NCCN GUIDELINES FOR PATIENTS®

2021

Rectal Cancer

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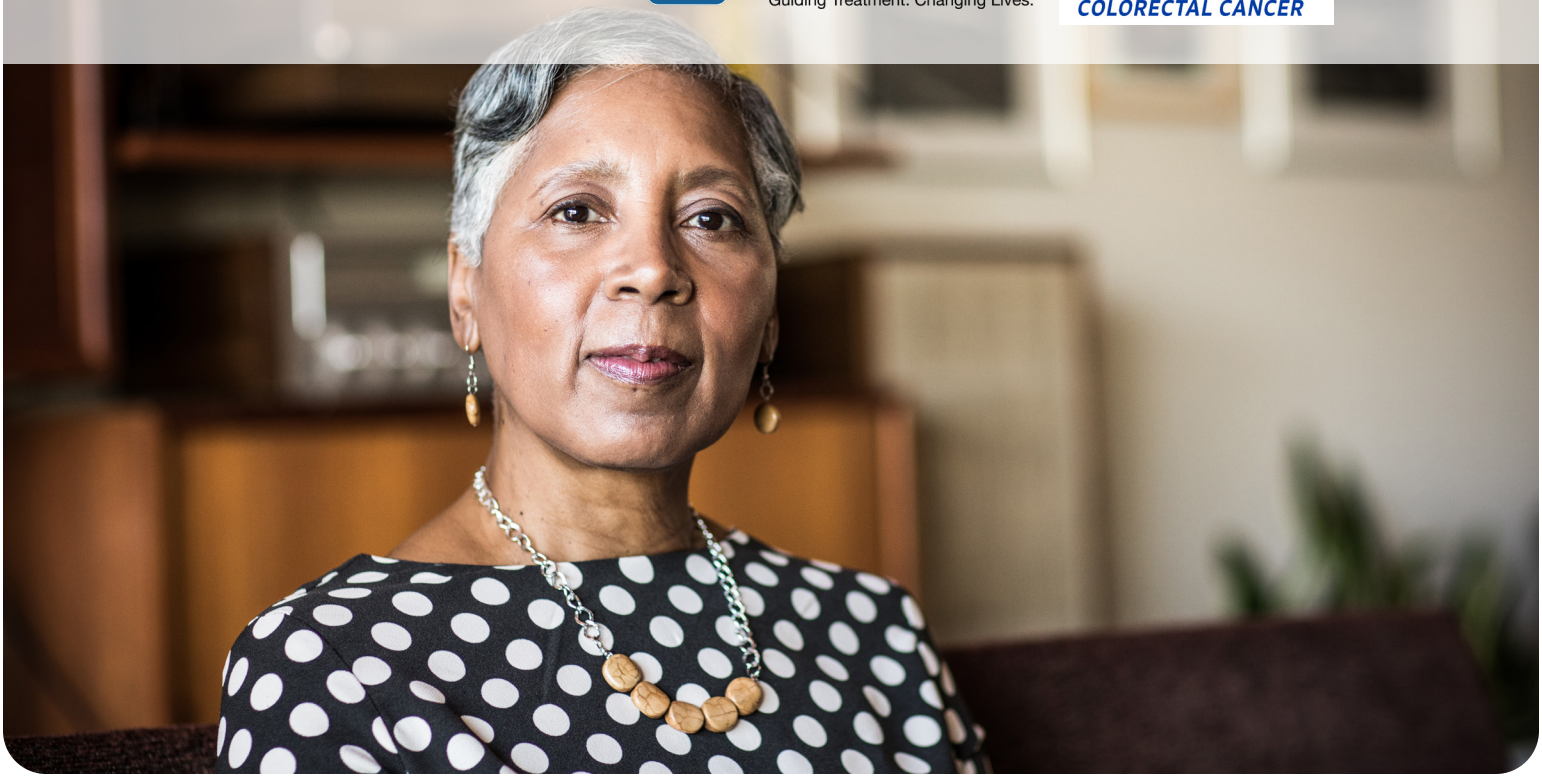

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- ✓ Designed to help you discuss cancer treatment with your doctors

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These NCCN Guidelines for Patients are based on the NCCN Guidelines® for Rectal Cancer, Version 1.2021 — December 22, 2020

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Contents

6 Rectal cancer basics

14 Treatment planning

26 Overview of treatments

41 Nonmetastatic cancer

50 Metastatic cancer

58 Survivorship

64 Making treatment decisions

70 Words to know

73 NCCN Contributors

74 NCCN Cancer Centers

76 Index

1
Rectal cancer basics

7	The rectum
8	About cancer
8	Polyps
9	Rectal cancer stages
13	Key points

Improvements in the detection and treatment of rectal cancer have led to better outcomes for patients. This chapter provides some basic information that will help prepare you for treatment.

The rectum

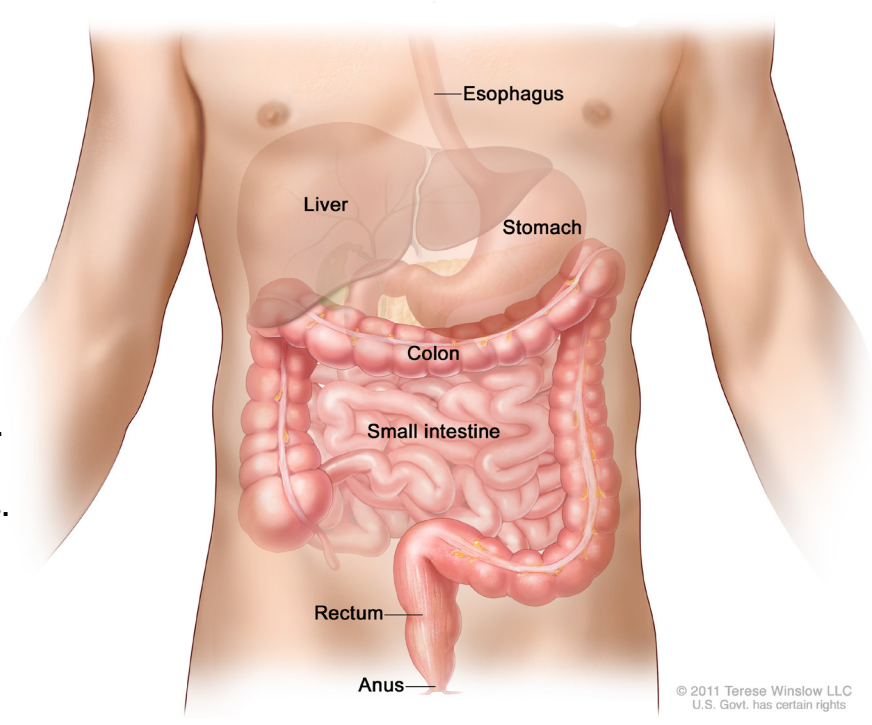
The rectum is the last several inches of the large intestine, also known as the large bowel. The large intestine is a long tube-shaped organ that forms the last part of the digestive system. The digestive system breaks down food for the body to use.

After being swallowed, food passes through the esophagus and into the stomach, where it is turned into a liquid. From the stomach, food enters the small intestine. Here, food is broken down into very small parts to allow nutrients to be absorbed into the bloodstream.

Partly digested food then moves into the large intestine. The colon is the first and longest section of the large intestine. The colon turns unused food from a liquid into a solid by absorbing water. This solid, unused food is called feces or stool. Stool is then held in the rectum until it exits the body through an opening called the anus.

The rectum

The rectum is about 5 inches (12 centimeters) long and forms the last part of the large intestine. Stool is held in the rectum until it leaves the body through the anus.



About cancer

The human body is made of over 30 trillion cells. All cells have built-in instructions that tell them how to act. These instructions are called genes. Genes are a part of deoxyribonucleic acid (DNA). Gene changes called mutations cause normal cells to become cancerous.

Cancer cells don't act like normal cells. Normal cells grow and then divide to make new cells only when needed. They also die when old or damaged. Cancer cells make new cells that aren't needed and do not die quickly when old or damaged. Over time, some types of cancer cells form a lump called a tumor.

Normal cells listen to signals from nearby cells telling them to "stop" when they get too close. Cancer cells ignore the "stop" signals from nearby cells and invade nearby tissues.

Normal cells stay in the area of the body where they belong. For example, stomach cells stay in the stomach. Cancer cells can break off and travel to other parts of the body, where new tumors can form. This is called metastasis. Cancer cells can travel through blood or lymph. Lymph is a clear fluid that carries important infection-fighting white blood cells (lymphocytes) throughout the body. It is also called lymphatic fluid.

Polyps

A polyp is an overgrowth of cells on the inner lining of the rectal wall. There are different types of polyps. Some are more likely to turn into cancer than others. The most common type is called an adenoma. Adenomas are considered to be pre-cancerous because, while it may take many years, they can become invasive rectal cancer. Cancer that forms in an adenoma is known as an adenocarcinoma. Adenocarcinoma is the most common type of rectal cancer.

Polyps need to be removed and tested for cancer. While most polyps do not become cancer, almost all rectal cancers start in a polyp. Removing polyps can prevent cancer before it occurs. Polyps can also be tested to make sure that cancer has not already started to develop. Most polyps can be removed during a colonoscopy, using a minor surgical procedure called a polypectomy.

More information on rectal cancer that forms in a polyp is provided in *Part 4, Nonmetastatic cancer*.

Rectal cancer stages

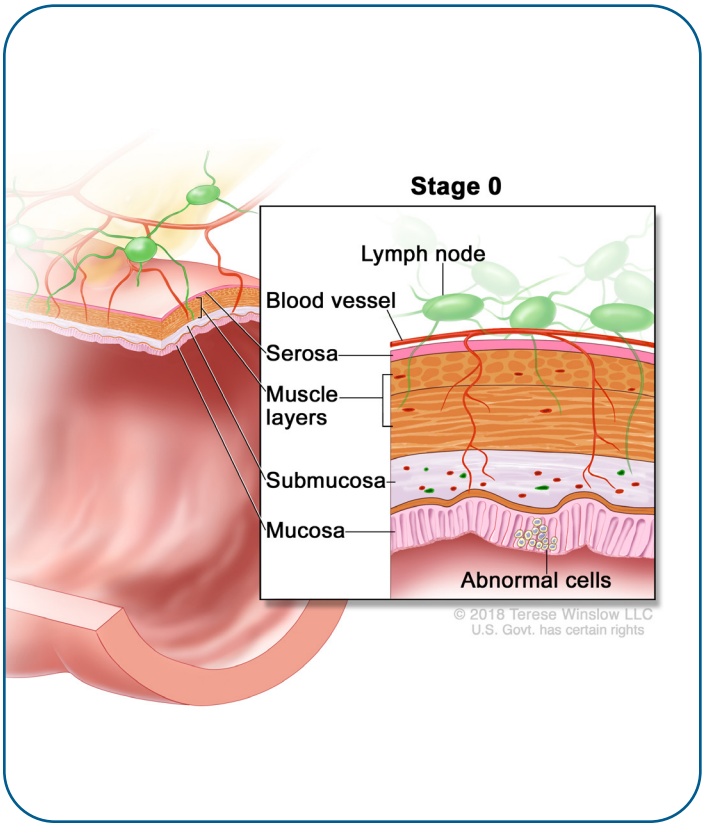
The stage is an assessment of the extent of cancer in the body. It is used to plan which tests may be needed and which treatments are best for you. Having a general idea of the structure of the rectal wall is helpful for understanding how rectal cancer is staged.

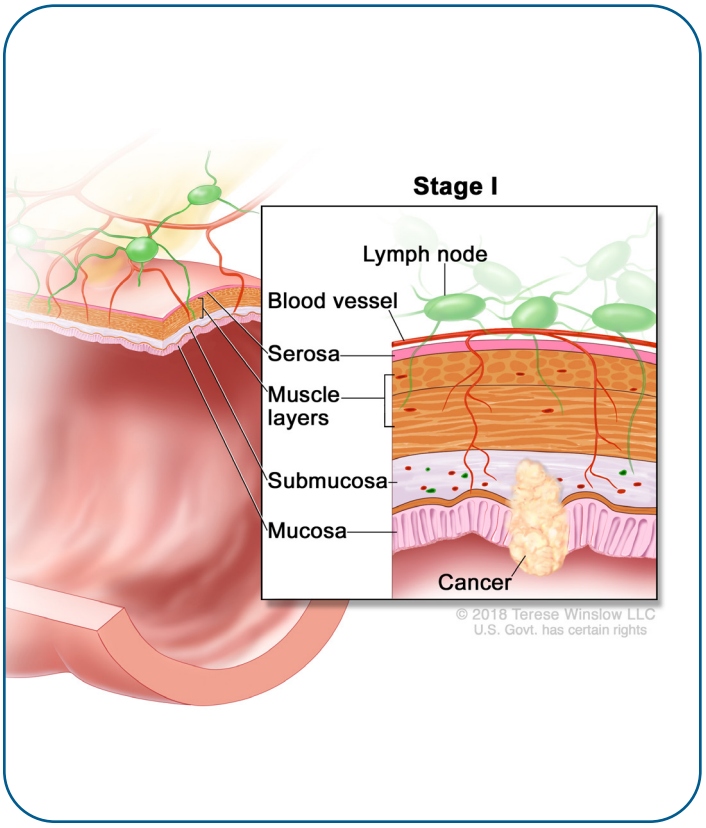
The rectal wall is made of layers of tissue. Cancer starts in the innermost layer that comes in contact with food. This layer is called the mucosa. The next layer is the submucosa. It is made of connective tissue and contains mucus glands, blood and lymph vessels, and nerves. The submucosa is followed by a layer of muscle called the muscularis propria. While the colon has a fourth layer called serosa (or adventitia), much of the rectum does not have this outer layer. This can make it easier for rectal cancer to spread to nearby areas in the pelvis.

If left untreated, cancer cells grow through the layers of the rectal wall, towards the inside of the pelvis. The cancer can then invade structures or organs outside of the rectum. Cancer cells can also break off from the rectal tumor and travel through lymph or blood to nearby lymph nodes.

The American Joint Committee on Cancer (AJCC) tumor, node, metastasis (TNM) system is used to stage rectal cancer. In the AJCC system, the following key pieces of information about the cancer are used to give it a stage:

- **T:** How far the tumor has grown into or through the rectal wall
- **N:** Whether any lymph nodes have cancer in them





- **M:** Whether the cancer has spread to areas or organs outside the rectum (metastasized)

The T, N, and M scores are combined to assign the cancer a stage. There are five stages of rectal cancer. They are numbered 0, I (1), II (2), III (3), or IV (4). The stages are explained below.

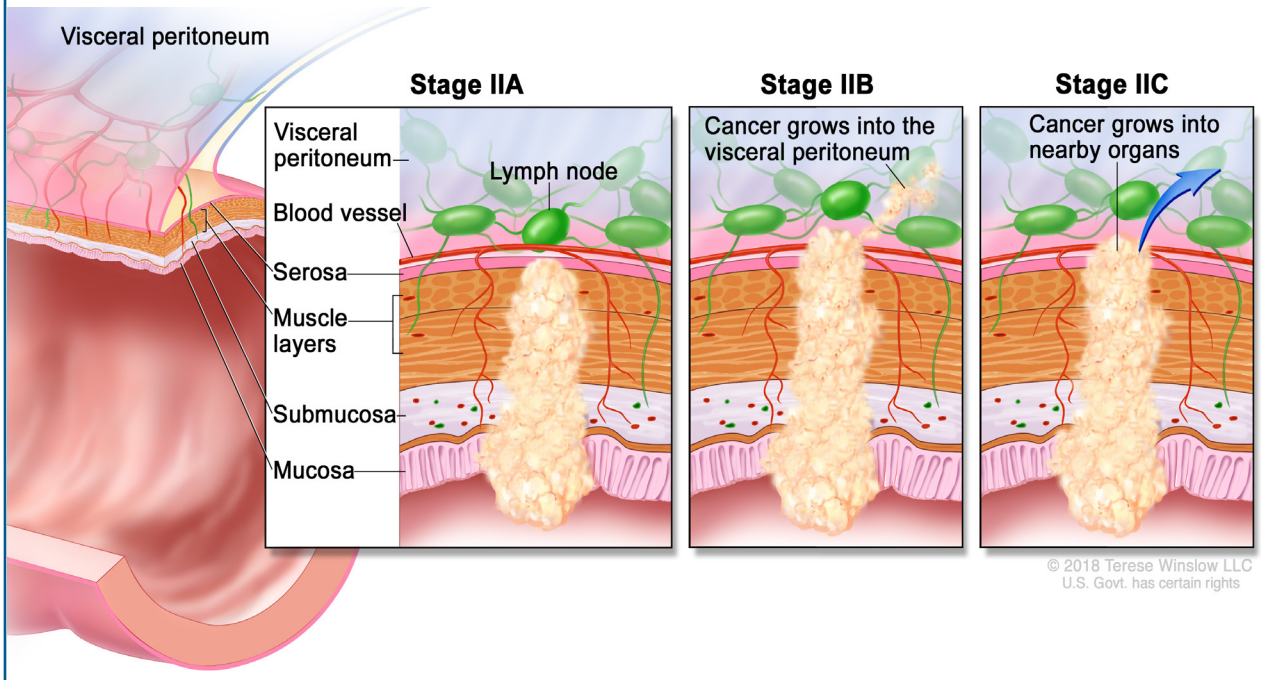
Stage 0
There are abnormal cells on the innermost layer of the rectal wall. These abnormal cells may later invade deeper layers of the rectal wall.

Stage I
The cancer has grown into either the second layer (submucosa) or the third layer (muscularis propria) of the rectal wall. There is no cancer in nearby lymph nodes or in areas outside the rectum.

Stage II
The cancer has grown through the rectal wall and possibly into nearby tissues, structures, or organs. There is no cancer in nearby lymph nodes or in areas far from the rectum.

Stage III
The cancer has spread to nearby lymph nodes or there are tumor deposits. Tumor deposits are small tumors in the fat around the rectum. Cancer has not spread to areas far from the rectum.

Stage IV
The cancer has spread to areas far from the rectum. Rectal cancer spreads most often to the liver and/or lungs.


Visceral peritoneum
Stage IIA
Visceral peritoneum
Lymph node
Blood vessel
Serosa
Muscle layers
Submucosa
Mucosa
Stage IIB
Cancer grows into the visceral peritoneum
Stage IIC
Cancer grows into nearby organs
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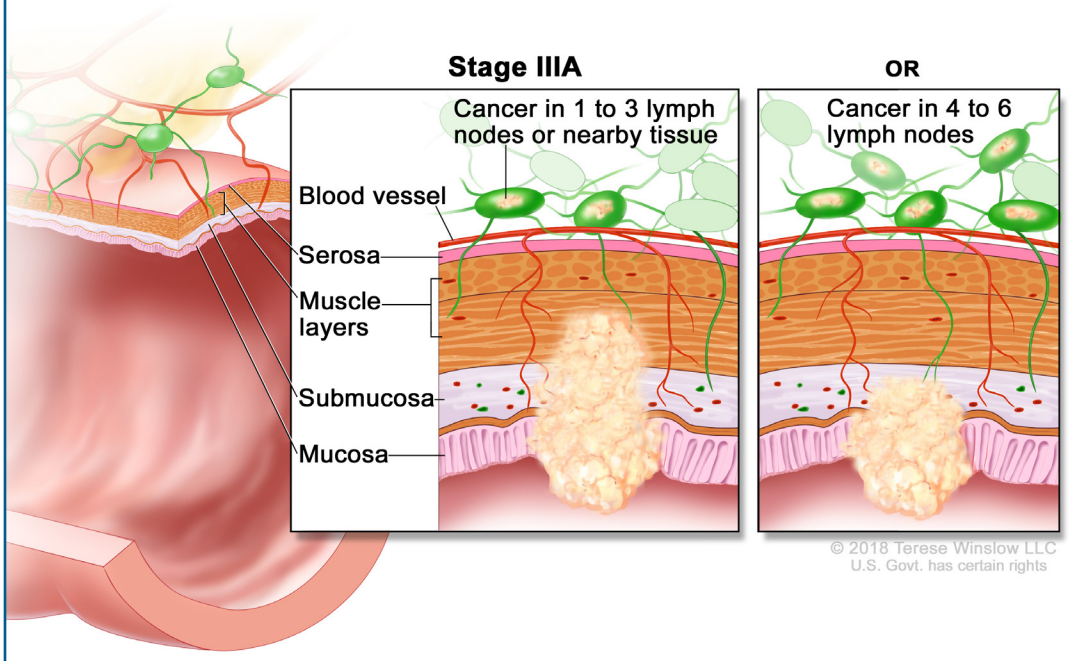
Stage IIIA
Cancer in 1 to 3 lymph nodes or nearby tissue
Blood vessel
Serosa
Muscle layers
Submucosa
Mucosa
OR
Cancer in 4 to 6 lymph nodes
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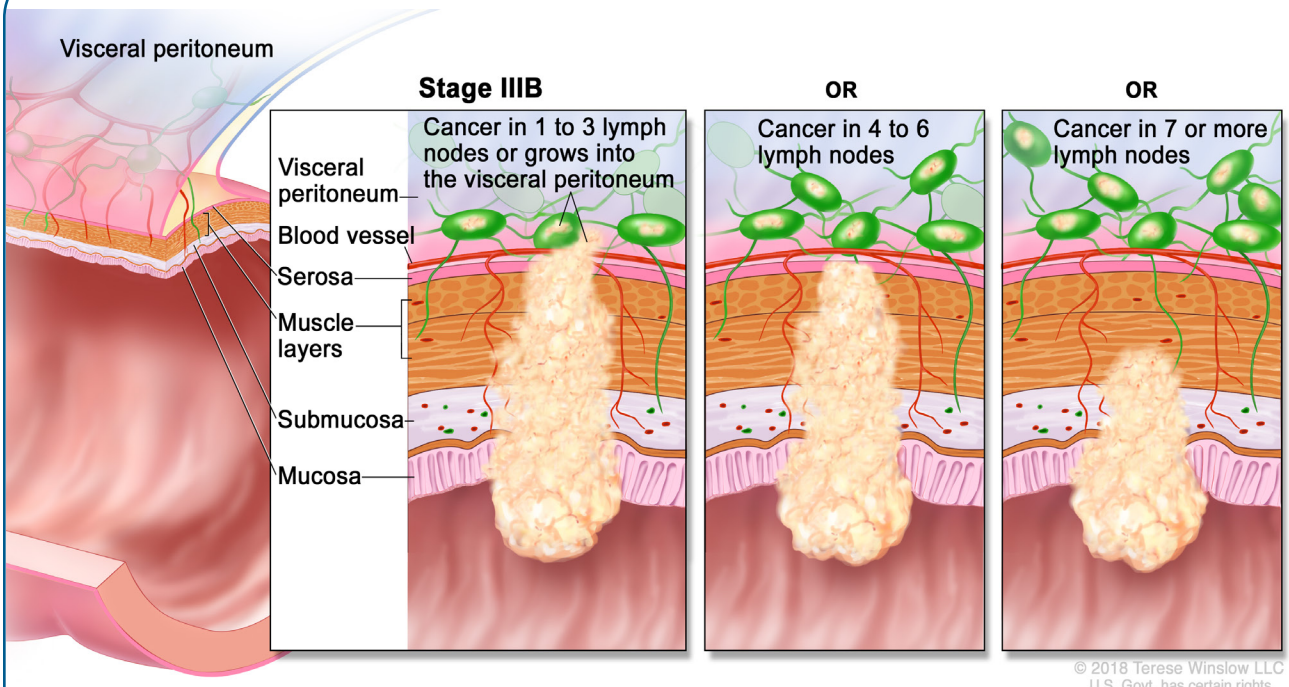
Visceral peritoneum
Stage IIIB
OR
OR
Visceral peritoneum
Blood vessel
Serosa
Muscle layers
Submucosa
Mucosa
Cancer in 1 to 3 lymph nodes or grows into the visceral peritoneum
Cancer in 4 to 6 lymph nodes
Cancer in 7 or more lymph nodes
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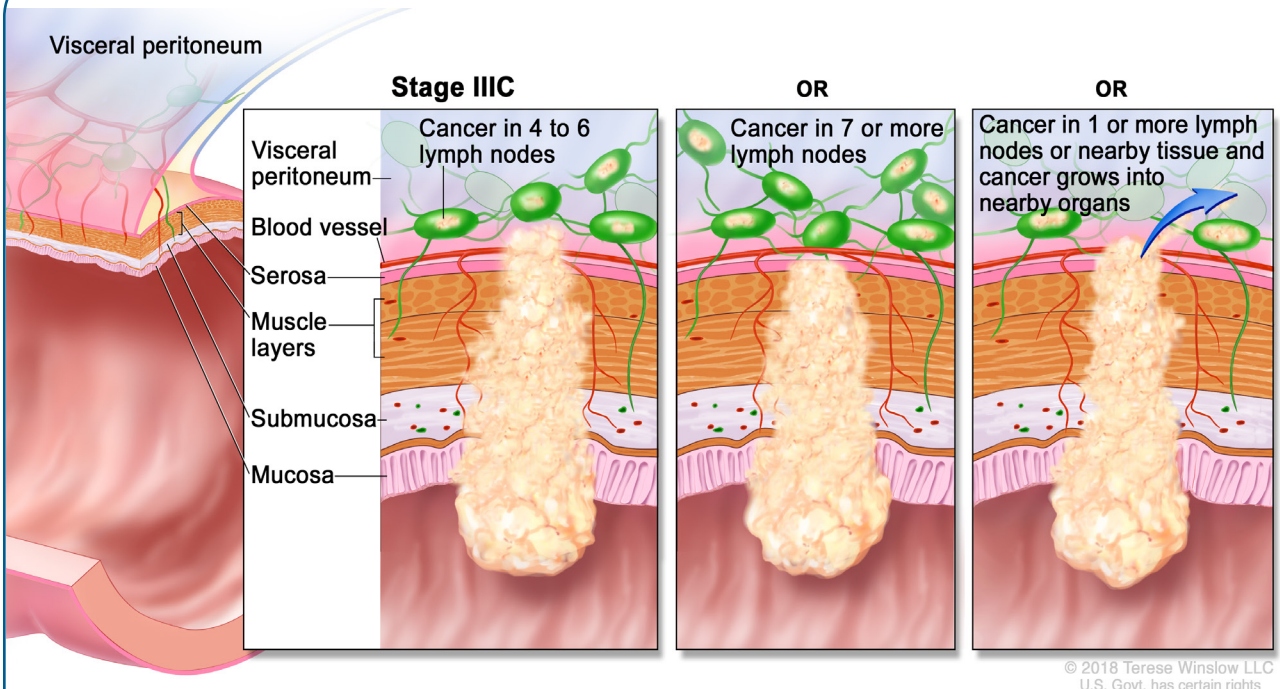
Visceral peritoneum
Stage IIIC
OR
OR
Visceral peritoneum
Blood vessel
Serosa
Muscle layers
Submucosa
Mucosa
Cancer in 4 to 6 lymph nodes
Cancer in 7 or more lymph nodes
Cancer in 1 or more lymph nodes or nearby tissue and cancer grows into nearby organs
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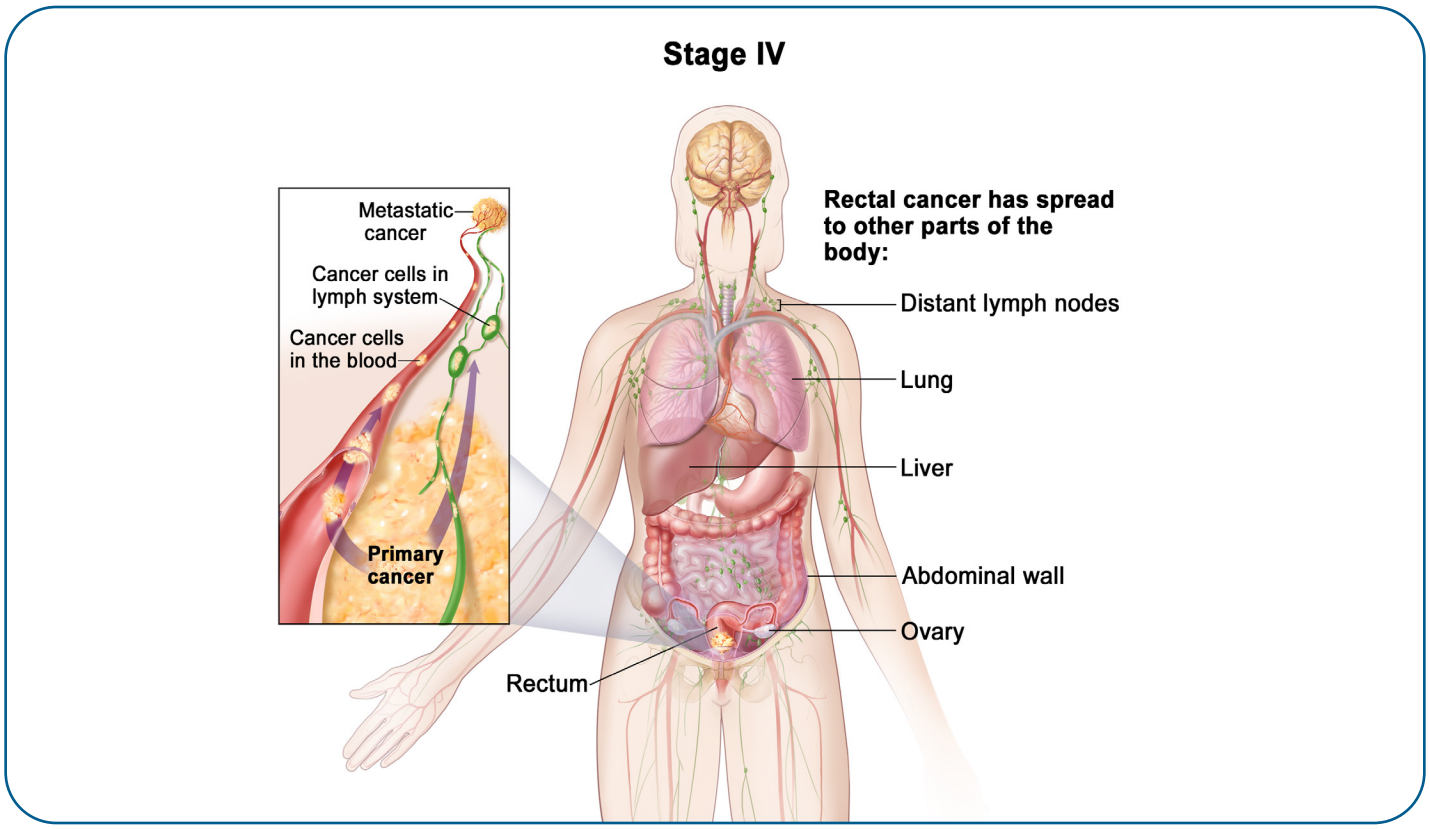

Key points

- The rectum is the last part of the large intestine. Stool is held in the rectum until it leaves the body through the anus.
- Many rectal cancers start in polyps called adenomas.
- Cancer that forms in an adenoma is known as an adenocarcinoma. Adenocarcinoma is the most common type of rectal cancer.
- After forming in a polyp, cancer can grow through the rectal wall and to other areas of the body.
- Cancer cells can spread to other body parts through lymph or blood. This is called metastasis.
- The cancer stage is an assessment of the extent of cancer in the body.
- There are five stages of rectal cancer. They are numbered 0, I (1), II (2), III (3), or IV (4).

2
Treatment planning

15 Health history
16 Biopsy
17 Colonoscopy
17 Pathology report
18 Blood tests
19 Imaging tests
22 Tumor biomarker testing
24 Fertility and family planning
25 Key points

Your doctors will make a treatment plan just for you. First, they need to gather information about the cancer and your general health. This chapter discusses testing and other steps needed to create your treatment plan.

There are several tests that can provide helpful information about which treatments are most appropriate for you. The health tests you may have before treatment are described next. Some tests are for anyone with rectal cancer, while others are for a select group.

Health history

Your medical history includes any health events and medicines you've taken in your life. It helps your doctors decide which treatments may be best for you. Rectal cancer and other diseases can run in families. For this reason, your doctor will ask about the medical history of your blood relatives. It is important to know who in your family has had what diseases and at what ages. Your doctor may ask about the health of your siblings, your parents and their siblings, and your grandparents and their siblings.

Inherited cancer syndromes

Rectal cancer most often occurs for unknown reasons. Some people, however, are more likely to get rectal cancer than the average person. This is because a mutation in their DNA was passed down to them, causing a disorder that increases the risk of rectal cancer. This is called an inherited cancer syndrome. There are two main inherited cancer syndromes for rectal cancer—Lynch syndrome and familial adenomatous polyposis (FAP). **Both Lynch syndrome and FAP are uncommon, occurring in fewer than 5 out of 100 people with rectal cancer.**

If your doctor thinks you might have an inherited cancer syndrome, you will be referred to a genetic counselor. A genetic counselor can talk with you and sometimes your family members about getting tested for syndromes related to rectal cancer. It is very important to meet with a genetic counselor prior to having any genetic testing. To be tested, you must provide a sample of blood or saliva. The sample is tested in a laboratory for changes (mutations) in genes that cause these syndromes.

Lynch syndrome

People born with Lynch syndrome, also known as hereditary non-polyposis colon cancer (HNPCC), are at high risk of developing rectal cancer and some other cancers, such as uterine (endometrial), ovarian, stomach, and urinary tract cancers. This syndrome is caused by inherited mutations of the genes that fix damaged DNA, called mismatch repair (MMR) genes. NCCN experts recommend testing everyone with rectal cancer for problems with the MMR genes. This helps determine who should be tested for Lynch syndrome.

Familial adenomatous polyposis (FAP)

FAP is a rare inherited syndrome that can cause hundreds to thousands of polyps to form in the colon and rectum. The polyps start as benign (non-cancerous) growths, but over time they can turn into cancer. Cancer is likely to develop by age 50 in people with classic FAP. A milder form called attenuated FAP causes fewer polyps and usually starts later in life.

Biopsy

A biopsy involves removing small pieces of tissue from the rectum, which are sent to a pathologist for testing. A biopsy of a rectal polyp or of suspected rectal cancer is usually done during a colonoscopy.

Rectal biopsy

First, your doctor will perform a digital rectal exam. Your doctor will insert a gloved and lubricated finger into your rectum to feel your rectum and nearby tissue from various angles. An anoscope may be used to help take tissue samples near the anus. This is a round, hollow tool that has a light. It will be inserted a few inches into your rectum. There are several possible techniques that may be used for the biopsy itself. Often, biopsy forceps or a wire loop called a snare is used.

For deeper samples, a sigmoidoscope will be used. This tool has a light, camera, and attachments that can be used to remove small pieces of tissue. Tissue samples may be taken using a special brush, forceps, or a swab.

Needle biopsy

If cancer is suspected to have spread to areas outside the rectum, such as the liver or lungs, a needle may be used to do the biopsy. In this case, a computed tomography (CT) scan or ultrasound may be used to help guide the needle into the tumor to remove the tissue sample. If a very thin needle is used, it is referred to as a fine-needle aspiration (FNA) or fine-needle biopsy (FNB). If a slightly larger needle is used to remove tissue, it is called a core needle biopsy.

Digital rectal exam

In a digital rectal exam (DRE), your doctor will insert a gloved and lubricated finger into your rectum. This allows your doctor to feel your rectum and nearby tissues from various angles.

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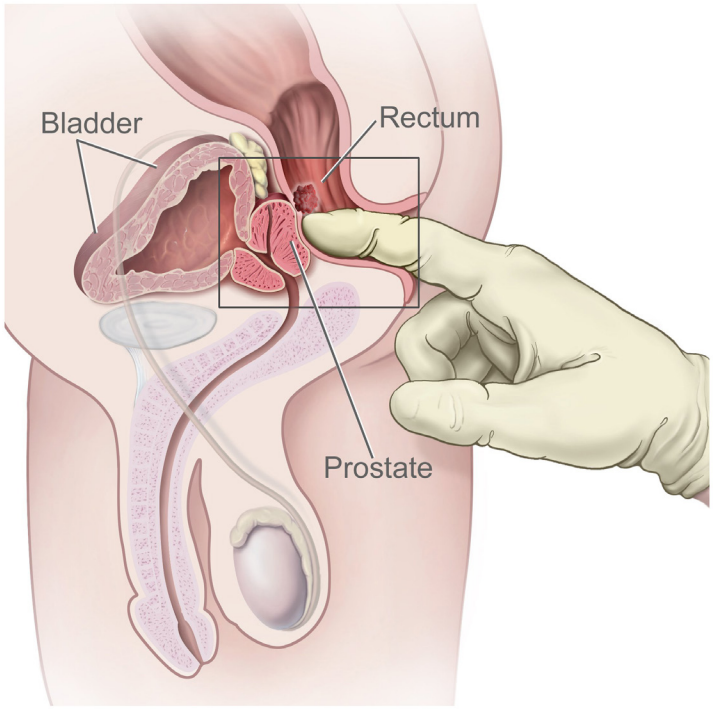


Colonoscopy

A colonoscopy is a procedure that allows your doctor to examine your colon and rectum for polyps and other diseases. A colonoscope is the device used for the test. Part of it looks like a thin tube. It has a light and camera. This part is inserted into the anus and gently guided through the large intestine.

You may be put on a liquid diet for 1 to 3 days before the test. You may also be instructed to take a laxative or an enema the night before. This will clean out your intestine. Right before the test, you may be given a sedative to lessen any pain. You will likely wear a hospital gown. The test will be performed while you lie on your side.

To see better, gas may be pumped into your intestine to make it bigger. You may be asked to shift a little to help your doctor guide the device. A picture of your rectum will be viewed by your doctor on a screen. If a polyp is found, a cutting tool will be inserted through the tube to remove it.

A colonoscopy takes about 30 to 60 minutes. Afterward, you may stay for another hour to allow any drugs that were used to wear off. However, you'll still need someone to drive you home. Most people feel normal the next day. Contact your doctor if you have severe pain, bloody stool, vomiting, or weakness.

Pathology report

Each time tissue is removed from the body and tested for cancer, the findings are detailed in a document called a pathology report. One key finding included in the report is the cancer grade, which is different than the cancer stage.

The cancer grade is a score of how fast the cancer is expected to grow and spread. It is based on how abnormal the cancer cells look when viewed under a microscope. Higher scores mean that the cancer is likely to grow and spread quickly. There are 5 possible grades:

- **GX** means that the grade cannot be determined.
- **G1** means that the cancer cells look similar to healthy cells. Also called well differentiated or low grade.
- **G2** means that the cancer cells are somewhat different than healthy cells. Also called moderately differentiated or intermediate grade.
- **G3** means that the cancer cells barely look like healthy cells. Also called poorly differentiated or high grade.
- **G4** means that the cancer cells are very abnormal looking. These are the highest grade and typically grow and spread faster than lower grade tumors. Also called undifferentiated or high grade.

Review your pathology report(s) with your doctor. Ask questions if you don't understand. This information can be complex. It is also a good idea to get a copy of your pathology report(s) and take notes.

Blood tests

Blood tests are used to look for signs of disease. A needle will be inserted into your vein to remove a sample of blood. The needle may bruise your skin and you may feel dizzy from the blood draw. The blood sample is sent to a lab where a pathologist will test it. A pathologist is a doctor who's an expert in testing cells to find disease.

Complete blood count

A complete blood count (CBC) measures the number of blood cells in a blood sample. It includes numbers of white blood cells, red blood cells, and platelets. White blood cells help the body fight infection. Red blood cells carry oxygen throughout the body. Platelets help wounds heal by forming blood clots. Cancer and other health problems can cause low or high blood cell counts.

Chemistry profile

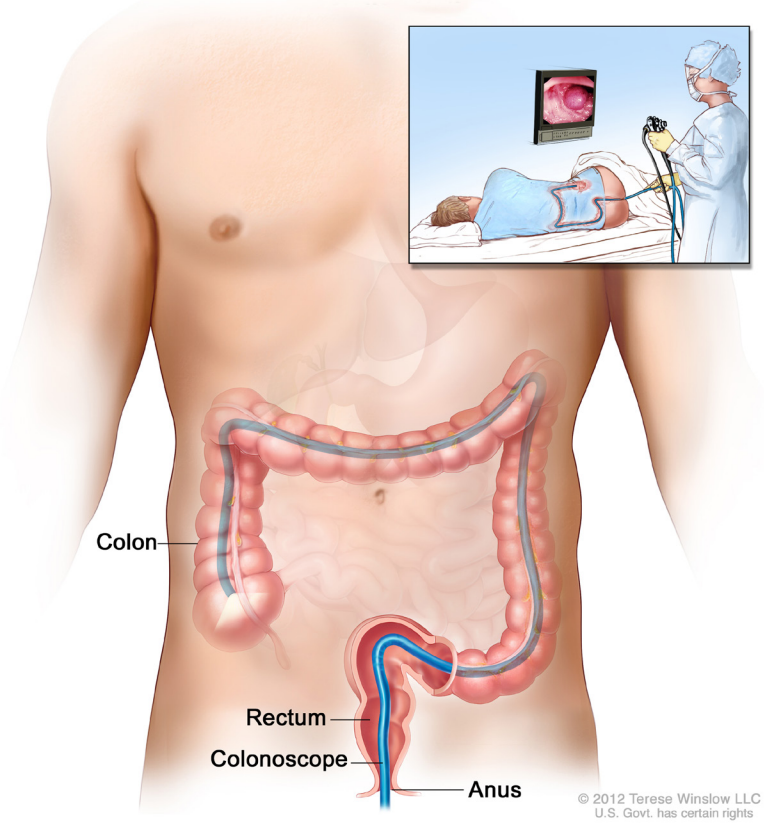
A chemistry profile, also called a complete metabolic panel (CMP), measures the level of certain substances in the blood. These substances include metabolites, electrolytes, fats, and proteins. This test provides information about how well your kidneys, liver, and other organs are working. Cancer and other health problems can cause higher or lower levels of these substances.

CEA blood test

When rectal cancer spreads, it can cause high or low levels of chemicals in the blood. One

Colonoscopy

A colonoscopy is a procedure that allows your doctor to look for and remove any abnormal tissue from the rectum and colon. A thin device is inserted through the anus, up the rectum, and into the colon. The device has a light, a camera, and a cutting tool.



example is a high carcinoembryonic antigen (CEA) level. CEA is normally low in healthy adults. Pregnant women and smokers may have higher CEA levels. High CEA levels could suggest the cancer has spread beyond the rectum.

Imaging tests

Imaging tests make pictures (images) of the insides of your body. They can show areas of cancer in the body. A radiologist is a doctor who is an expert in interpreting these images. Your radiologist will convey the imaging results to your cancer doctor (oncologist). This information helps your doctor plan the next steps of care.

Your treatment team will tell you how to prepare for these tests. You may need to stop taking some medicines and stop eating and drinking for a few hours before the scan. Tell your team if you get nervous in small spaces. This is known as claustrophobia. You may be given a sedative (medicine) to help you relax.

Some imaging tests use contrast. Contrast is a substance that is injected into your bloodstream. It makes the pictures clearer. Some people have an allergic reaction to contrast. Tell your doctor if you've had problems with contrast in the past. If you have had a reaction to a contrast agent in the past, you may be given or advised to take a steroid and an antihistamine medication (eg, Benadryl) before the scan.

Computed tomography (CT)

CT takes many pictures of areas inside of the body using x-rays. A computer combines the x-rays to make one detailed picture.

CT scans

If surgery is needed or being considered, CT scans of your chest, abdomen, and pelvis are recommended. They can show if the cancer has spread to other structures or organs, such as the liver or lungs.

The picture is saved for later viewing by a radiologist.

If surgery is needed or being considered, CT scans of your chest, abdomen, and pelvis are recommended. They can show if the cancer has spread to other structures or organs, such as the liver or lungs. Contrast should be used for CT of the abdomen and pelvis. Although contrast is not needed for the chest CT, expect to receive contrast if all three areas are being imaged at the same time. If you cannot have the contrast agent used for CT scans, magnetic resonance imaging (MRI) (described next) may be used to see the abdomen and pelvis instead.

In a few select situations, CT may be combined with positron emission tomography (PET). PET/CT is not often used for rectal cancer. It may be used to help determine if surgery is an option for metastatic disease, or in the rare event that you can't receive contrast for CT or MRI. PET involves first injecting a radioactive drug (a "tracer") into the body. The radiotracer is detected with a special camera during the scan.

Magnetic resonance imaging (MRI)

MRI uses a magnetic field and radio waves to make pictures of areas inside the body. MRI is especially good at making clear pictures of areas of soft tissue. Unlike a CT scan, MRI does not use radiation.

If surgery is needed or being considered, an MRI will be ordered to determine the extent of the cancer in the pelvis. An MRI can show how deep into the rectal wall the cancer has grown and whether there is cancer in nearby lymph nodes. Contrast may or may not be used. In addition to MRI of the pelvis, MRI may also be used to look for areas of cancer in the

MRI

If surgery is needed or being considered, MRI is used to determine the extent of the cancer in the pelvis. An MRI can show how deep into the rectal wall the cancer has grown and whether there is cancer in nearby lymph nodes.

abdomen. This may be the case if you cannot receive the contrast agent used for a CT scan. If you cannot undergo an MRI scan, a CT scan of your pelvis and endorectal ultrasound (see below) may be ordered.

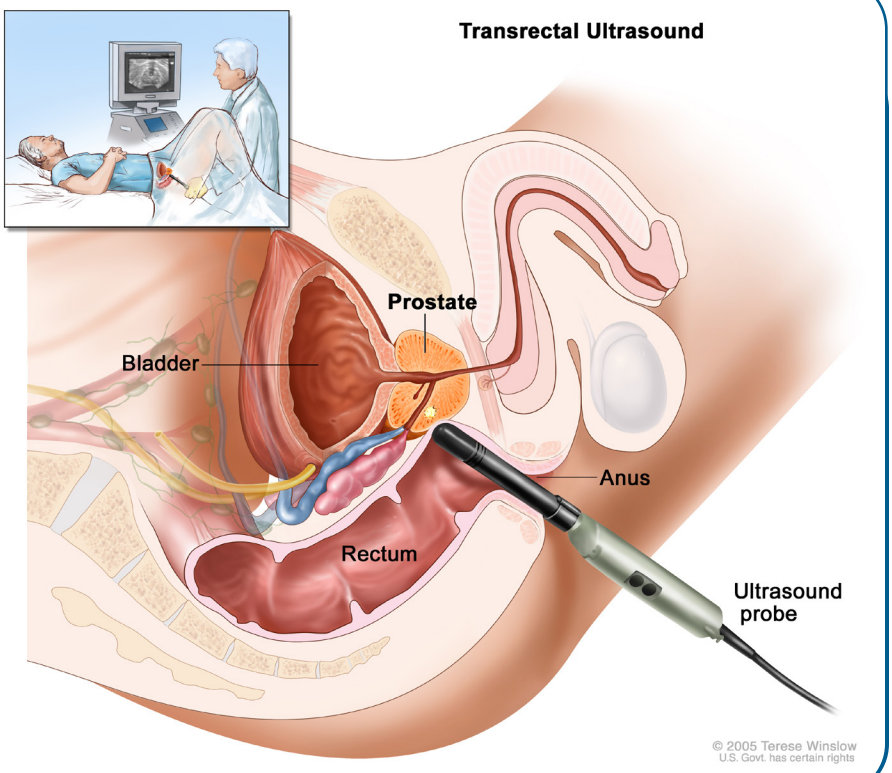
A gel may be inserted into the rectum before MRI imaging. You will need to wear a coil device that sends and receives radio waves. The coil device looks like a brace. It covers your body from below your chest to the top of your legs. Straps may be used to help you stay in place. An MRI may cause your body to feel a bit warm.

Endorectal ultrasound

Instead of pelvic MRI, you may receive an endorectal ultrasound (EUS). This test can also show the extent of cancer in the pelvis. A small probe is inserted into the rectum. The probe emits sound waves that bounce off tissue and make echoes. The echoes form a picture that can be seen by your doctor on a screen. If needed, a biopsy of lymph nodes or other structures near the rectum may be performed using EUS guidance.

Endorectal ultrasound

If you cannot have a pelvic MRI (because you have a pacemaker, for example) or if MRI images were unhelpful, you may have an endorectal ultrasound and CT of the pelvis. This test may also be ordered if your doctor knows the cancer has not grown far into the rectal wall.



Tumor biomarker testing

Biomarkers are specific features of cancer cells. Biomarkers can include proteins made in response to the cancer and changes (mutations) in the DNA of the cancer cells.

Biomarker testing is used to learn whether your cancer has any targetable changes to help guide your treatment. If it does, targeted therapy or immunotherapy may be a treatment option if needed. The results of biomarker testing can also be used to determine whether you meet the criteria for joining certain clinical trials. Testing for biomarker mutations involves analyzing a piece of tumor tissue in a laboratory.

Other names for biomarker testing include molecular testing, genomic testing, tumor gene testing, and mutation testing. Biomarkers used for colorectal cancer treatment planning are described below.

For everyone with rectal cancer

MMR/MSI testing

In normal cells, a process called mismatch repair (MMR) fixes errors (mutations) that happen when the DNA divides and makes a copy of itself. If the MMR system isn't working right, errors build up and cause the DNA to become unstable. This is called microsatellite instability (MSI).

There are two kinds of laboratory tests for this biomarker. Depending on the method used, an abnormal result is called either microsatellite instability high (MSI-H) or mismatch repair deficient (dMMR). Both results mean the same thing. Tumors that **are not** MSI-H/dMMR are referred to as microsatellite stable (MSS) or mismatch repair proficient (pMMR).

MMR or MSI testing is recommended for everyone diagnosed with rectal cancer. If the cancer is dMMR/MSI-H, you will also be tested for Lynch syndrome.

For metastatic (stage IV) rectal cancer

KRAS and *NRAS* mutations

RAS is a family of genes that includes the *HRAS*, *KRAS*, and *NRAS* genes. Some rectal cancers have mutations in the *KRAS* or *NRAS* genes. These genes are often referred to as simply the "*RAS*" genes. Genes work as instruction manuals for making important proteins. As a result, the proteins these genes make are overactive and can tell the cancer to grow.

Some treatments for metastatic rectal cancer do not work if the *RAS* genes are abnormal. For this reason, NCCN experts only recommend testing for *KRAS* and *NRAS* mutations if the cancer has spread to other parts of your body (metastasized).

BRAF mutation

Fewer than 10 out of 100 rectal cancers have a mutation called *BRAF* V600E. This mutation may cause cancer cells to grow and spread quickly. NCCN experts recommend everyone with metastatic rectal cancer have their cancer tested for this mutation. If cancer has spread to other parts of the body and the cancer has this mutation, treatments that target abnormal *BRAF* may be helpful.

HER2 testing

HER2 is a protein involved in normal cell growth. Having too much HER2 can cause cancer cells to grow and spread quickly. Only about 3 to 5 out of 100 people with rectal cancer have too much HER2. HER2 testing is recommended for everyone with metastatic rectal cancer unless there is a known *RAS* or *BRAF* mutation. HER2 testing can help your doctor determine whether systemic therapies that target HER2 may help you.

Radiation side effects can differ from patient to patient and male to female. If you're a female patient, please talk to your doctor about intercourse after radiation treatment. How to prevent pain during intercourse after radiation may be an uncomfortable topic to discuss but it will be worth it in the end.

– Marisa
Rectal cancer survivor

Fertility and family planning

For unknown reasons, rectal cancer is being diagnosed more often in young adults. Some cancer treatments can cause or contribute to infertility. If you want the option of having children after treatment or are unsure, tell your doctors. There are ways to be able to have children after cancer treatment. This is called fertility preservation.

If you are of childbearing age, your doctor will discuss any fertility-related risks of your treatment plan with you. You may be referred for counseling about fertility preservation options. Some fertility preservation options are described below.

Sperm banking

Sperm banking stores semen for later use by freezing it in liquid nitrogen. The medical term for this is semen cryopreservation.

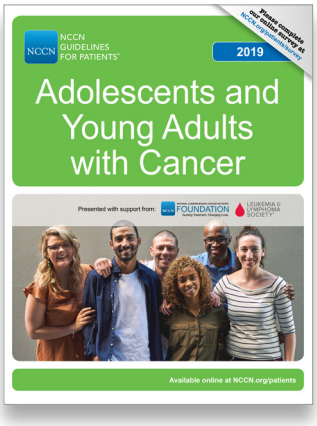
Egg freezing

Like sperm banking, unfertilized eggs can be removed, frozen, and stored for later use. The medical term for this is oocyte cryopreservation.

Ovarian tissue banking

This method involves removing part or all of an ovary and freezing the part that contains the eggs. The frozen tissue that contains the eggs can later be unfrozen and put back in the body.

For more information on this topic, see the *NCCN Guidelines for Patients: Adolescents and Young Adults with Cancer* at NCCN.org/patientguidelines.



Key points

- Everyone with rectal cancer should be asked about their family health history. Inherited syndromes related to rectal cancer include Lynch syndrome (HNPCC) and FAP.
- An MRI of the pelvis can show how deep into the rectal wall the cancer has grown and whether there is cancer in nearby lymph nodes.
- CT scans of the chest, abdomen, and pelvis can show if the cancer has spread to other structures or organs, such as the liver or lungs.
- MMR or MSI testing is recommended for everyone diagnosed with rectal cancer.
- Testing for mutated *KRAS/NRAS* and *BRAF* genes is recommended for everyone with metastatic rectal cancer.
- HER2 testing is also recommended for everyone with metastatic rectal cancer unless there is a known *KRAS/NRAS* or *BRAF* mutation.
- Young adults diagnosed with rectal cancer should be counseled about fertility-related risks of treatment and options for fertility preservation.

3
Overview of treatments

27 Rectal surgery
32 Systemic therapy
35 Radiation therapy
37 Other treatments
38 Clinical trials
40 Key points

This chapter describes the rectal cancer treatments you may have. The specific treatments you receive will depend on the extent of the cancer, your overall health, and other factors.

Rectal surgery

This section describes the types of surgery used for rectal cancer. Another name for surgery that removes tissue, or all or part of an organ, is resection. You may have more than one type of surgery. Surgery to remove liver or lung metastases is described in *Part 5: Metastatic cancer*.

Your treatment team will tell you how to prepare for and what to expect during surgery. You may need to stop taking some medicines to reduce the risk of severe bleeding. Eating less, changing to a liquid diet, or using enemas or laxatives will empty your colon and rectum for surgery. Right before surgery, you will be given general anesthesia.

Transanal surgery

Some small tumors that have not invaded the muscle layer of the rectum wall can be removed by transanal surgery. In staging terms, doctors describe these tumors as T1, N0, M0. This type of surgery does not require cutting into the abdomen. Instead, the rectal tumor and some surrounding tissue is removed through the anus.

A goal of surgery is to remove the tumor in one piece to avoid leaving cancer cells behind. Some normal-looking tissue around the tumor is also removed. This is called the surgical margin.

A benefit of transanal surgery is that the sphincter is not removed. The sphincter is the round muscle in the anus that opens and closes to control bowel function. Leaving the sphincter intact allows for normal bowel function and eliminates the need for a permanent colostomy bag.

A drawback to transanal surgery is that lymph nodes are not removed. You will also be watched very closely for the cancer returning. More details on transanal surgeries are given next.

Transanal local excision

This surgery removes tumors located towards the bottom of the rectum, near the anus. The surgeon cuts through all layers of the rectal wall to remove the cancer and some surrounding normal rectal tissue.

Either local or general anesthesia is used to prevent pain during surgery. Local anesthesia involves numbing the treatment site or the entire pelvis. General anesthesia uses medicines that cause a deep, sleep-like state.

Before surgery, the tumor location is confirmed with a rectal exam. Your position during surgery depends on the location of the tumor in the rectum. You may lie face down on a table that can be raised in the middle, so that your buttocks are higher than your head and feet. Or, you may lie on your back with your legs raised in stirrups.

A few tools will be used to assess the tumor. Your buttocks will be taped apart. A tool called a retractor is used to spread open the anus. A second retractor is used to expand the rectum. The surgery starts with marking the surgical margin. Your surgeon will make a dotted line around the tumor with a heated wire. The tumor will then be removed.

After removing the cancerous area and some nearby healthy tissue, the hole in the rectal wall is then closed. At the end, the surgeon will perform a proctoscopic exam to make sure the rectum was not closed or narrowed. A proctoscopic exam involves examining the rectum with a short, rigid tool called a proctoscope. Proctoscopes are hollow and have a small light at the end that allows the rectum to be inspected.

Transanal endoscopic microsurgery

This type of transanal surgery removes tumors in the middle or upper rectum. General anesthesia with a nerve block is used. Based on the tumor location, you may lie on your stomach, back, or side.

A scope is inserted into the rectum. The scope has a light, camera, air ports, and an open channel. Air is pumped into the rectum to expand it. The light and camera allow the surgeon to see the tumor. The tumor is then removed with small tools inserted through the open channel.

Transabdominal surgery

Transabdominal surgery involves cutting into the abdomen to reach and remove the cancerous tissue. The rectal tumor, surrounding tissue, and nearby lymph nodes are removed. All of the removed tissue is tested by a pathologist. The results of testing are used to determine the cancer stage.

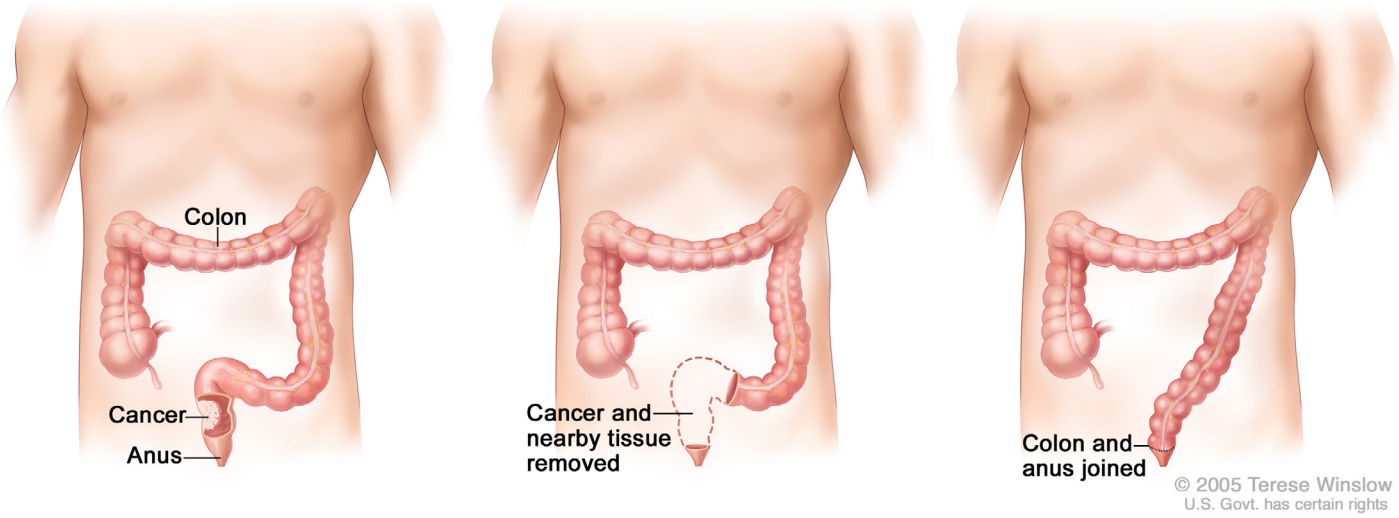
Transabdominal surgery for rectal cancer involves total mesorectal excision (TME). The mesorectum is the fatty tissue surrounding the rectum that contains blood vessels and lymph nodes. A total mesorectal excision removes the mesorectum in one piece. Nerves are not removed.

An anastomosis is a type of surgery that connects two parts of the bowel. After transabdominal surgery for rectal cancer, the colon is often attached directly to the anus. This is called a coloanal anastomosis. It preserves the possibility of near-normal bowel movements.

If the colon cannot be connected to the anus, a colostomy is made. A colostomy connects a part of the colon to the outside of the abdomen. This creates an opening, called a stoma, on the surface of the abdomen. Stool exits the body through the stoma and goes into a bag attached to the skin. A colostomy may only be needed temporarily to allow the rectum to heal before an anastomosis. In some cases, it is necessary to surgically remove the anus. In this case, a colostomy is permanent. Colostomy is also known as diversion because it diverts (redirects) the flow of stool.

Low anterior resection (LAR)

LAR is the type of surgery used for tumors in the mid to upper rectum. The cancerous area of the rectum and part or all of the sigmoid colon is removed. When possible, the colon is connected to the remaining rectum.



There is more than one type of transabdominal surgery. The method used depends on the location and extent of the cancer. At least 12 lymph nodes should be removed during all types of transabdominal surgery. Types of transabdominal surgery are described next.

Low anterior resection

A low anterior resection (LAR) is used for tumors in the mid to upper rectum. In addition to the cancerous area of the rectum, part or all of the sigmoid colon is removed. The sigmoid colon is the section of colon closest to the rectum. When possible, the colon is connected to the remaining rectum. This is called a colorectal anastomosis.

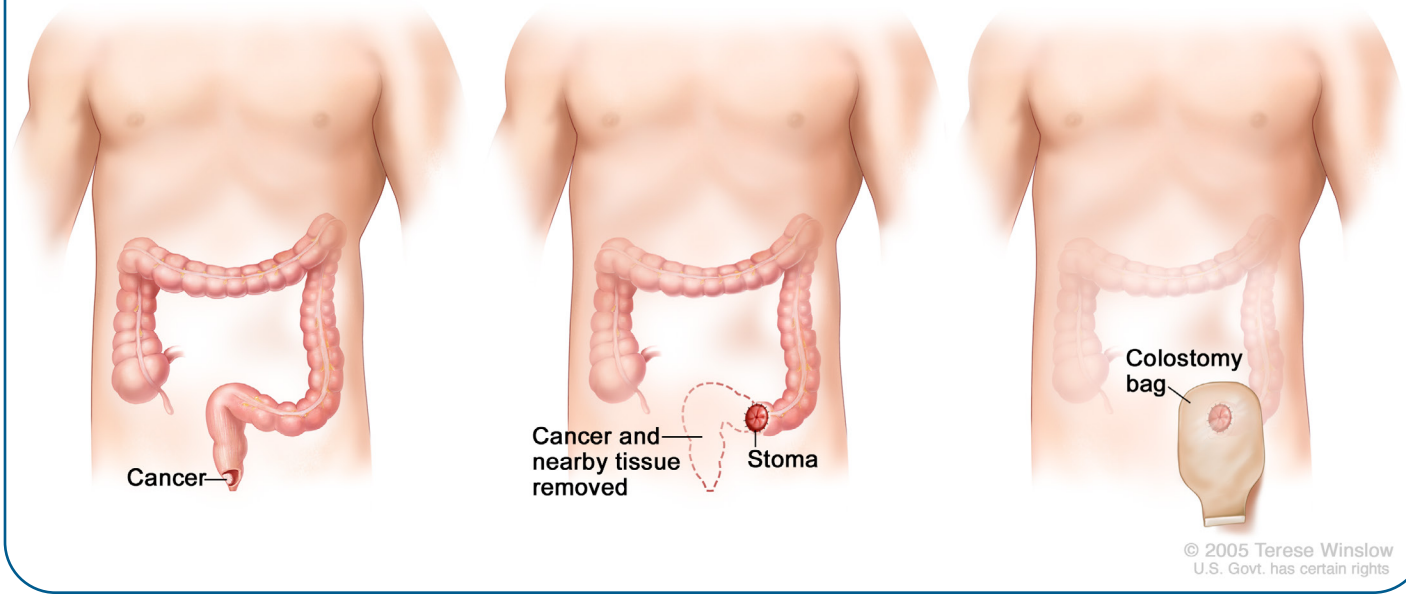
Abdominoperineal resection

Abdominoperineal resection (APR) is used for tumors in the lower rectum. These tumors may have grown into the anus or nearby muscle (levator ani). An APR requires a second cut into the skin between the anus and genitals. This area is called the perineum.

APR typically involves removing the area where the rectum and the colon meet, the rectum, the anus, and other tissue. In some cases, the levator muscles are also removed. The outer ring of muscle in the anus may be spared. A permanent colostomy, described on the previous page, is needed.

Abdominoperineal resection (APR)

APR is used for tumors in the lower rectum that may have grown into the anus or nearby muscle. It involves removing the rectum and anus and creating a permanent colostomy for stool to leave the body.



Minimally invasive surgery

Instead of open surgery, a minimally invasive method may be an option. This method involves making a few small cuts into the abdominal wall, and possibly a cut between the legs. Thin tools are inserted into the cuts that allow the surgeon to see and remove tissue. Minimally invasive surgery should only be carried out by a surgeon experienced in this method. Also, this surgery should only be done on tumors that are not likely to return after treatment. Minimally invasive surgery is also known as laparoscopic surgery.

Side effects of surgery

Surgery causes pain, swelling, and scars. Pain and swelling often fade away in the weeks following surgery. Scars from surgery do not disappear completely. As with any surgery, there is a chance of complications. These include major blood loss, infection, heart attack, and blood clots. There can also be injury to nearby organs. Your surgical team will design care to minimize these risks.

There are short- and long-term side effects specific to rectal surgery. In the days or weeks following surgery, stool may leak out where the bowel was reconnected (anastomotic leak). This can cause pain, fever, and life-threatening infection. Your urine stream may be delayed during healing. If nerves or other structures are cut, bladder and sexual functioning may be impaired.

It is common for scar tissue to form after abdominal surgery. In some cases, however, there is so much scar tissue that the bowel becomes obstructed (blocked). In rare cases, the bowel may become tightly wrapped around an area of scar tissue. This is an emergency that requires surgery.

A possible long-term effect of rectal surgery is hernia. Hernia refers to organs pushing through tissues or muscles weakened by surgery.

Not all side effects of surgery are listed here. Ask your treatment team for a complete list of common and rare side effects.

Systemic therapy

Systemic therapy is the use of medicine to kill cancer cells. The medicine(s) travel in the bloodstream to reach cells throughout the body. Systemic therapy can kill healthy cells in addition to cancer cells. The damage to healthy cells causes potentially harsh side effects, such as hair loss, cracked skin, and mouth sores. Most commonly, systemic therapy is given intravenously. This means the medicine is slowly infused into the bloodstream through a vein.

Types of systemic therapy include chemotherapy, targeted therapy, and immunotherapy. Unlike chemotherapy, targeted therapy and immunotherapy are most effective at treating cancers with specific features, called biomarkers. These newer types of systemic therapy may be treatment options for patients with advanced rectal cancer.

Systemic therapies are often combined to treat cancer. For example, several chemotherapy drugs may be given together, or a chemotherapy drug may be given with a targeted therapy. Combinations of systemic therapies are called regimens.

If systemic therapy is planned, the regimen(s) given depends (in part) on:

- Whether the cancer has metastasized (spread to areas outside the rectum)
- The results of tumor biomarker testing (see page 22 for more information)
- Your general health

Ask your treatment team for a full list of common and rare side effects of each systemic therapy you are receiving. More information on the main types of systemic therapy is provided below.

Chemotherapy

Chemotherapy is the most commonly used type of systemic therapy for rectal cancer. It is given in cycles of treatment days followed by days of rest. This allows your body to recover before the next cycle. Cycles vary in length depending on which drugs are used. For example, you might receive chemotherapy every day for 1 week followed by 3 weeks with no chemotherapy. These 4 weeks make up one cycle. Often, a cycle is 14, 21, or 28 days long. Some commonly used combination chemotherapy regimens used to treat rectal cancer are listed in Guide 1.

Chemotherapy can be very harsh on your body and can have many unpleasant side effects. The negative effects of chemotherapy are worse with some drugs and regimens than others. Your treatment team will consider whether certain regimens would be too harsh for you.

Regimens considered more intensive that may be harsher on the body include FOLFOX, CAPEOX, FOLFIRI, and FOLFOXIRI. Any chemotherapy regimen that has “OX” in the name means the regimen includes oxaliplatin. Oxaliplatin can damage the nervous system. Any chemotherapy regimen that has “IRI” in the name means the regimen contains irinotecan. Irinotecan tends to cause more abdominal cramping, nausea, diarrhea, and hair loss, but does not have the effects on nerves seen with oxaliplatin.

Guide 1
Combination chemotherapy regimens

FOLFOX	**FOL** = Leucovorin calcium **F** = Fluorouracil **OX** = Oxaliplatin
CAPEOX	**CAPE** = Capecitabine **OX** = Oxaliplatin
FOLFIRI	**FOL** = Leucovorin calcium **F** = Fluorouracil **IRI** = Irinotecan
FOLFOXIRI	**FOL** = Leucovorin calcium **F** = Fluorouracil **OX** = Oxaliplatin **IRI** = Irinotecan
5-FU/LV	**FU** = Fluorouracil **LV** = Leucovorin calcium

If regimens containing oxaliplatin and/or irinotecan are expected to be too harsh, your doctor may recommend 5-FU/leucovorin or capecitabine alone. However, these regimens can also cause potentially harsh side effects. Capecitabine can cause a side effect known as hand-foot syndrome. Symptoms include redness, swelling, and pain on the palms of the hands, bottoms of feet, or both. Sometimes blisters appear. Your dose of capecitabine may be changed at the earliest signs of hand-foot syndrome.

Targeted therapy

Targeted therapy is treatment with drugs that target a specific or unique feature of cancer cells. There are different types of targeted therapy that work in one or more ways. Targeted therapy can treat rectal cancer by:

- Targeting and attacking specific receptors found on cancer cells
- Stopping overactive proteins inside the cancer cell from sending growth signals
- Stopping the growth of new blood vessels into rectal tumors, "starving" them

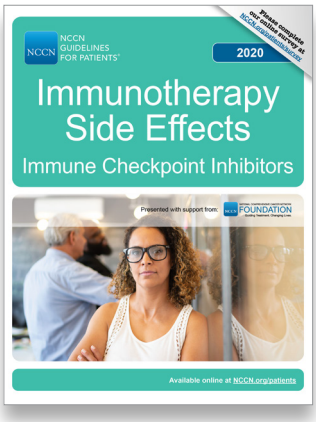
A targeted therapy known as a biologic may be added to chemotherapy to treat rectal cancer.

Immunotherapy

The immune system is your body's natural defense against infection and disease. Immunotherapy increases the activity of parts of your immune system, improving your body's ability to find and destroy cancer cells. Drugs called checkpoint inhibitors are a type of immunotherapy used to treat rectal cancers that have certain biomarkers.

Your immune system has important white blood cells called T cells. T cells' main job is to attack harmful things in your body, like bacteria, viruses, and cancer. They do this with the help of certain proteins on their surface. When T-cell proteins "meet" certain proteins on cancer cells, it is called an immune checkpoint. The T cell is "told" to leave the cancer cell alone instead of attacking it. Checkpoint inhibitors can stop the T-cell protein from meeting the cancer cell protein. This means that the T cells will do their job and attack the cancer cells.

Checkpoint inhibitors currently used to treat some rectal cancers include pembrolizumab (Keytruda®) and nivolumab (Opdivo®). Nivolumab may be given with another immunotherapy drug called ipilimumab (Yervoy®).



For information on the side effects of immune checkpoint inhibitors, see the *NCCN Guidelines for Patients Immunotherapy Side Effects: Immune Checkpoint Inhibitors* at NCCN.org/patientguidelines.

What to expect: Chemotherapy

- Side effects of chemotherapy depend on many things (drug type, dosage, length of treatment) and are different for everyone.
- Common side effects include nausea, fatigue, not feeling hungry, diarrhea, hair loss, and mouth sores.
- Some chemotherapy drugs can damage your sensory nerves. Symptoms of this include numbness, tingling, and pain in fingers and toes.

Radiation therapy

Radiation therapy uses high-energy rays to kill cancer cells.

External beam radiation therapy

External beam radiation therapy (EBRT) is the type of radiation used most often to treat rectal cancer. This method delivers radiation from outside the body using a large machine. The radiation passes through skin and other tissue to reach the tumor.

Types of EBRT include three-dimensional conformal radiation therapy (3D-CRT), intensity-modulated radiation therapy (IMRT), and stereotactic body radiation therapy (SBRT). All types are conformal, which means that the radiation beams are shaped to the cancer site. This helps minimize damage to healthy tissue. The type used depends on the location and size of the tumor(s) and other factors. SBRT is a special radiation technique described in more detail in *Part 5, Metastatic cancer* beginning on page 50.

Long-course chemoradiation

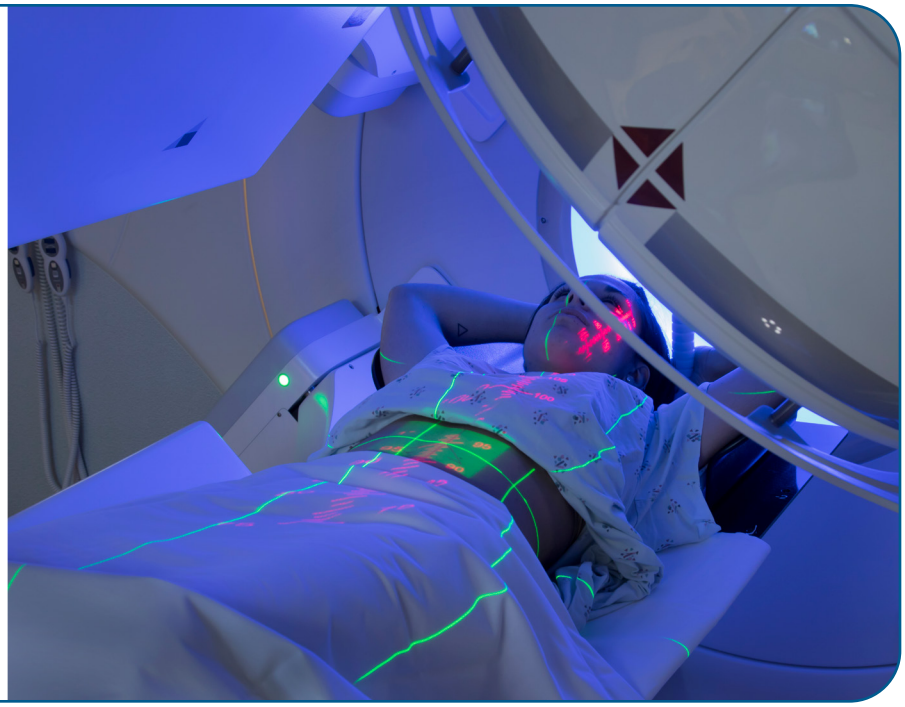
In the treatment of rectal cancer, external radiation therapy is often used in combination with chemotherapy. Radiation therapy is given in 25 to 28 treatment sessions, called fractions. Chemotherapy is given during the same time period. This is known as long-course chemoradiation.

Short-course radiation therapy

Another method of radiation treatment for rectal cancer is short-course radiation therapy. This method delivers a higher dose of radiation over a much shorter time period, typically in 5 treatment sessions. Chemotherapy is not given.

External beam radiation therapy (EBRT)

A large machine aims radiation at the tumor, passing through skin and other tissue to reach it.



If external radiation is planned

A planning session, called simulation, is needed before treatment begins. After being guided into the treatment position, pictures of the cancer sites are made with an imaging test. Using the pictures, the radiation team plans the best radiation dose and number of treatments.

During treatment, you will lie on a table as you did for simulation. Devices may be used to keep you from moving, with you sometimes lying on your back or on your stomach. This helps to target the tumor. Radiation beams are aimed with help from ink marks on your skin or marker seeds in the tumor.

You will be alone in the treatment room. A technician will operate the machine from a nearby room and will be able to see, hear, and speak with you at all times. As treatment is given, you may hear noises. You will not see, hear, or feel the radiation. One session can take less than 10 minutes. Sessions may take longer if imaging to verify the position is done before each treatment. Imaging before treatment is called image-guided radiation therapy (IGRT). The imaging in this case checks the position of the cancer and the accuracy of the setup but does not tell the physician about the response of the tumor itself.

Other types of radiation therapy

Radiation can also be aimed directly at the tumor site during surgery, after the tumor is removed. The goal is to destroy any cancer cells that may be left in the tissue that was connected to the tumor. This is known as intraoperative radiation therapy (IORT).

Another type involves using a wire with a radiation source at the tip to treat rectal tumors directly. This is known as endorectal brachytherapy.

> “Being diagnosed with stage IV rectal cancer at age 36 was overwhelming. Fortunately, there are many fantastic online resources and support groups. It helped me to talk to other patients and know that I'm never alone.
>
> – Peg
> Rectal cancer survivor

Other treatments

See *Part 5, Metastatic cancer* beginning on page 50 for information on local therapies that may be used to treat rectal cancer that spreads to the liver, lungs, or other areas.

What are some side effects of radiation?

- Feeling tired and worn out
- Hair loss in the treated area
- Changes to urination and bowel movements
- Diarrhea
- Nausea/vomiting
- Late side effects can include infertility, sexual dysfunction, bowel dysfunction, reduced bone density, and second cancers
- Vaginal dilators can help with sexual dysfunction--see the Survivorship section of this guide for more information on sexual health
- Not all side effects are listed here. Ask your treatment team for a full list.

Clinical trials

A clinical trial is a type of medical research study. After being developed and tested in a laboratory, potential new ways of fighting cancer need to be studied in people. If found to be safe and effective in a clinical trial, a drug, device, or treatment approach may be approved by the U.S. Food and Drug Administration (FDA).

Everyone with cancer should carefully consider all of the treatment options available for their cancer type, including standard treatments and clinical trials. Talk to your doctor about whether a clinical trial may make sense for you.

Phases

Most cancer clinical trials focus on treatment. Treatment trials are done in phases.

- **Phase I trials** study the dose, safety, and side effects of an investigational drug or treatment approach. They also look for early signs that the drug or approach is helpful.
- **Phase II trials** study how well the drug or approach works against a specific type of cancer.
- **Phase III trials** test the drug or approach against a standard treatment. If the results are good, it may be approved by the FDA.
- **Phase IV trials** study the long-term safety and benefit of an FDA-approved treatment.

Who can enroll?

Every clinical trial has rules for joining, called eligibility criteria. The rules may be about age, cancer type and stage, treatment history, or general health. These requirements ensure that participants are alike in specific ways and that the trial is as safe as possible for the participants.

Informed consent

Clinical trials are managed by a group of experts called a research team. The research team will review the study with you in detail, including its purpose and the risks and benefits of joining. All of this information is also provided in an informed consent form. Read the form carefully and ask questions before signing it. Take time to discuss with family, friends, or others you trust. Keep in mind that you can leave and seek treatment outside of the clinical trial at any time.

Start the conversation

Don't wait for your doctor to bring up clinical trials. Start the conversation and learn about all of your treatment options. If you find a study that you may be eligible for, ask your treatment team if you meet the requirements. If you have already started standard treatment you may not be eligible for certain clinical trials. Try not to be discouraged if you cannot join. New clinical trials are always becoming available.

Frequently asked questions

There are many myths and misconceptions surrounding clinical trials. The possible benefits and risks are not well understood by many with cancer.

Will I get a placebo?

Placebos (inactive versions of real medicines) are almost never used alone in cancer clinical trials. It is common to receive either a placebo with a standard treatment, or a new drug with

a standard treatment. You will be informed, verbally and in writing, if a placebo is part of a clinical trial before you enroll.

Do I have to pay to be in a clinical trial?

Rarely. It depends on the study, your health insurance, and the state in which you live. Your treatment team and the research team can help determine if you are responsible for any costs.

Finding a clinical trial

In the United States

NCCN Cancer Centers
NCCN.org/cancercenters

The National Cancer Institute (NCI)
cancer.gov/about-cancer/treatment/clinical-trials/search

Worldwide

The U.S. National Library of Medicine (NLM)
clinicaltrials.gov/

Need help finding a clinical trial?
NCI's Cancer Information Service (CIS)
1.800.4.CANCER (1.800.422.6237)
cancer.gov/contact

Key points

- Transanal surgery may be an option for some very early rectal cancers. The rectal tumor is removed through the anus.
- Transabdominal surgery involves cutting into the abdominal wall. It is used for many rectal cancers. The tumor, surrounding tissue, and nearby lymph nodes are removed.
- Systemic therapy is the use of medicine to kill cancer cells throughout the body. Types of systemic therapy include chemotherapy, targeted therapy, and immunotherapy.
- Radiation therapy uses high-energy rays to kill cancer cells. External radiation therapy is the type of radiation used most often to treat rectal cancer.
- Radiation therapy and chemotherapy can be used together to treat rectal cancer. This is known as chemoradiation.
- Clinical trials give people access to investigational treatments that may, in time, be approved by the U.S. Food and Drug Administration (FDA).

4
Nonmetastatic cancer

42 Malignant polyps
44 Rectal cancer requiring surgery
47 Surveillance
48 If cancer comes back
49 Key points

This chapter is a treatment guide for rectal cancer that has not spread to areas far from the rectum.

Rectal cancer often forms in polyps on the lining of the rectum. It can also take the form of lesions on the inside of the rectum.

Malignant polyps

A polyp is an overgrowth of cells on the inner lining of the rectal wall. The most common type is called an adenoma. Adenomas are considered pre-cancerous because, while it may take many years, they can become invasive rectal cancer. Cancer that forms in an adenoma is known as an adenocarcinoma.

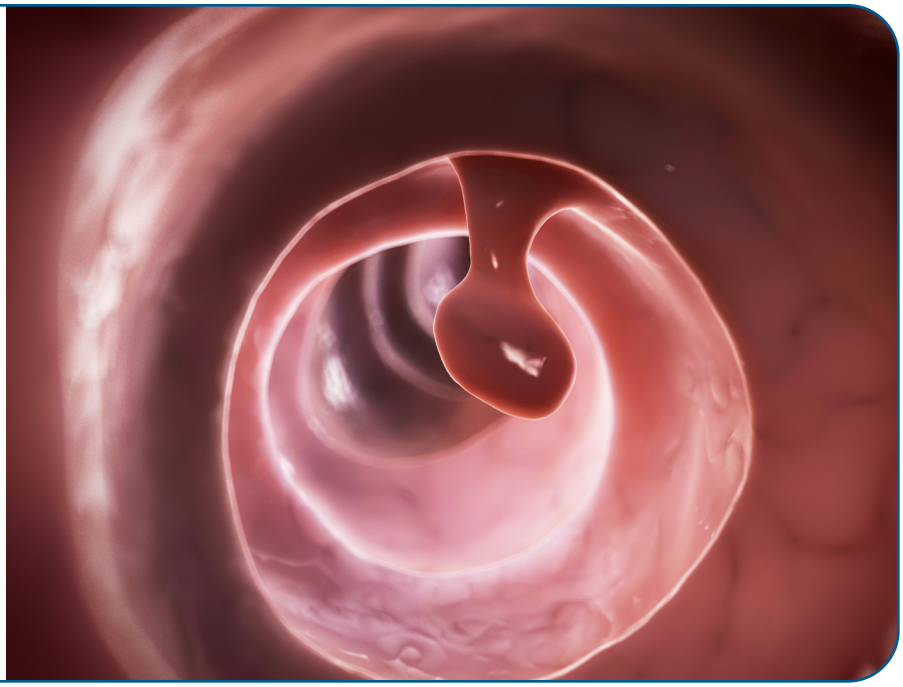
The two main shapes of polyps are sessile and pedunculated. Pedunculated polyps are shaped like mushrooms and stick out from the rectal wall. They have a stalk and round top. Sessile polyps are flatter and do not have a stalk.

If not found and removed early enough, cancer that starts in a polyp can grow into the rectum wall. This is referred to as a malignant polyp. Most polyps can be removed during a colonoscopy, using a minor surgical procedure called a polypectomy. In some cases, no further treatment is needed after a polypectomy.

In other cases, resection (surgical removal) of a bigger piece of the rectum is needed. This depends on the shape of the polyp (pedunculated or sessile), the results of the polypectomy, and the results of testing the removed tissue. Before deciding whether resection is needed after a polypectomy, your

Pedunculated polyp

Pedunculated polyps have a stalk and are mushroom-like in appearance. No further treatment is needed for a malignant pedunculated polyp that was completely removed in one piece and found to be low risk based on testing.



doctor will review the results of testing with you and discuss your options.

Good polypectomy results

No further treatment is needed for a malignant **pedunculated** polyp that was completely removed in one piece and found to be low risk based on testing. Malignant **sessile** polyps, however, are more likely to return after polypectomy and often have other poor treatment outcomes. For this reason, surgery is a recommended treatment option for sessile polyps—even those with good results of polypectomy and testing. Observation is also an option for sessile polyps. If surgery is planned for a sessile polyp, transanal surgery may be an option. Otherwise, transabdominal surgery is recommended. See *After transanal surgery* and *After transabdominal surgery* below for next steps.

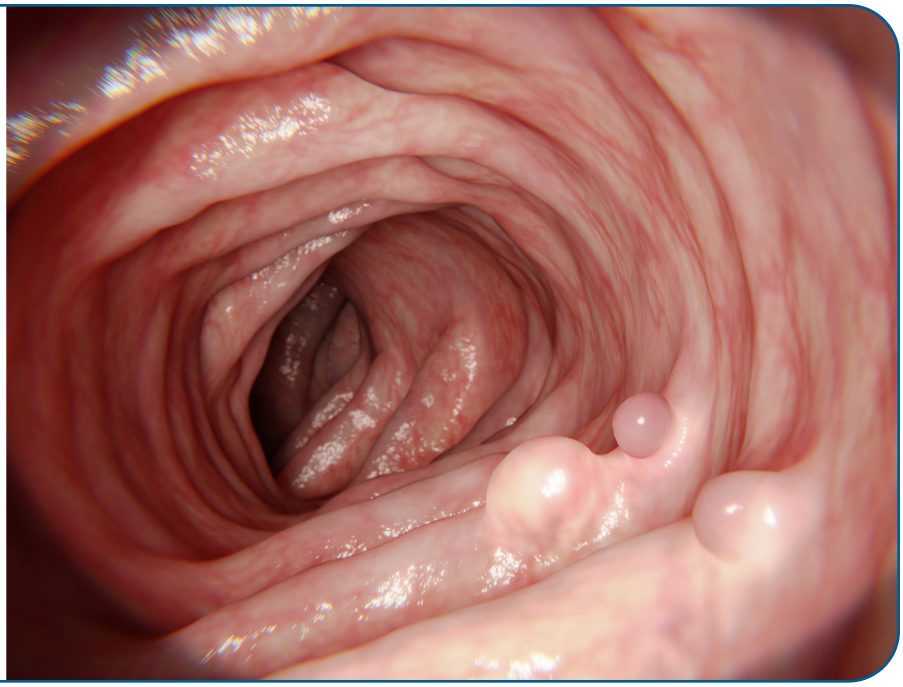
Other polypectomy results

If the polyp is not removed in one piece, or if testing of the removed polyp finds high-risk features, surgery is needed. Transanal surgery may be an option for small tumors that have not invaded the muscle layer of the rectal wall. See *After transanal surgery* on the next page for information on next steps.

Rectal tumors that cannot be removed by transanal excision are removed by transabdominal resection. This type of surgery requires cutting into the abdomen to reach and remove the cancer. See *After transabdominal surgery* on the next page for information on next steps.

Sessile polyp

Sessile polyps don't have a stalk and can be harder to spot than pedunculated polyps. Malignant sessile polyps are more likely to return after polypectomy than pedunculated polyps. Surgery is an option for sessile polyps.



Rectal cancer requiring surgery

If cancer that formed in a polyp is not caught early enough to be removed by polypectomy, surgery is needed. Surgery is also needed for rectal cancer that forms in lesions on the rectal wall.

The true extent of the cancer cannot be known until after surgery. It can be estimated, however, based on the results of testing. This is known as the clinical (pre-surgery) stage. The clinical stage is used to determine your treatment options. Testing includes:

- Colonoscopy
- Biopsy
- Testing of removed tissue
- Mismatch repair (MMR) or microsatellite instability (MSI) testing
- Blood tests including complete blood count (CBC), chemistry profile, carcinoembryonic antigen (CEA) level
- CT scan of the chest
- CT or MRI of the abdomen
- MRI of the pelvis
- Endoscopic rectal ultrasound (ERUS) and CT of the pelvis if you cannot have pelvic MRI
- Additional imaging tests as needed

More information on these tests can be found in *Part 2, Treatment planning*.

Early rectal cancer

If testing indicates that the tumor has not grown beyond the second layer of the rectal wall (the submucosa), it is a T1 tumor. Transanal surgery may be an option. Other specific criteria must be met for transanal surgery to be considered. Otherwise, transabdominal surgery is recommended.

If testing indicates that the tumor has invaded the muscle layer of the rectum wall but has not grown beyond it (a T2 tumor), transabdominal resection is recommended.

See *After transanal surgery or After transabdominal surgery* below for next steps.

After transanal surgery

If the cancer is confirmed to be T1 (has not grown farther than the second layer of the rectum wall) and the tumor is considered low risk, no further treatment is needed.

If high-risk features are found, or if the cancer is T2, more treatment is needed. T2 tumors have invaded the muscle layer of the rectal wall. In this case, the preferred next treatment is transabdominal surgery. See *After transabdominal surgery* below for next steps.

Another option is treatment with either short-course radiation therapy or chemoradiation next. If there are no signs of cancer after treatment with short-course radiation or chemoradiation, a watch-and-wait approach may be taken. A watch-and-wait approach is only an option for highly selected patients who agree to careful follow-up programs with endoscopic exam and rectal MRI. Or, you may have chemotherapy with FOLFOX or CAPEOX to kill any cancer cells that remain in the body.

If there are signs of cancer after radiation or chemoradiation, transabdominal resection is recommended. Chemotherapy with FOLFOX or CAPEOX may be given after surgery to kill any cancer cells that remain in the body.

See *Surveillance* on page 47 for next steps.

After transabdominal surgery

The tissue and lymph nodes removed during transabdominal surgery are sent to a pathologist to be examined. The pathologist assesses how far the cancer has grown within the rectal wall and assigns the cancer a stage. The stage is used to determine whether more treatment is needed.

If the cancer has not spread beyond the muscle layer of the rectum wall (either a T1 or a T2 tumor), the cancer is stage I. No further treatment is needed.

If the cancer is stage II or III, more treatment is almost always needed. Stage II rectal cancer has spread beyond the rectum into nearby areas, but not to nearby lymph nodes. Stage III rectal cancers have spread to nearby lymph nodes. Observation may be an option after surgery for some very low-risk stage II cancers.

Next treatments may include:

- Chemoradiation followed by chemotherapy
- Chemotherapy followed by chemoradiation
- Chemotherapy alone

Chemotherapy medicines recommended for use with radiation include 5-fluorouracil (5-FU) and capecitabine. If you are unable to tolerate either of these, a third option for use with radiation is bolus 5-FU/leucovorin. Bolus refers to the use of a single dose given over a short period of time. When chemotherapy is given by itself (not as part of chemoradiation), either FOLFOX or CAPEOX is recommended.

See *Surveillance* on page 47 for next steps.

We want your feedback!

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Take our survey to let us know what we got right and what we could do better:

NCCN.org/patients/feedback

Locally advanced rectal cancer

The term locally advanced is used to describe rectal cancer that:

- Has spread to nearby lymph nodes, or
- Has grown all the way through the rectum wall (a T3 or T4 tumor), or
- Cannot be removed with surgery or for which surgery is otherwise not an option

Total neoadjuvant therapy (TNT)

Unlike early rectal cancers, most locally advanced cancers are treated first with 12 to 16 weeks of chemotherapy **and** either long-course chemoradiation or short-course radiation therapy. This treatment approach is known as total neoadjuvant therapy (TNT). If these treatments work well and the tumor responds, surgery may be an option. For the chemotherapy portion of treatment before surgery, usually either FOLFOX or CAPEOX is given. FOLFOXIRI may be used in some cases. More information on chemoradiation and radiation is provided below.

Neoadjuvant therapy

Sometimes, only long-course chemoradiation or short-course radiation therapy is given first, followed by surgery if possible. This approach is known as simply neoadjuvant therapy. In this case, chemotherapy with FOLFOX or CAPEOX is given after surgery and is called adjuvant therapy. More information on chemoradiation and radiation is provided below.

About chemoradiation and radiation

Long-course chemoradiation involves receiving radiation therapy in 25 to 28 treatment sessions, called fractions. Chemotherapy with either 5-fluorouracil (5-FU) or capecitabine is given during the same time period. If you are unable to tolerate either of these, a third option for use with radiation is bolus 5-FU and leucovorin. Bolus refers to the use of a single dose given over a short period of time.

For many years, long-course chemoradiation was the standard approach for treating locally advanced rectal cancer. Another option shown to have similar outcomes is short-course radiation therapy. Short-course radiation therapy delivers a higher dose of radiation over a much shorter time period, typically in five treatment sessions. Chemotherapy is not given.

Order of treatments

The order of treatments for locally advanced rectal cancer can vary. Chemotherapy may be given first, followed by chemoradiation or short-course radiation therapy. Or, chemoradiation or short-course radiation therapy is given first, followed by chemotherapy. Your treatment team will determine the optimal treatment order for you.

After treatment

After treatment, imaging tests will be ordered to see if surgery is now an option. This is called restaging. If surgery is possible, surgery is recommended for most people and a transabdominal resection is performed. Chemotherapy with FOLFOX or CAPEOX may be given after surgery.

If chemotherapy and radiation therapy work extremely well and no cancer can be detected in the body, you may be given the option to take a “watch-and-wait” approach instead of surgery. Some research suggests that, in these patients, having surgery does not always lead to better treatment outcomes. However, the benefits and harms of taking a watch-and-

wait approach compared to proceeding with surgery are not fully known. The decision to pursue surgery or not should be one that you and your doctor make together after careful consideration.

If surgery is still not an option after chemotherapy and/or radiation, treatment with systemic therapy is recommended. Your doctor will consider the following in order to select an appropriate regimen for you:

- Chemotherapy medicines you've already received
- Whether the tumor has any biomarker mutations (see page 22 for information on biomarkers)
- How well you are expected to tolerate certain systemic therapies

Surveillance

Follow-up testing is started when there are no signs of cancer after treatment. It is helpful for finding new cancer growth early.

Stage I

Surveillance for stage I rectal cancer depends on the type(s) of surgery received. If you had transanal surgery only, regular proctoscopies and colonoscopies are needed. If transabdominal surgery with full surgical staging was performed, only regular colonoscopies are needed. See Guide 2.

If you don't have any symptoms, other testing is not needed on a regular basis. Your doctor may order imaging tests if they suspect the cancer may have come back or spread.

Guide 2
Surveillance for stage I rectal cancer

Transanal surgery only	• **Proctoscopy** every 3 to 6 months for the first 2 years, then every 6 months for another 3 years
	• **Colonoscopy** 1 year after surgery
	  • If an advanced adenoma is not found, repeat in 3 years, then every 5 years
	  • If an advanced adenoma is found, repeat in 1 year

Transabdominal resection	**Colonoscopy** 1 year after surgery
	  • If an advanced adenoma is not found, repeat in 3 years, then every 5 years
	  • If an advanced adenoma is found, repeat in 1 year

Stages II and III

In addition to colonoscopy, surveillance for stage II and III rectal cancer includes physical exams, CEA blood tests, and CT scans. Rising CEA levels may be a sign that rectal cancer has returned. CT scans can find metastases, should any develop. The recommended schedule for surveillance testing is shown in the Guide 3.

In addition to surveillance testing, a range of other care is important for cancer survivors. See *Part 6: Survivorship* section of this guide for more information.

If cancer comes back

Cancer that returns to the rectum or to nearby areas in the pelvis is called a local recurrence. Treatment options depend on whether the cancer is (or may become) resectable. If the cancer is small enough, your first treatment may be surgery. Chemoradiation is given after surgery to kill any remaining cancer cells. Otherwise, chemotherapy and either long-course chemoradiation or short-course radiation therapy is given before surgery.

If surgery is not possible, you may have treatment with systemic therapy, chemoradiation, or short-course radiation. If systemic therapy is planned, your doctor will consider the following in order to select an appropriate regimen for you:

- Chemotherapy medicines you've already received

Guide 3
Surveillance for stage II and stage III rectal cancer

Medical history and physical exam	Every 3–6 months for first 2 years, then every 6 months for 3 more years
CEA blood test	Every 3–6 months for first 2 years, then every 6 months for 3 more years
CT of chest, abdomen, and pelvis	Every 6–12 months for 5 years
Colonoscopy	**No prior total colonoscopy:** 3 to 6 months after surgery **Prior total colonoscopy:** 1 year after surgery If no advanced adenoma, repeat in 3 years, then every 5 years If advanced adenoma, repeat in 1 year

- Whether the tumor has any of the biomarkers (see *Part 2, Treatment planning* for information on biomarkers)
- How well you are expected to tolerate certain systemic therapies.

If cancer returns to areas far from the rectum, it is called a distant recurrence. See *Part 5: Metastatic cancer for information*.

Key points

- No further treatment is needed for a malignant pedunculated polyp that was completely removed in one piece and found to be low risk based on testing.
- Surgery is an option for malignant sessile polyps, which are more likely to return after polypectomy than pedunculated polyps.
- Transanal surgery may be an option for some very early rectal cancers that have not grown beyond the second layer of the rectum wall.
- Transabdominal surgery is recommended for early rectal cancers that do not meet the criteria for transanal surgery.
- No further treatment is needed for cancers found to be stage I after transabdominal surgery.
- More treatment is almost always needed for cancers found to be stage II or stage III after transabdominal surgery. Treatment after surgery often includes chemotherapy and chemoradiation.
- The term "locally advanced" is used to describe rectal cancer that has grown all the way through the rectum wall and into nearby areas or that has spread to nearby lymph nodes.
- Most locally advanced cancers are treated first with chemotherapy and either long-course chemoradiation or short-course radiation therapy. This is known as total neoadjuvant therapy. If these treatments work well, surgery may be an option.
- Colonoscopies are used to monitor for the return of all stage I rectal cancers. If transanal surgery was the only type of surgery performed, proctoscopies are also needed for the first 5 years after surgery.
- Surveillance for stage II and III rectal cancer includes physical exams, CEA blood tests, colonoscopies, and CT scans.

5
Metastatic cancer

51 Local therapies for metastases
53 Stage IV rectal cancer
55 Surveillance
56 Metastasis at recurrence
57 Key points

Rectal cancer spreads most often to the liver, sometimes to the lungs, and less often to the abdomen or other areas. Cancer may have already spread by the time it is diagnosed. This is stage IV rectal cancer. More commonly, metastases develop after treatment for non-metastatic rectal cancer.

About half of people with rectal cancer will develop metastases. Most will be liver metastases that cannot be removed with surgery. This section discusses both metastatic disease found at diagnosis (stage IV rectal cancer) and metastatic disease that develops after treatment. Although both are considered metastatic cancer, there are some differences in how these types of cancer are treated.

Local therapies for metastases

Treatment options for metastatic rectal cancer may include local therapies. Local therapies are treatments that target the metastatic tumors directly. Some may be used in place of or in addition to surgery.

Resection

Surgery, also called resection, is the preferred way to remove rectal cancer that has spread to the liver or lungs. If surgical resection is not possible, or is not expected to completely remove the metastases, treatment with image-guided ablation (described below) or other local therapies described in this section may be an option.

Another name for surgery to remove a metastasis is called a metastasectomy. The methods of surgery for metastasectomy vary based on where the cancer has spread. Rectal cancer spreads most often to the liver. A liver resection, removing the part of the liver with cancer, is a possibility if you will have enough healthy, noncancerous liver after surgery. If your doctor thinks your liver will be too small after the cancerous part is removed, you may need to have it enlarged. This is done using a minimally invasive procedure called portal vein embolization (PVE). An interventional radiologist uses a catheter inserted into certain veins in the liver. This blocks the blood vessel to the liver tumor, which causes the healthy part of the liver to grow larger.

For lung metastases, removing the part of the lung(s) with cancer (lung resection) may be an option.

Interventional oncology/radiology treatments

Interventional oncology/radiology is a medical specialty that uses imaging techniques, such as computed tomography (CT), ultrasound, magnetic resonance imaging (MRI), and positron emission tomography (PET)/CT to deliver minimally invasive cancer treatments. The use of imaging during the procedure allows the doctor to precisely target the tumor(s). Interventional oncology/radiology treatments are also known as image-guided therapies.

Image-guided ablation

Image-guided ablation destroys small liver or lung tumors with little harm to nearby tissue. It may be performed by either an interventional radiologist or a surgeon. Ablation may be used by itself for small tumors that can be completely destroyed, or it may be used in addition to surgery. Ablation will only be used

if all visible areas of cancer can be destroyed. In some cases, ablation can be done as an outpatient in the interventional radiology department in a single session.

Currently, the most commonly used ablative therapies are radiofrequency (RFA) and microwave ablation. These methods kill cancer cells using heat. The delivery of cold energy—called cryoablation—is also used, mostly for lung tumors. Other less common ablative methods include irreversible electroporation, also known as "nanoknife" and laser ablation. All ablative therapies are delivered using a specially designed needle called a “probe” or “electrode” placed directly into or next to the target tumor. All types of ablation kill cancer cells by delivering targeted energy into the tumor while sparing or minimizing damage to normal tissues.

Intra-arterial liver-directed therapies

Treatment with intra-arterial therapy may be an option for liver tumors that do not improve with chemotherapy and that cannot be resected or ablated. Intra-arterial therapy treats liver tumors with chemotherapy beads (chemoembolization) or radioactive spheres (radioembolization). If radiation spheres are used, it is known as selective internal radiation therapy. These procedures may be performed by either an interventional oncologist/ radiologist or a surgeon.

A catheter is inserted into an artery in your leg or wrist and guided to the liver tumor(s). Once in place, the spheres or beads are inserted into the blood vessel. The spheres accumulate in the tumor and deliver radiation internally to the tumor, causing the cancer cells to die. The chemotherapy beads can also work to stop the blood supply to the tumor and starve the tumor. The chemotherapy or radiation further damage the cancer cells and cause the tumor to shrink. Bland embolization is an option for some people with liver metastases. It is given when embolization with chemotherapy is not an option.

Although not performed by an interventional radiologist, another intra-arterial liver-directed therapy is hepatic arterial infusion chemotherapy (HAIC). While chemotherapy is most often given intravenously to reach cells throughout the body, it can also be given directly to the liver to treat metastases. Using a port or pump that is placed during surgery, the drugs are funneled directly into the artery leading to the liver. HAIC should only be done at treatment centers with experience in this method.

SBRT

Stereotactic body radiation therapy (SBRT) is a highly specialized type of radiation therapy. In SBRT, treatment is typically delivered in 5 or fewer sessions, called fractions. High doses of radiation are delivered to a metastatic site or sites using very precise beams. The treatment setup for SBRT is often more complex than typical external radiation therapy because higher doses of radiation therapy are delivered. SBRT may be used to treat rectal cancer that has spread to the liver, lungs, or bone.

Stage IV rectal cancer

If cancer was found in areas far from the rectum when you were first diagnosed, the cancer is stage IV. Testing for suspected (or known) stage IV rectal cancer includes:

- Colonoscopy
- Proctoscopy (as needed)
- CT scan of the chest
- CT or MRI of the abdomen
- MRI of the pelvis (with or without contrast)
- Complete blood count (CBC) and chemistry profile
- Blood test for carcinoembryonic antigen (CEA) level
- Biomarker testing: *RAS* and *BRAF* mutations; mismatch repair (MMR)/ microsatellite instability (MSI) status; and HER2 overexpression (HER2 testing not needed if there is a *RAS* or *BRAF* mutation)
- Biopsy if needed

More information on these tests can be found in the *Treatment planning* section beginning on page 14.

Cancer in the liver and/or lungs

When possible, surgery and/or other local therapies are the preferred way to treat rectal cancer that has spread to the liver or lungs. To determine if surgery is an option, your case should be evaluated by a team of experts that includes a surgeon experienced in removing liver and lung tumors and an interventional oncologist/radiologist. Additional imaging tests such as a PET/CT scan or an MRI of the liver may be ordered to help determine if surgery is an option. If you are a candidate for surgery, see *The cancer is resectable* on the next page.

The primary treatment for stage IV rectal cancer that cannot be removed with surgery and/or ablation is systemic therapy. If one regimen does not work or stops working, there are other options that may work for you. These are called second- and third-line regimens. Some of the options depend on what treatment you've already had.

One of the following chemotherapy regimens is usually given first:

- FOLFIRI
- FOLFOX
- CAPEOX
- FOLFOXIRI

A targeted therapy known as a biologic may also be included in the chemotherapy regimen. Biologics include:

- Bevacizumab (Avastin®)
- Panitumumab (Vectibix®)
- Cetuximab (Erbitux®)

Panitumumab and cetuximab are only used for rectal tumors that have normal *KRAS/NRAS* and *BRAF* genes.

For MSI-H/dMMR tumors, immunotherapy may be an option. There is not as much research available on this option. Talk to your doctor about immunotherapy versus chemotherapy if your cancer is MSI-H/dMMR. Currently recommended immunotherapies include pembrolizumab (Keytruda®) and nivolumab

(Opdivo®). Nivolumab may be given with another immunotherapy called ipilimumab (Yervoy®).

Although uncommon, systemic therapy may shrink the tumors to a size small enough to be removed with surgery. If surgery might be possible, the size of the tumors will be checked about every 2 months during systemic therapy. If the tumors become resectable, surgery is recommended. You may have short-course radiation therapy or chemoradiation before surgery. Although surgery is preferred to remove metastases, treatment with other local therapies such as ablation or SBRT is also an option.

If the cancer does not become resectable, systemic therapy is typically continued. The goal is to slow the growth and spread of the cancer. If the rectal tumor grows during initial systemic therapy, you may first have chemoradiation or a short course of radiation to the rectal tumor before continuing systemic therapy.

The regimen you receive next may be different from what you had before. The choice of regimen will depend on prior systemic therapy received, whether the cancer has any biomarkers, and how well you are expected to tolerate certain systemic therapies.

Options for HER2-positive rectal cancers include:

- Trastuzumab (Herceptin®) with either pertuzumab (Perjeta®) or lapatinib (Tykerb®)
- Fam-trastuzumab deruxtecan-nxki (Enhertu®)

If the cancer progresses again, third-line systemic therapy options may include:

- Chemotherapy with trifluridine and tipiracil (Lonsurf®)
- Targeted therapy with regorafenib (Stivarga®)

Lonsurf® and Stivarga® are tablets taken by mouth. The targeted therapy bevacizumab (Avastin®) may be given in combination with Lonsurf®.

See *Surveillance* on the following page for next steps.

The cancer is resectable

If all areas of cancer are resectable, surgery is recommended. Systemic therapy and either chemoradiation or short-course radiation therapy are given before surgery. The order in which these treatments are given can vary. Systemic therapy may be given first, followed by chemoradiation or short-course radiation therapy and then surgery. Or, either short-course radiation or chemoradiation may be given first, followed by systemic therapy and then surgery. Your treatment team will determine the optimal treatment order for you.

For systemic therapy, chemotherapy with FOLFOX, CAPEOX, 5-FU/leucovorin or capecitabine is recommended. For MSI-H/dMMR tumors, immunotherapy with pembrolizumab (Keytruda®) or nivolumab (Opdivo®) may be an option. Nivolumab may be given with another immunotherapy called ipilimumab (Yervoy®). There is not as much research available on this option. Talk to your doctor about immunotherapy versus chemotherapy before surgery if your cancer is MSI-H/dMMR.

Surgery to remove the rectal tumor and the metastases may be done at the same time, or in separate surgeries. Although surgery is preferred to remove the metastases, treatment with local therapies such as ablation or SBRT may be appropriate if there is a limited number of small tumors.

Cancer in the abdomen

Some people with metastatic rectal cancer will also form tumors in the peritoneum. The peritoneum is the thin layer of tissue that lines the abdomen and covers most of the abdominal organs. The goal of care for rectal cancer that has spread to the abdomen is to relieve or prevent symptoms. The main treatment is systemic therapy. The regimen you receive will depend on whether the tumor has any biomarkers (see page 22 for information on biomarkers) and how well you are expected to tolerate certain systemic therapies.

Tumors growing in or around the intestines can block the flow of stool. This is called a bowel obstruction. If the cancer is (or is expected to) block the bowel, you will first need care to unblock the bowel before starting systemic therapy. This can be done using one of several surgical techniques, or with a mesh metal tube called a stent.

Surveillance

Surveillance for stage IV rectal cancer includes colonoscopies, physical exams, CEA blood tests, and CT scans. Rising CEA levels may be a sign that rectal cancer has returned. CT scans can help find new metastases. The recommended schedule for surveillance testing is shown in Guide 4.

In addition to surveillance testing, a range of other care is important for cancer survivors. See the *Survivorship* section of this guide on page 58 for more information.

Guide 4
Surveillance for stage IV rectal cancer

Medical history and physical exam	Every 3–6 months for first 2 years, then every 6 months for 3 more years
CEA blood test	Every 3–6 months for first 2 years, then every 6 months for 3 more years
CT of chest, abdomen, and pelvis	Every 3–6 months for first 2 years, then every 6–12 months for 3 more years
Colonoscopy	**No prior total colonoscopy:** 3 to 6 months after surgery **Prior total colonoscopy:** 1 year after surgery If no advanced adenoma, repeat in 3 years, then every 5 years If advanced adenoma, repeat in 1 year

Metastasis at recurrence

If cancer returns after initial treatment of localized rectal cancer and is found in other areas of the body, such as the liver or lungs, it is called a distant recurrence. Treatment with surgery and/or local therapies is recommended if all of the tumors can be totally removed. However, most liver and lung metastases cannot be removed using surgery or local therapies. You may have a PET/CT scan to help determine whether surgery is possible.

Like stage IV rectal cancer, distant recurrences of rectal cancer are most often treated with systemic therapy. Your options for systemic therapy may be slightly different, however. It is likely that you received oxaliplatin-based chemotherapy as part of initial treatment.

CAPEOX and FOLFOX are oxaliplatin-based regimens. Oxaliplatin can cause serious nerve damage and should not be given too often. For this reason, if you've had recent treatment with FOLFOX or CAPEOX, you should not have more chemotherapy that includes oxaliplatin. The recommended options for systemic therapy are shown in Guide 5.

Treatment of distant recurrences of rectal cancer is similar to treatment for stage IV rectal cancer. See *Stage IV rectal cancer* on page 53 for more information.

Guide 5
Systemic therapy for distant recurrence - recent treatment with FOLFOX or CAPEOX

Regimen	May be given with
FOLFIRI or irinotecan	Bevacizumab Ziv-aflibercept Ramucirumab Cetuximab (normal *KRAS/NRAS/BRAF* genes only) Panitumumab (normal *KRAS/NRAS/BRAF* genes only)
Nivolumab (dMMR/MSI-H tumors only)	Ipilimumab
Pembrolizumab (dMMR/MSI-H tumors only)	____
Encorafenib + cetuximab or vemurafenib (*BRAF* V600E mutation positive)	____

Key points

- Metastasis refers to the spread of cancer cells to distant areas.
- If metastases are present at the time of diagnosis, it is stage IV rectal cancer.
- Most commonly, metastases develop after treatment for non-metastatic rectal cancer. This is known as a distant recurrence.
- Local therapies may be used to treat some metastatic rectal cancers. Local therapies include image-guided ablation, intra-arterial liver-directed therapies, and SBRT.
- When possible, surgery and/or ablation is preferred to treat rectal cancer that has spread to the liver or lungs. However, most liver and lung metastases cannot be removed using surgery and/or local therapies.
- Metastatic rectal cancer that cannot be completely removed with surgery and/or local therapies is treated with systemic therapy.
- Supportive/palliative care is available for everyone with cancer. It isn't meant to treat the cancer, but rather to help with symptoms and make you more comfortable.

6
Survivorship

59 Your primary care doctor
60 Help with side effects
61 Healthy habits
62 More information
63 Key points

Survivorship focuses on the physical, emotional, and financial issues unique to cancer survivors. Managing the long-term side effects of cancer and its treatment, staying connected with your primary care doctor, and living a healthy lifestyle are important parts of survivorship.

Rectal cancer survivors may experience both short- and long-term health effects of cancer and its treatment. The effects depend on the treatment(s) received. Surgery, systemic therapy, and radiation therapy all have unique potential side effects.

Staying connected with your primary care doctor and practicing healthy habits can help prevent or offset these effects. It can also help lower the risk of getting other types of cancer.

> When you are deciding on your treatment options remember that even though some decisions need to be made fast, don't rush. Think through your options and get second, or even third opinions. Have people you can trust to talk through your options so you feel comfortable in your decision.
>
> – Cari
> Rectal cancer survivor

Your primary care doctor

After finishing cancer treatment, your primary care doctor will play an important role in your care. Your oncologist (cancer doctor) and primary care physician (PCP) should work together to make sure you get the follow-up care you need. Your oncologist will develop a survivorship care plan that includes:

- A summary of your cancer treatment history
- A description of possible late- and long-term side effects
- Recommendations for monitoring for the return of cancer
- Information on when your care will be transferred to your PCP. The plan should also outline specific responsibilities for both your cancer doctor and your PCP
- Recommendations on your overall health and well-being

Help with side effects

Bowel changes

Surgery that involves removing all or part of the rectum can result in changes to bowel function. This type of surgery is called a low anterior resection (LAR). These changes can include:

- Overall increase in bowel movements
- Urgent need to pass stool
- Having many (possibly watery) bowel movements over the course of a few hours (stool clustering)
- Irregular and unpredictable bowel movements
- Inability to control bowel movements (fecal incontinence)
- Increase in gas (flatulence)

Together these symptoms are referred to as low anterior resection syndrome (LARS). There are ways to control or lessen these symptoms. The over-the-counter anti-diarrheal medicine loperamide (Imodium®) can help with stool clustering. It can also help with incontinence, as it thickens stool.

Exercises that strengthen the muscles in the pelvic floor can help with urgency and stool incontinence. Changes to diet can also help with these LARS symptoms. Eat foods high in insoluble (not soluble) fiber and use fiber supplements. Psyllium-based products (Metamucil®, for example) may help slow and thicken the stool. Ask your treatment team for a list of foods that may help or worsen bowel changes after low anterior resection.

Many people find that wearing protective undergarments provides peace of mind.

Nerve damage

The chemotherapy drug oxaliplatin can cause nerve damage to your fingers and toes. Symptoms include numbness, cramping, tingling, or pain in these areas. Acupuncture and/or heat may help. If you have painful nerve damage, a drug called duloxetine (Cymbalta®) may provide some relief. If the pain is persistent, talk to your doctor about seeing a pain management specialist.

Ostomy care

If you have an ostomy, you may want to join an ostomy support group. Another option is to see a health care provider that specializes in ostomy care, such as an ostomy nurse. People with ostomies can still live very active lifestyles. However, it's a good idea to consult with an ostomy professional before undertaking vigorous physical activity.

Increased risk of fractures

Radiation treatment to the pelvis can mean you are at increased risk of pelvic fractures because your bones are not as dense as they were before. Your doctor may want to start monitoring the density of your bones.

Sexual health

Some people may experience sexual side effects after treatment to the rectum. For those with a penis, this could mean difficulty getting an erection. For those with a vagina, vaginal dryness and pain during sex are also possible.

Vaginal stenosis

Radiation therapy to the pelvic area can cause the vagina to become shorter and more narrow. This is called vaginal stenosis. Vaginal stenosis can make it uncomfortable or even painful to have sex, or to have vaginal examinations by a doctor. Vaginal dilator therapy can be used to lessen the effects of vaginal stenosis. A vaginal dilator is a device used to gradually stretch or widen the vagina. Vaginal dilators are not one-size-fits-all. Different sizes are available, as are dilator kits containing different size devices. The size of the dilator can be increased over time as the vagina lengthens and widens. Use of a vaginal dilator should can begin as soon as you are healed after treatment.

Healthy habits

Monitoring for the return of cancer is important after finishing treatment. But it is also important to keep up with other aspects of your health. Steps you can take to help prevent other health issues and to improve your quality of life are described next.

Get screened for other types of cancer. Your primary care doctor should tell you what cancer screening tests you should have based on your gender, age, and risk level.

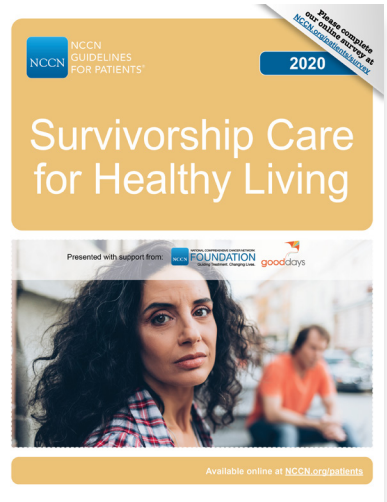
Get other recommended health care for your age and gender, such as blood pressure screening, hepatitis C screening, and immunizations (such as the flu shot).

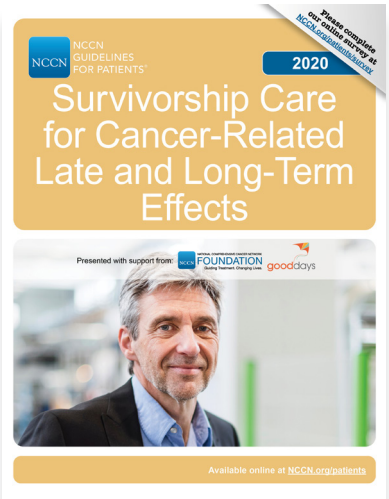
Leading a healthy lifestyle includes maintaining a healthy body weight. Try to exercise at a moderate intensity for at least 30 minutes most days of the week. All patients should have a discussion with their doctor before starting a new exercise regimen. Eat a healthy diet with lots of plant-based foods.

- Talk to your doctor about taking aspirin every day to prevent future colorectal cancers.
- Drink little to no alcohol. This means no more than 1 drink/day for women, and no more than 2 drinks/day for men.
- If you are a smoker, quit! Your doctor will be able to provide (or refer you for) counseling on how to stop smoking.

More information

The following resources are available and provide additional information on cancer survivorship:





Experts recommend eating a healthy diet, especially one that includes a lot of plant-based foods (veggies, fruits, and whole grains).

Key points

- Survivorship focuses on the physical, emotional, and financial issues unique to cancer survivors.
- Your cancer doctor (oncologist) and primary care doctor should work together to make sure you get the follow-up care you need.
- The care recommended for you after cancer treatment should be detailed in a written survivorship care plan.
- It is important to live a healthy lifestyle after cancer. This means drinking little to no alcohol, eating a healthy diet, exercising, quitting smoking, and keeping up with other aspects of your health.
- If you have an ostomy, consider joining an ostomy support group or seeking care from a health care professional that specializes in ostomies.
- Acupuncture and/or heat can help relieve some symptoms of nerve damage caused by chemotherapy. Duloxetine (Cymbalta®) may provide relief of painful nerve damage.

Cutting back on alcohol is an important part of staying healthy. Experts recommend no more than 1 drink per day for women, and no more than 2 drinks per day for men.

7
Making treatment decisions

65 It's your choice
65 Questions to ask your doctors
69 Websites

It is important to be comfortable with the cancer treatment you choose. This choice starts with having an open and honest conversation with your doctor.

It's your choice

In shared decision-making, you and your doctors share information, discuss the options, and agree on a treatment plan. It starts with an open and honest conversation between you and your doctor.

Treatment decisions are very personal. What is important to you may not be important to someone else.

Some things that may play a role in your decision-making:

- What you want and how that might differ from what others want
- Your religious and spiritual beliefs
- Your feelings about certain treatments like surgery, chemotherapy, and radiation
- Your feelings about pain or side effects such as nausea and vomiting
- Cost of treatment, travel to treatment centers, and time away from work
- Quality of life and length of life
- How active you are and the activities that are important to you

Think about what you want from treatment. Discuss openly the risks and benefits of specific treatments and procedures. Weigh options and share concerns with your doctor. If you take the time to build a relationship with your doctor, it will help you feel supported when considering options and making treatment decisions.

Second opinion

It is normal to want to start treatment as soon as possible. While cancer can't be ignored, there is time to have another doctor review your test results and suggest a treatment plan. This is called getting a second opinion, and it's a normal part of cancer care. Even doctors get second opinions!

Things you can do to prepare:

- Check with your insurance company about its rules on second opinions. There may be out-of-pocket costs to see doctors who are not part of your insurance plan.
- Make plans to have copies of all your records sent to the doctor you will see for your second opinion.

Support groups

Many people diagnosed with cancer find support groups to be helpful. Support groups often include people at different stages of treatment. Some people may be newly diagnosed, while others may be finished with treatment. If your hospital or community doesn't have support groups for people with cancer, check out the websites listed in this book.

Questions to ask your doctors

Possible questions to ask your doctors are listed on the following pages. Feel free to use these or come up with your own. Be clear about your goals for treatment and find out what to expect from treatment. Keep a notebook handy to record answers to your questions.

What are my options?

1. Can I just carefully monitor the cancer?
2. Do you consult NCCN recommendations when considering options?
3. Are you suggesting options other than what NCCN recommends? If yes, why?
4. Do your suggested options include clinical trials? Please explain why.
5. How do my age, health, and other factors affect my options? What if I am pregnant?
6. Which option is proven to work best?
7. Which options lack scientific proof?
8. What are the benefits of each option? Does any option offer a cure or long-term cancer control?
9. What are the risks of each option? What are possible complications? What are the rare and common side effects? Short-lived and long-lasting side effects? Serious or mild side effects? Other risks?
10. How do you know if treatment is working?
11. What are my options if my treatment stops working?
12. What can be done to prevent or relieve the side effects of treatment?

What does each option require of me?

1. Will I have to go to the hospital or elsewhere? How often? How long is each visit?
2. Do I have a choice of when to begin treatment? Can I choose the days and times of treatment?
3. How do I prepare for treatment? Do I have to stop taking any of my medicines? Are there foods I will have to avoid?
4. Should I bring someone with me when I get treated?
5. Will the treatment hurt?
6. How much will the treatment cost me? What does my insurance cover?
7. Will I miss work or school? Will I be able to drive?
8. Is home care after treatment needed? If yes, what type?
9. How soon will I be able to manage my own health?
10. When will I be able to return to my normal activities?

What is your experience?

1. Are you board certified? If yes, in what area?
2. How many patients like me have you treated?
3. How many procedures like the one you're suggesting have you done?
4. Is this treatment a major part of your practice?
5. How many of your patients have had complications?

Websites

American Cancer Society
cancer.org/cancer/colon-rectal-cancer.html

Cancer.Net
cancer.net/cancer-types/colorectal-cancer

CancerCare
Cancercare.org

Cancer Support Community
cancersupportcommunity.org

Colon Cancer Coalition
coloncancercoalition.org

The Colon Club
Colonclub.com

Colorectal Cancer Alliance
ccalliance.org

Fight Colorectal Cancer
FightColorectalCancer.org

Love Your Buns
loveyourbuns.org/

National Cancer Institute (NCI)
cancer.gov/types/colorectal

National Coalition for Cancer Survivorship
canceradvocacy.org/

National Comprehensive Cancer Network
NCCN.com

U.S. National Library of Medicine (NLM) Clinical Trials Database
clinicaltrials.gov

Take our survey
And help make the NCCN Guidelines for Patients better for everyone!

NCCN.org/patients/comments

Words to know

abdomen
The belly area between the chest and pelvis.

ablation
A type of local therapy used to destroy tumors in the liver or lungs.

adenocarcinoma
Cancer in cells that line organs and make fluids or hormones.

adenoma
The most common type of polyp and is the most likely to form cancer cells. Also called adenomatous polyp.

anus
The opening at the end of the rectum through which stool leaves the body.

biopsy
Removal of small amounts of tissue or fluid to be tested for disease.

cancer grade
A rating of how quickly a cancer is expected to grow and spread. Cancer grade is based on how abnormal cancer cells look when viewed under a microscope.

cancer stage
A rating of the extent of cancer in the body.

carcinoembryonic antigen (CEA)
A protein that gets released by some tumors and can be detected in blood as a tumor marker.

carcinoma in situ
Cancer that has not grown into tissue that could allow cancer cells to spread. It is a noninvasive cancer.

catheter
A flexible tube inserted in the body to give treatment or drain fluid from the body.

clinical trial
Research on an investigational test or treatment to assess its safety or how well it works.

colon
The hollow organ in which eaten food turns from a liquid into a solid form.

colonoscope
A thin, long tube with a light and camera used to see the colon.

colonoscopy
Insertion of a thin tool into the colon to view or remove tissue.

colostomy
Surgery to connect a part of the colon to the outside of the abdomen and that allows stool to drain into a bag.

complete blood count (CBC)
A test of the number of blood cells in a sample of blood.

computed tomography (CT)
A test that uses x-rays from many angles to make a picture of the inside of the body.

contrast
A substance put into the body to make clearer pictures during imaging tests.

embolization
Blocking blood flow to a tumor using beads that emit either chemotherapy or radiation.

endoscopic polypectomy
Surgery to remove a polyp during a colonoscopy.

enema
Injection of liquid into the rectum to clear the bowel.

esophagus
The tube-shaped digestive organ between the mouth and stomach.

external beam radiation therapy (EBRT)
Treatment with radiation received from a machine outside the body. The most common type of radiation therapy used for rectal cancer.

familial adenomatous polyposis (FAP)
An inherited cancer syndrome that increases the risk of developing colon and rectal cancer.

hereditary non-polyposis colon cancer (HNPCC)
An inherited cancer syndrome that increases the risk of developing colon and rectal cancer. Also called Lynch syndrome.

infertility
The inability to produce children.

infusion
A method of giving drugs slowly through a needle into a vein.

intraoperative radiation therapy (IORT)
Radiation therapy that is given inside the body at the end of an operation.

invasive cancer
Cancer cells have grown into the second layer of the rectum wall.

large intestine
The digestive organ that prepares unused food for leaving the body.

laxative
Substances used to clean out the intestines.

lymph nodes
Small groups of special disease-fighting cells located throughout the body.

magnetic resonance imaging (MRI)
A test that uses a magnetic field and radio waves to make pictures of areas inside the body.

metastasectomy
Surgery to remove cancer that has spread far from the first tumor.

metastasis
The spread of cancer cells from the first (primary) tumor to other areas of the body.

mucosa
The innermost layer of the rectal wall.

muscularis propria
The third layer of the rectal wall. Also known as the muscle layer.

mutation
An abnormal change in the instructions within cells for making and controlling cells.

needle biopsy
Removal of tissue or fluid samples from the body with a needle.

noninvasive cancer
Cancer cells have not grown into the second layer of the rectum wall.

observation
A period of testing for cancer growth.

pathologic stage
A rating of the extent of cancer based on the results of surgery.

pathologist
A type of doctor that specializes in testing cells and tissue to find disease.

pedunculated polyp
A polyp shaped like a mushroom with a stalk.

pelvis
The area between the hip bones.

polyp
An abnormal growth on the lining of the colon or rectum.

portal vein embolization
The blood vessel to the liver tumor is blocked causing the healthy part of the liver to grow larger.

progression
The growth or spread of cancer after being tested or treated.

radiation therapy
The use of high-energy rays to destroy cancer cells.

radiologist
A doctor who specializes in reading imaging tests.

rectum
An organ in the digestive system that holds stool until it exits the body through the anus.

recurrence
The return of cancer after a cancer-free period.

sessile polyp
A polyp that is flat.

small intestine
The digestive organ that absorbs nutrients from eaten food.

stool
Unused food passed out of the body; also called feces.

submucosa
The second layer of the rectum wall. Made mostly of connective tissue.

supportive care
Treatment for the symptoms or health conditions caused by cancer or its treatment.

surgical margin
The normal tissue around the edge of a tumor that is removed during surgery.

colonoscopy
Insertion of a thin tool into the colon to view the entire colon and, if needed, remove tissue.

tumor deposit
The presence of tiny tumors where the lymph drains from the tumor.

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NCCN Cancer Centers

Abramson Cancer Center
at the University of Pennsylvania
Philadelphia, Pennsylvania
800.789.7366 • *pennmedicine.org/cancer*

Fred & Pamela Buffett Cancer Center
Omaha, Nebraska
402.559.5600 • *unmc.edu/cancercenter*

Case Comprehensive Cancer Center/
University Hospitals Seidman Cancer
Center and Cleveland Clinic Taussig
Cancer Institute
Cleveland, Ohio
800.641.2422 • UH Seidman Cancer Center
uhhospitals.org/services/cancer-services
866.223.8100 • CC Taussig Cancer Institute
my.clevelandclinic.org/departments/cancer
216.844.8797 • Case CCC
case.edu/cancer

City of Hope National Medical Center
Los Angeles, California
800.826.4673 • *cityofhope.org*

Dana-Farber/Brigham and
Women's Cancer Center |
Massachusetts General Hospital
Cancer Center
Boston, Massachusetts
617.732.5500
youhaveus.org
617.726.5130
massgeneral.org/cancer-center

Duke Cancer Institute
Durham, North Carolina
888.275.3853 • *dukecancerinstitute.org*

Fox Chase Cancer Center
Philadelphia, Pennsylvania
888.369.2427 • *foxchase.org*

Huntsman Cancer Institute
at the University of Utah
Salt Lake City, Utah
800.824.2073
huntsmancancer.org

Fred Hutchinson Cancer
Research Center/Seattle
Cancer Care Alliance
Seattle, Washington
206.606.7222 • *seattlecca.org*
206.667.5000 • *fredhutch.org*

The Sidney Kimmel Comprehensive
Cancer Center at Johns Hopkins
Baltimore, Maryland
410.955.8964
www.hopkinskimmelcancercenter.org

Robert H. Lurie Comprehensive
Cancer Center of Northwestern
University
Chicago, Illinois
866.587.4322 • *cancer.northwestern.edu*

Mayo Clinic Cancer Center
Phoenix/Scottsdale, Arizona
Jacksonville, Florida
Rochester, Minnesota
480.301.8000 • Arizona
904.953.0853 • Florida
507.538.3270 • Minnesota
mayoclinic.org/cancercenter

Memorial Sloan Kettering
Cancer Center
New York, New York
800.525.2225 • *mskcc.org*

Moffitt Cancer Center
Tampa, Florida
888.663.3488 • *moffitt.org*

The Ohio State University
Comprehensive Cancer Center -
James Cancer Hospital and
Solove Research Institute
Columbus, Ohio
800.293.5066 • *cancer.osu.edu*

O'Neal Comprehensive
Cancer Center at UAB
Birmingham, Alabama
800.822.0933 • *uab.edu/onealcancercenter*

Roswell Park Comprehensive
Cancer Center
Buffalo, New York
877.275.7724 • *roswellpark.org*

Siteman Cancer Center at Barnes-
Jewish Hospital and Washington
University School of Medicine
St. Louis, Missouri
800.600.3606 • *siteman.wustl.edu*

St. Jude Children's Research Hospital/
The University of Tennessee
Health Science Center
Memphis, Tennessee
866.278.5833 • *stjude.org*
901.448.5500 • *uthsc.edu*

Stanford Cancer Institute
Stanford, California
877.668.7535 • *cancer.stanford.edu*

UC Davis
Comprehensive Cancer Center
Sacramento, California
916.734.5959 | 800.770.9261
health.ucdavis.edu/cancer

UC San Diego Moores Cancer Center
La Jolla, California
858.822.6100 • *cancer.ucsd.edu*

UCLA Jonsson
Comprehensive Cancer Center
Los Angeles, California
310.825.5268 • *cancer.ucla.edu*

UCSF Helen Diller Family
Comprehensive Cancer Center
San Francisco, California
800.689.8273 • *cancer.ucsf.edu*

University of Colorado Cancer Center
Aurora, Colorado
720.848.0300 • *coloradocancercenter.org*

University of Michigan
Rogel Cancer Center
Ann Arbor, Michigan
800.865.1125 • *rogelcancercenter.org*

The University of Texas
MD Anderson Cancer Center
Houston, Texas
844.269.5922 • *mdanderson.org*

University of Wisconsin
Carbone Cancer Center
Madison, Wisconsin
608.265.1700 • *uwhealth.org/cancer*

UT Southwestern Simmons
Comprehensive Cancer Center
Dallas, Texas
214.648.3111 • *utsouthwestern.edu/simmons*

Vanderbilt-Ingram Cancer Center
Nashville, Tennessee
877.936.8422 • *vicc.org*

Yale Cancer Center/
Smilow Cancer Hospital
New Haven, Connecticut
855.4.SMILOW • *yalecancercenter.org*

Notes

Index

ablation 40, 51–55, 57, 70

acupuncture 60, 63

biomarker 14, 22–23, 32, 34, 47, 49, 53–55

BRAF 22–23, 25, 53, 57

carcinoembryonic antigen (CEA) 18–19, 44, 48–49, 53, 55–56

clinical trial 22, 26, 38–40, 66, 69

colonoscopy 8, 16–18, 42, 44, 47–48, 53, 56

familial adenomatous polyposis (FAP) 15, 25

fertility 14, 24–25, 37

HER2 23, 25, 53–54

hereditary non-polyposis colon cancer (HNPCC) 15, 25, 71

immunotherapy 22, 32, 34, 40, 53–54

KRAS/NRAS 22, 25, 27

laparoscopic surgery 31

Lynch syndrome 15, 22, 25

low anterior resection syndrome (LARS) 29–30, 60

metastasectomy 51

microsatellite instability/mismatch repair (MSI/MMR) 15, 22, 25, 44, 53–54, 57

polypectomy 8, 42–44, 49

sexual health 37, 61

supportive care 57

survivorship 37, 48, 55, 59–63, 69

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Rectal Cancer

2021

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