and why?
- How much experience do you have treating this type of cancer?
- Should I get a second opinion? How do I do that? Can you recommend someone?
- What would the goal of the treatment be?
- How quickly do we need to decide on treatment?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What risks or side effects are there to the treatments you suggest? Are there things I can do to reduce these side effects?
- How might treatment affect my daily activities?
- What are the chances the cancer will recur (come back) with these treatment plans?
- What will we do if the treatment doesn't work or if the cancer recurs?

During treatment

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but asking the ones that do may be helpful.

- How will we know if the treatment is working?
- Is there anything I can do to help manage side effects?
- What symptoms or side effects should I tell you about right away?
- How can I reach you on nights, holidays, or weekends?

- Do I need to change what I eat during treatment?
- Are there any limits on what I can do?
- What kind of exercise should I do, and how often?
- Can you suggest a mental health professional I can see if I start to feel overwhelmed, depressed, or distressed?

After treatment

- Do I need a special diet after treatment?
- Are there any limits on what I can do?
- What other symptoms should I watch for?
- What kind of exercise should I do now?
- What type of follow-up will I need after treatment?
- How often will I need to have follow-up exams and imaging tests?
- Will I need any blood tests?
- How will we know if the cancer has come back? What should I watch for?
- What will my options be if the cancer comes back?

Along with these sample questions, be sure to write down some of your own. For instance, you might want more information about recovery times. Or you may want to ask about clinical trials for which you may qualify.

Keep in mind that doctors aren't the only ones who can give you information. Other health care professionals, such as nurses and social workers, can answer some of your questions. To find out more about speaking with your health care team, see *Talking With Your Doctor*.

Living as a colorectal cancer survivor

For many people with colorectal cancer, treatment may remove or destroy the cancer. The end of treatment can be both stressful and exciting. You'll be relieved to finish treatment, yet it's hard not to worry about cancer coming back. This is very common if you've had cancer.

For other people, colorectal cancer may never go away completely. Some people may get regular treatment with chemotherapy, radiation therapy, or other treatments to try to help keep the cancer in check. Learning to live with cancer that does not go away can be difficult and very stressful.

Life after colorectal cancer means returning to some familiar things and also making some new choices.

Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions

Typical follow-up schedules after colorectal cancer

Even if you have completed treatment, you will likely have follow-up visits with your doctor for many years. It's very important to go to all of your follow-up appointments. During these visits, your doctors will ask if you are having any problems and may do exams and lab tests or imaging tests to look for signs of cancer or treatment side effects.

Some treatment side effects might last a long time or might not even show up until years after you have finished treatment. Your doctor visits are a good time to ask questions and talk about any changes or problems you notice or concerns you have.

To some extent, the frequency of follow up visits and tests will depend on the stage of your cancer and the chance of it coming back.

Doctor visits

Your doctor will probably recommend you have a physical exam every 3 to 6 months for the first couple of years after treatment, then every 6 months or so for the next few years. People who were treated for early-stage cancers may need exams less frequently.

Colonoscopy

In most cases, your doctor will recommend you have a colonoscopy within a year after surgery. If the results are normal, most patients won't need another one for 3 years. If the results of that exam are normal, then future exams often can be about every 5 years.

Imaging tests

Whether or not your doctor recommends imaging tests will depend on the stage of your cancer and other factors. CT scans may be done regularly, such as once a year, for those at higher risk of recurrence, especially in the first few years after treatment. People who had tumors in the liver or lungs removed might be tested even more frequently.

Blood tests for tumor markers

Carcinoembryonic antigen (CEA) and CA 19-9 are substances called tumor markers that can be found in the blood of some people with colorectal cancer. Doctors often check levels of these markers (especially CEA) with blood tests before treatment begins.

If they are elevated at first and then go down to normal after surgery, they can be checked again when you come in for follow-up (typically every few months for the first couple of years after treatment, then every 6 months or so for the next few years).

If the tumor marker level goes up again, it might be a sign that the cancer has come back, and colonoscopy or imaging tests may be done to try to locate the site of recurrence. If tumor marker levels weren't elevated when the cancer was first found, they aren't likely to be helpful as a sign of the cancer coming back.

Keeping health insurance and copies of your medical records

Even after treatment, it's very important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your cancer treatment, you might find yourself seeing a new doctor who doesn't know about your medical history. It's important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in *Keeping Copies of Important Medical Records*.

Managing long-term side effects

Most side effects go away after treatment ends, but some may continue and need special care to manage. For example, if you have a colostomy or ileostomy, you may worry about doing even everyday activities. Whether your ostomy is temporary or permanent, a health care professional trained to help people with colostomies and ileostomies (an enterostomal therapist) can teach you how to care for it. You can ask the American Cancer Society about programs offering information and support in your area. Learn more about managing and caring for an ostomy in *Colostomy: A Guide* and *Ileostomy: A Guide*.

Can I lower my risk of colorectal cancer progressing or coming back?

If you have (or have had) colorectal cancer, you probably want to know if there are things you can do that might lower your risk of the cancer growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Fortunately, research has shown there are some things you can do that might be helpful.

Getting to and staying at a healthy weight

A lot of research suggests that being overweight or obese (very overweight) raises your risk of colorectal cancer coming back, as well as the risk of dying from colorectal cancer. But there is less research to show whether losing weight during or after treatment can actually lower the risk of colorectal cancer recurrence.

Of course, getting to a healthy weight can also have other health benefits. But if you're thinking about losing weight, it's important to discuss this with your doctor, especially if you are still getting treatment or have just finished it.

Being active

A good deal of research suggests that people who get regular physical activity after treatment have a lower risk of colorectal cancer recurrence and of dying from colorectal cancer. Physical activity has also been linked to improvements in quality of life, physical functioning, and fewer fatigue symptoms. It's not clear exactly how much activity might be needed, but more seems to be better.

It's important to talk with your treatment team before starting a new physical activity program. This might include meeting with a physical therapist as well. Your team can help you plan a program that can be both safe and effective for you.

Eating a healthy diet

In general, it's not clear if eating any specific type of diet can help lower your risk of colorectal cancer coming back. Some studies have suggested that colorectal cancer survivors who eat diets high in vegetables, fruits, whole grains, chicken, and fish might live longer than those who eat diets with more refined sugars, fats, and red or processed meats. But it's not clear if this is due to effects on colorectal cancer or possibly to other health benefits of eating a healthy diet.

Still, there are clearly health benefits to eating well. For example, diets that are rich in plant sources are often an important part of getting to and staying at a healthy weight. Eating a healthy diet can also help lower your risk for some other health problems, such as heart disease and diabetes.

Dietary supplements

So far, no dietary supplements have been shown to clearly help lower the risk of colorectal cancer progressing or coming back. This doesn't mean that none will help, but it's important to know that none have been proven to do so.

Vitamin D: Some research has suggested that colorectal cancer survivors with higher levels of vitamin D in their blood might have better outcomes than those with lower levels. But it's not yet clear if taking vitamin D supplements can affect outcomes.

Calcium: Some research has suggested that calcium supplements can lower the risk of colorectal polyps in people who have previously had polyps. But it's not clear if calcium supplements can lower the risk of colorectal cancer coming back.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they're allowed to claim they can do. If you are thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that could be harmful.

Alcohol

Alcohol intake has been linked with an increased risk of getting colorectal cancer, especially in men. But whether alcohol affects the risk of colorectal cancer recurrence is not as clear.

The American Cancer Society recommends that people who drink alcohol limit their intake to no more than 1 drink a day for women and no more than 2 drinks a day for men, to help lower their risk of *getting* certain types of cancer (including colorectal cancer). But for people who have finished cancer treatment, the effects of alcohol on recurrence risk are largely unknown. This issue is complicated by the fact that low to moderate alcohol use has been linked with a lower risk of heart disease.

Because this issue is complex, it's important to discuss it with your health care team, taking into account your risk of colorectal cancer recurrence (or getting a new colorectal cancer), your risk of heart disease, and your risk of other health issues linked to alcohol use.

Quitting smoking

Research has shown that colorectal cancer survivors who smoke are more likely to die from their cancer (as well as from other causes). Aside from any effects on colorectal cancer risk, quitting smoking can clearly have many other health benefits.

If you are thinking about quitting smoking and need help, talk to your doctor, or call the American Cancer Society at 1-800-227-2345 for information and support.

If the cancer comes back

If the cancer does recur at some point, your treatment options will depend on where the cancer is located, what treatments you've had before, and your health. For more information on how recurrent cancer is treated, see Treatment of colon cancer, by stage or Treatment of rectal cancer, by stage. For more general information on dealing with a recurrence, you may also want to see *When Your Cancer Comes Back: Cancer Recurrence*

Could I get a second cancer after colorectal cancer treatment?

People who've had colorectal cancer can still get other cancers, although most don't get cancer again. Colorectal cancer survivors are at higher risk for getting another colorectal cancer, as well as some other types of cancer. Learn more in *Second cancers after colorectal cancer*.

Moving on after colorectal cancer

Emotional support

Some amount of feeling depressed, anxious, or worried is normal when colorectal cancer is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others.

Sexuality and feeling good about your body

Learning to be comfortable with your body during and after colorectal cancer treatment is a personal journey, one that is different for everyone. Information and support can help you cope with these changes over time. Learn more in Sexuality for the Man With Cancer or Sexuality for the Woman With Cancer.

Second cancers after colorectal cancer

Colorectal cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. Cancer that comes back after treatment is called a *recurrence*. But some cancer survivors develop a new, unrelated cancer later. This is called a *second cancer*.

Unfortunately, being treated for colorectal cancer doesn't mean you can't get another cancer. People who have had colorectal cancer can still get the same types of cancers that other people get. In fact, they might be at higher risk for certain types of cancer.

People who have had **colon cancer** can get any type of second cancer, but they have an increased risk of certain cancers, including:

- A second colon cancer (This is different from the first cancer coming back.)
- Rectal cancer
- Stomach cancer
- Small intestine cancer
- Anal cancer
- Bile duct cancer
- Uterine cancer
- Kidney cancer
- Cancer of the ureter (the tube that connects the kidney to the bladder)

People who have had **rectal cancer** can get any type of second cancer, but they are at increased risk of certain cancers, including:

- Colon cancer
- Small intestine cancer
- Anal cancer
- Lung cancer
- Vaginal cancer
- Kidney cancer

The increased risk with some of these cancers may be due to shared risk factors, such as diet, obesity, and physical activity. Genetics may also be a factor. For example, people with Lynch syndrome (hereditary non-polyposis colorectal cancer) have an increased risk of many of these cancers.

Follow-up after colorectal cancer treatment

After completing treatment for colorectal cancer, you should still see your doctor regularly to look for signs the cancer has come back or spread. See Living as a colorectal cancer survivor for information on the types of tests you might need after treatment.

Survivors of colorectal cancer should also follow the American Cancer Society guidelines for the early detection of cancer, such as those for breast, cervical, lung, and prostate cancer.

For people who have had colorectal cancer, most experts don't recommend any additional testing to look for second cancers unless you have symptoms. One possible exception is in women who had colorectal cancer as a result of having Lynch syndrome, as these women are also at increased risk for endometrial and some other cancers. If you have Lynch syndrome, it's important to talk to your doctor about your risks.

Can I lower my risk of getting a second cancer?

There are steps you can take to lower your risk and stay as healthy as possible. For example, people who have had colorectal cancer should do their best to stay away from tobacco products. Smoking might further increase the risk of some of the second cancers that are more common after colorectal cancer.

To help maintain good health, colorectal cancer survivors should also:

- Get to and stay at a healthy weight
- Keep physically active
- Eat a healthy diet, with an emphasis on plant foods
- Limit alcohol to no more than 1 drink per day for women or 2 per day for men

These steps may also lower the risk of some other health problems.

See Second Cancers in Adults for more information about causes of second cancers.

What's new in colorectal cancer research?

Research is always going on in the area of colorectal cancer. Scientists are looking for causes and ways to prevent colorectal cancer, better ways to find it early, and ways to improve treatments. Here are some examples of current research.

Reducing colorectal cancer risk

Many studies are looking to identify the causes of colorectal cancer, in the hopes of using this knowledge to help prevent it.

Other studies are looking to see if certain types of diets, dietary supplements, or medicines can lower a person's risk of colorectal cancer. For example, many studies have shown that aspirin and similar pain relievers might help lower the risk of colorectal cancer, but these drugs can sometimes have serious side effects. Researchers are now trying to determine if there are some groups of people for whom the benefits would outweigh the risks.

Early detection tests

Doctors are looking for better ways to find colorectal cancer early by studying new types of screening tests and improving the ones already being used.

Lab tests to help predict cancer recurrence risk

Lab tests (including Oncotype Dx^{\circledR} Colon Cancer Assay, ColoPrint $^{\circledR}$, and $ColDx^{\intercal}$) have been developed to help predict which patients have a higher risk of their colorectal cancer coming back after treatment. The tests do this by looking at the activity of many different genes inside colorectal cancer cells. So far, though, none of these tests have been shown to help predict which people could benefit from chemo or other treatments.

Tests to help stage colorectal cancer

Researchers have developed a test that can find areas of colon cancer spread in nearby lymph nodes that wouldn't have been found with the tests normally used. This test detects a kind of RNA that is in some colon cancer cells but not in normal lymph node cells. This may help identify patients who have a higher stage of colon cancer than originally suspected, and who might benefit from chemotherapy after surgery.

Treatment

Researchers are constantly looking for better ways to treat colorectal cancer.

Newer surgery techniques

Surgeons are continuing to improve their techniques for operating on colorectal cancers. They now have a better understanding of what makes colorectal surgery more likely to be successful, such as making sure enough lymph nodes are removed during the operation.

Laparoscopic surgery is done through several small incisions in the abdomen instead of one large one, and it's becoming more widely used for some colon and rectal cancers. This approach usually lets patients recover faster, with less pain after the operation, and it seems to be about as effective as standard surgery.

With **robotic surgery**, a surgeon sits at a control panel and operates very precise robotic arms to perform the surgery. This type of surgery is also being studied to see if it as effective as standard surgery.

Chemotherapy

Chemotherapy is an important part of treatment for many people with colorectal cancer, and doctors are constantly trying to make it more effective and safer. Different approaches are being tested in clinical trials, including:

- Testing new chemo drugs (such as trifluridine and tipiracil) or drugs that are already used against other cancers (such as cisplatin or gemcitabine).
- Looking for new ways to combine drugs already known to be active against colorectal cancer, such as irinotecan and oxaliplatin, to improve their effectiveness.
- Studying the best ways to combine chemotherapy with radiation therapy, targeted therapies, and/or immunotherapy.

Targeted therapy

Targeted therapy drugs work differently from standard chemotherapy drugs. They affect specific parts of cancer cells that make them different from normal cells. Several targeted therapy drugs are already used to treat colorectal cancer. Doctors continue to study the best way to give these drugs to make them more effective, as well as looking at new targeted therapy drugs.

Targeted therapies are currently used to treat advanced colorectal cancers, but newer studies are trying to determine if using them with chemotherapy in earlier-stage cancers as part of adjuvant therapy may further reduce the risk of recurrence.

Immunotherapy

An exciting area of research is the field of immunotherapy, which is treatment that uses the body's own immune system to fight the cancer.

Immune checkpoint inhibitors: An important part of the immune system is its ability to keep itself from attacking normal cells in the body. To do this, it uses "checkpoints" – molecules on immune cells that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to avoid being attacked by the immune system.

Newer drugs that target checkpoint molecules such as PD-1 hold a lot of promise as cancer treatments. Unfortunately, early studies of some of these drugs against colorectal cancer did not result in many responses to treatment. However, colorectal cancers that have gene changes known as microsatellite instability (MSI) have been found to be more likely to respond to the anti-PD-1 drug pembrolizumab (Keytruda). A large study is now under way to try to confirm this finding.

Cancer vaccines: Researchers are studying several vaccines to try to treat colorectal cancer or prevent it from coming back after treatment. Unlike vaccines that prevent infectious

diseases, these vaccines are meant to boost the person's immune reaction to fight colorectal cancer more effectively.

Many types of vaccines are being studied. For example, some vaccines are created by removing some of the person's own immune system cells (called *dendritic cells*) from their blood, exposing them in the lab to a substance that will make them attack cancer cells, and then putting them back into the person's body. At this time, these types of vaccines are only available in clinical trials.

Additional resources for colorectal cancer

More information from your American Cancer Society

We have a lot more information that you might find helpful. Explore www.cancer.org or call our National Cancer Information Center_toll-free number, 1-800-227-2345. We're here to help you any time, day or night.

Other national organizations and websites*

Along with the American Cancer Society, other sources of information and support include:

American College of Gastroenterology

Website: www.acg.gi.org

Has a special "patient" section with information, including podcasts, on colorectal cancer risks and screening tests; and can help find a gastroenterologist near you

Fight Colorectal Cancer

Toll-free number: 1-877-4CRC-111 (1-877-427-2111)

Website: www.fightcolorectalcancer.org

Offers information on diagnosis and treatment, a phone or email Answer Line to help those with colorectal cancer questions, access to an online support community, and a monthly electronic newsletter

Colon Cancer Alliance

Toll-free number: 1-877-422-2030 Website: www.ccalliance.org

Offers support and information for survivors, caregivers, and others touched by colorectal cancer (CRC); a Buddy Program that matches people for one-on-one support, an online support program called My CCA Support where those affected by CRC can connect with others, and more

^{*}Inclusion on this list does not imply endorsement by the American Cancer Society.

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-227-2345** or visit www.cancer.org.

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