



Treating Colorectal Cancer

If you've been diagnosed with colorectal cancer, your cancer care team will discuss your treatment options with you. It's important that you think carefully about each of your choices. Weigh the benefits of each treatment option against the possible risks and side effects.

How is colorectal cancer treated?

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

Local treatments: Some treatments are called *local therapies*. This means they treat the tumor without affecting the rest of the body. Types of local therapy used for colorectal cancer include:

- Surgery (the type of surgery will depend on whether it's for [colon](#) or [rectal cancer](#))
- [Radiation therapy](#)
- [Ablation or embolization](#)

These treatments are more likely to be useful for earlier stage cancers (smaller cancers that haven't spread), but they might also be used in some other situations.

Systemic treatments: Colorectal cancer can also be treated using drugs, which can be given by mouth or directly into the bloodstream. These are called *systemic therapies* because they can reach cancer cells throughout the body. Depending on the type of colorectal cancer, different types of drugs might be used, such as:

- [Chemotherapy](#)
- [Targeted therapy](#)
- [Immunotherapy](#)

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

[Stage](#) or [Treatment of Rectal Cancer, by Stage](#).

Which doctors treat colorectal cancer?

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

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

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

Making treatment decisions

It's important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. It's also very important to ask questions if there's anything you're not sure about. See [What Should You Ask Your Doctor About Colorectal Cancer?](#) for ideas.

Getting a second opinion

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

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to learn more about promising new treatments or procedures. Clinical trials are one way to get state-of-the-

art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you'd like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

See [Clinical Trials](#) to learn more.

Considering complementary and alternative methods

You may hear about alternative or complementary methods to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

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

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what's known (or not known) about the method, which can help you make an informed decision.

See [Complementary and Alternative Medicine](#) to learn more.

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life. Learn more in [If Cancer Treatments Are No Longer Working](#).

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

Help getting through colorectal cancer treatment

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

The American Cancer Society also [has programs and services](#) – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

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

Surgery for Colon Cancer

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

Any type of colon surgery needs to be done on a clean and empty colon. You will be put on a special diet before surgery and may need to use laxative drinks and enemas to get all of the stool out of your colon. This bowel prep is a lot like the one used before a [colonoscopy](#).

Polypectomy and local excision

Some early colon cancers (stage 0 and some early stage I tumors) and most polyps can be removed during a [colonoscopy](#). This is a procedure that uses a long flexible tube with a small video camera on the end that's put into the person's rectum and threaded into the colon. These surgeries can be done during a colonoscopy:

- For a **polypectomy**, the cancer is removed as part of the polyp, which is cut at its stalk (the part that looks like the stem of a mushroom). This is usually done by

passing a wire loop through the colonoscope to cut the polyp off the wall of the colon with an electric current.

- A **local excision** is a slightly more involved procedure. Tools are used through the colonoscope to remove small cancers on the inside lining of the colon along with a small amount of surrounding healthy tissue on the wall of colon.

When cancer or polyps are taken out this way, the doctor doesn't have to cut into the abdomen (belly).

Colectomy

A colectomy is surgery to remove all or part of the colon. Nearby [lymph nodes](#) are also removed.

- If only part of the colon is removed, it's called a **hemicolectomy**, **partial colectomy**, or **segmental resection**. The surgeon takes out the part of the colon with the cancer and a small segment of normal colon on either side. Usually, about one-fourth to one-third of the colon is removed, depending on the size and location of the cancer. The remaining sections of colon are then reattached. At least 12 nearby lymph nodes are also removed so they can be checked for cancer.
- If all of the colon is removed, it's called a **total colectomy**. Total colectomy isn't often needed to treat colon cancer. It's mostly used only if there's another problem in the part of the colon without cancer, such as hundreds of polyps (in someone with [familial adenomatous polyposis](#)) or, sometimes, inflammatory bowel disease.

How it's done

A colectomy can be done in 2 ways:

- **Open colectomy:** The surgery is done through a single long incision (cut) in the abdomen (belly).
- **Laparoscopic-assisted colectomy:** The surgery is done through many smaller incisions and special tools. A laparoscope is a long, thin lighted tube with a small camera and light on the end that lets the surgeon see inside the abdomen. It's put into one of the small cuts, and long, thin instruments are put in through the others to remove part of the colon and lymph nodes.

Because the incisions are smaller in a laparoscopic-assisted colectomy than in an open colectomy, patients often recover faster and may be able to leave the hospital sooner than they would after an open colectomy. But this type of surgery requires special

expertise, and it might not be the best approach for everyone. If you're considering this type of surgery, be sure to look for a skilled surgeon who has done many of these operations.

Overall survival rates and the chance of the cancer returning are much the same between an open colectomy and a laparoscopic-assisted colectomy.

If the colon is blocked

When cancer blocks the colon, it usually happens slowly and the person can become very sick over time. In cases like this, a stent may be placed before surgery is done. A **stent** is a hollow metal or plastic tube that the doctor can put inside the colon and through the blockage using a colonoscope. This tube keeps the colon open and relieves the blockage to help you prepare for surgery.

If a stent can't be placed in a blocked colon or if the tumor has caused a hole in the colon, surgery may be needed right away. This usually is the same type of colectomy that's done to remove the cancer, but instead of reconnecting the ends of the colon, the top end of the colon is attached to an opening (called a stoma) made in the skin of the abdomen. Stool then comes out this opening. This is called a **colostomy** and is usually only needed for a short time. Sometimes the end of the small intestine (the ileum) instead of the colon is connected to a stoma in the skin. This is called an **ileostomy**. Either way, a bag sticks to the skin around the stoma to hold the waste.

Once the patient is healthier, another operation (known as a *colostomy reversal* or *ileostomy reversal*) can be done to put the ends of the colon back together or to attach the ileum to the colon. Rarely, if a tumor can't be removed or a stent placed, the colostomy or ileostomy may need to be permanent.

For more on this, see [Colostomy Guide](#) and [Ileostomy Guide](#).

Surgery for colon cancer spread

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

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

Side effects of colon surgery

Possible [risks and side effects of surgery](#) depend on several factors, including the extent of the operation and your general health before surgery. Problems during or shortly after the operation can include bleeding, infection, and blood clots in the legs.

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

Rarely, the new connections between the ends of the colon may not hold together and may leak. This can quickly cause severe belly pain, fever, and the belly feels very hard. A smaller leak may cause you to not pass stool, have no desire to eat, and not do well or recover after surgery. A leak can lead to infection and more surgery may be needed to fix it. It's also possible that the incision (cut) in the abdomen (belly) might open up, becoming an open wound that may need special care as it heals.

After the surgery, you might develop scar tissue in your abdomen that can cause organs or tissues to stick together. These are called *adhesions*. Normally your intestines freely slide around inside your body. In rare cases, adhesions can cause the bowels to twist up and can even block the bowel. This causes pain and swelling in the belly that's often worse after eating. Further surgery may be needed to remove the scar tissue.

Colostomy or ileostomy

Some people need a temporary or permanent colostomy (or ileostomy) after surgery. This can take some time to get used to and might require some lifestyle adjustments. If you have a colostomy or ileostomy, you'll need help learning how to manage it. Specially trained ostomy nurses or enterostomal therapists can do this. They'll usually see you in the hospital before your operation to discuss the ostomy and to mark a site for the opening. After the operation they may come to your house or meet with you in an outpatient setting to give you more training. There may also be ostomy support groups

you can be part of. This is a good way to learn from people with first-hand experience.

For more information, see [Colostomy Guide](#) and [Ileostomy Guide](#).

More information about Surgery

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

- [References](#)

American Society of Clinical Oncology. Colorectal Cancer: Treatment Options. 8/2017. Accessed at www.cancer.net/cancer-types/colorectal-cancer/treatment-options on February 7, 2018.

Encyclopedia of Surgery. Colostomy. Accessed at www.surgeryencyclopedia.com/Ce-Fi/Colostomy.html on February 28, 2018.

National Cancer Institute. Colon Cancer Treatment (PDQ®)—Patient Version. December 7, 2017. Accessed at www.cancer.gov/types/colorectal/patient/colon-treatment-pdq on February 7, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Colon Cancer, Version 1.2018 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/colon.pdf on February 7, 2018.

Hyman N, Manchester TL, Osler T, Burns B, Cataldo PA. Anastomotic Leaks After Intestinal Anastomosis: It's Later Than You Think. *Annals of Surgery*. 2007;245(2):254–258.

Libutti SK, Salz LB, Willett CG, Levine RA. Chapter 57: Cancer of the colon. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Tong G, Zhang G, Liu J, et al. A meta-analysis of short-term outcome of laparoscopic surgery versus conventional open surgery on colorectal carcinoma. *Medicine* (Baltimore). 2017;96(48):e8957.

US National Library of Medicine. MedlinePlus. Intestinal obstruction. 2/7/2018. Accessed at <https://medlineplus.gov/ency/article/000260.htm> on February 28, 2018.

Van Schaeybroeck S, Lawler M, Johnston B, et al. Colorectal cancer. In: Neiderhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa: Elsevier; 2014: 1278-1335.

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Surgery for Rectal Cancer

Surgery is usually the main treatment for [rectal cancer](#). [Radiation](#) and [chemotherapy](#) are often given before or after surgery. The type of surgery used depends on the [stage](#) (extent) of the cancer, where it is, and the goal of the surgery.

A key piece of information needed before surgery is how close the tumor is to the anus. This can impact the type of surgery done. It can also impact outcomes if the cancer has spread to the ring-like sphincter muscles around the anus that keep stool from coming out until they relax during a bowel movement.

Polypectomy and local excision

Some early rectal cancers and most polyps can be removed during a [colonoscopy](#). This is a procedure that uses a long flexible tube with a small video camera on the end that's put into the person's anus and threaded into the rectum. These surgeries can be done during a colonoscopy:

- For a **polypectomy**, the cancer is removed as part of the polyp, which is cut at its stalk (the part that looks like the stem of a mushroom). This is usually done by passing a wire loop through the colonoscope to cut the polyp from the wall of the rectum with an electric current.
- A **local excision** is a slightly more involved procedure. Tools are used through the colonoscope to remove small cancers on the inside lining of the rectum along with a small amount of surrounding healthy tissue on the wall of rectum.

When cancer or polyps are taken out this way, the doctor doesn't have to cut into the abdomen (belly).

Local transanal resection (full thickness resection)

This procedure can be used to remove some early stage I rectal cancers that are relatively small and not too far from the anus. As with polypectomy and local excision, local transanal resection (also known as *transanal excision*) is done with instruments that are put into the rectum through the anus. The skin over the abdomen (belly) isn't cut. This procedure can be used to remove some early stage I rectal cancers that are relatively small and not too far from the anus. It's usually done with local anesthesia (numbing medicine) – the patient is not asleep during the operation.

In this operation, the surgeon cuts through all layers of the rectal wall to take out the cancer as well as some surrounding normal rectal tissue. The hole in the rectal wall is then closed.

[Lymph nodes](#) are not removed during this procedure, so if the tumor has grown deep into the rectum, radiation with or without chemotherapy may be recommended after surgery.

Transanal endoscopic microsurgery (TEM)

This operation can sometimes be used for early stage I cancers that are higher in the rectum and can't be reached using the standard transanal resection (see above). A specially designed magnifying scope is put through the anus and into the rectum. This allows the surgeon to do a transanal resection with great precision and accuracy. This operation requires special equipment and surgeons with special training and experience, so it's only done at certain cancer centers.

Low anterior resection (LAR)

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

A low anterior resection is done with general anesthesia, the patient is put into a deep

sleep and doesn't feel pain. The surgeon makes several small incisions (cuts) in the abdomen. The cancer and a margin (edge or rim) of normal tissue around the cancer is removed, along with nearby lymph nodes and other tissues around the rectum.

The colon is then reattached to the remaining rectum so that a permanent [colostomy](#) is not needed. (A colostomy is needed when, instead of reconnecting the colon and rectum, the top end of the colon is attached to an opening made in the skin of the abdomen. Stool then comes out this opening.)

If radiation and chemotherapy have been given before surgery, it's common for a short-term [ileostomy](#) to be made. (This is where the end of the ileum, the last part of the small intestine, is connected to a hole in the skin of the abdomen.) This gives the rectum time to heal before body waste moves through it again. In most cases, the ileostomy can be reversed (the intestines are reconnected) about 8 weeks later.

Most patients spend several days in the hospital after a low anterior resection, depending on how the surgery was done and their overall health. It could take 3 to 6 weeks to recover at home.

Proctectomy with colo-anal anastomosis

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

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

General anesthesia is used (drugs are used to put the patient into a deep sleep) for this operation. Most patients spend several days in the hospital after surgery, depending on how it was done and their overall health. It could take 3 to 6 weeks to recover at home.

Abdominoperineal resection (APR)

This operation is more involved than a low anterior resection. It can be used to treat some stage I cancers and many stage II or III cancers in the lower part of the rectum (the part close to the anus). It's often needed if the cancer is growing into the sphincter muscle (the muscle that keeps the anus closed and prevents stool leakage) or the nearby muscles that help control urine flow (called levator muscles).

Here, the surgeon makes a cut or incision (or several small incisions) in the skin of the abdomen, and another in the skin around the anus. This allows the surgeon to remove the rectum, the anus, and the tissues around it, including the sphincter muscle. Because the anus is removed, a permanent colostomy is created (the end of the colon is connected to a hole in the skin over the abdomen) to allow stool to leave the body.

General anesthesia (where the patient is put into a deep sleep) is used for this operation. Most people spend several days in the hospital after an APR, depending on how the surgery is done and their overall health. Recovery time at home may be 3 to 6 weeks.

Pelvic exenteration

If the rectal cancer is growing into nearby organs, a pelvic exenteration may be recommended. This is a major operation. The surgeon will remove the rectum as well as any nearby organs that the cancer has reached, such as the bladder, prostate (in men), or uterus (in women).

A colostomy is needed after pelvic exenteration. If the bladder is removed, a [urostomy](#) is needed, too. (This is an opening in skin of the abdomen where urine leaves the body and is held in a pouch that sticks to the skin.) It can take many months to fully recover from this complicated surgery.

Diverting colostomy

Some patients have rectal cancers that have spread and also have tumors blocking the rectum. In this case, surgery may be done to relieve the blockage without removing the part of the rectum containing the cancer. Instead, the colon is cut above the tumor and attached to a stoma (an opening in the skin of the abdomen) to allow stool to come out. This is called a *diverting colostomy*. It can often help the patient recover enough to start other treatments (such as [chemotherapy](#)).

Surgery for rectal cancer spread

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

Side effects of rectal surgery

Possible [risks and side effects of surgery](#) depend on several factors, including the extent of the operation and a person's general health before surgery. Problems during or shortly after the operation can include bleeding from the surgery, infections at the surgery site, and blood clots in the legs.

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

Rarely, the new connections between the ends of the colon may not hold together and may leak. This can quickly cause severe belly pain, fever, and the belly feels very hard. A smaller leak may cause you to not pass stool, have no desire to eat, and not do well or recover after surgery. A leak can lead to infection and more surgery may be needed to fix it. It's also possible that the incision (cut) in the abdomen (belly) might open up, becoming an open wound that may need special care as it heals.

After the surgery, you might develop scar tissue in your abdomen that can cause organs or tissues to stick together. These are called *adhesions*. Normally your intestines freely slide around inside your body. In rare cases, adhesions can cause the bowels to twist up and can even block the bowel. This causes pain and swelling in the belly that's often worse after eating. Further surgery may be needed to remove the scar tissue.

Colostomy or ileostomy

Some people need a temporary or permanent colostomy (or ileostomy) after surgery. This may take some time to get used to and may require some lifestyle adjustments. If you have a colostomy or ileostomy, you will need to learn how to manage it. Specially trained ostomy nurses or enterostomal therapists can help you with this. They'll usually

see you in the hospital before your operation to discuss the ostomy and to mark a site for the opening. After your surgery they may come to your house or an outpatient setting to give you more training. There may also be ostomy support groups you can be part of. This is a good way to learn from people with first-hand experience.

For more information, see [Colostomy Guide](#) and [Ileostomy Guide](#) .

Sexual function and fertility

Rectal surgery has been linked to sexual problems and quality of life issues in both men and women. Talk to your doctor about how your body will look and work after surgery. Ask how surgery will impact your sex life. You and your partner should know what you can expect, for example:

- **If you are a man**, an AP resection (APR) may stop your erections or your ability to reach orgasm. In other cases, your pleasure at orgasm may become less intense. Normal aging may cause some of these changes, but they may be made worse by the surgery. An APR can also affect fertility. Talk with your doctor if you think you might want to father a child in the future. There may still be ways to do this.
- **If you are a woman**, rectal surgery (except pelvic exenteration) usually doesn't cause any loss of sexual function. Abdominal adhesions (scar tissue) may sometimes cause pain or discomfort during sex. If your uterus is removed, you won't be able to get pregnant.

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

For more about sexuality and fertility, see [Fertility and Sexual Side Effects](#).

More information about Surgery

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

- [References](#)

Lee DJ, Sagar PM, Sadadcharam G, Tan KY. Advances in surgical management for

locally recurrent rectal cancer: How far have we come? *World J Gastroenterol*. 2017;23(23):4170-4180.

Libutti SK, Willett CG, Salz LB, Levine RA. Chapter 60: Cancer of the rectum. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Ma B, Gao P, Wang H, et al. What has preoperative radio(chemo)therapy brought to localized rectal cancer patients in terms of perioperative and long-term outcomes over the past decades? A systematic review and meta-analysis based on 41,121 patients. *Int J Cancer*. 2017 1;141(5):1052-1065.

National Cancer Institute. Rectal Cancer Treatment (PDQ®)—Patient Version. May 19, 2017. Accessed at www.cancer.gov/types/colorectal/patient/rectal-treatment-pdq on February 8, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Rectal Cancer, Version 4.2017 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/rectal.pdf on February 8, 2018.

Orsini RG, Vermeer TA, Traa MJ, et al. Does extended surgery influence health-related quality of life in patients with rectal cancer? *Dis Colon Rectum*. 2015;58(2):179-185.

Rausa E, Kelly ME, Bonavina L, O'Connell PR, Winter DC. A systematic review examining quality of life following pelvic exenteration for locally advanced and recurrent rectal cancer. *Colorectal Dis*. 2017;19(5):430-436.

São Julião GP, Habr-Gama A, Vailati BB, et al. New Strategies in Rectal Cancer. *Surg Clin North Am*. 2017;97(3):587-604.

Sigurdson ER, Benson AB, Minsky B. Cancer of the rectum. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014: 1336-1359.

Sun V, Grant M, Wendel CS, et al. Sexual Function and Health-Related Quality of Life in Long-Term Rectal Cancer Survivors. *J Sex Med*. 2016;13(7):1071-1079.

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Ablation and Embolization for Colorectal Cancer

When [colorectal cancer](#) has spread and there are a few small tumors the liver or lung, these metastases can sometimes be removed by surgery or destroyed by other techniques, such as ablation or embolization.

When all of the primary cancer in the colon or rectum can be removed with surgery, these techniques might be used to destroy small spots of cancer if it has spread.

Ablation and embolization might also be good options for people whose metastatic tumors come back after surgery, whose cancer can't be cured with surgery, or who can't have surgery for other reasons. This might help a person live longer. It can also help treat problems the tumor is causing, like [pain](#).

In most cases, patients don't need to stay in the hospital for these treatments.

Ablation

Ablation refers to treatments that destroy small (less than 4 cm across) tumors without removing them. The use of radiofrequency ablation to treat cancer that has spread to the liver is best understood. But there are many different ablation techniques, and ablation can be used to treat tumors in other places, too.

Radiofrequency ablation

Radiofrequency ablation (RFA) uses high-energy radio waves to kill tumors. A [CT scan](#) or [ultrasound](#) is used to guide a thin, needle-like probe through the skin and into the tumor. An electric current is then sent to the tip of the probe, releasing high-frequency radio waves that heat the tumor and destroy the cancer cells.

Microwave ablation (MWA)

This newer ablation method is used to treat cancer that has spread to the liver. Imaging tests are used to guide a needle-like probe into the tumor. Electromagnetic microwaves

are then sent through it to create high temperatures that kill tumors quickly. This treatment has been used to treat larger tumors (up to 6 cm across).

Ethanol (alcohol) ablation

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

Cryosurgery (cryotherapy or cryoablation)

Cryosurgery destroys the tumor by freezing it with a thin metal probe. The probe is guided through the skin and into the tumor using [ultrasound](#). Then very cold gasses are passed through the end of the probe to freeze the tumor, killing the cancer cells. This method can treat larger tumors than the other ablation techniques, but it sometimes general anesthesia is needed (drugs are used to put the patient into a deep sleep). Treatment can be repeated as needed to kill all the cancer cells.

Side effects of ablation therapy

Possible [side effects](#) after ablation therapy include:

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

Serious complications are rare, but they are possible.

Embolization

During an embolization procedure, substances are injected into blood vessels to try to block or reduce the blood flow to cancer cells in the liver. This allows doctors to treat the metastatic tumors, while limiting the effects of treatment on the healthy parts of the liver, as well as the rest of the body.

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

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

There are 3 main types of embolization procedures used to treat colorectal cancer that has spread (metastasized) to the liver:

- **Arterial embolization** is also called *trans-arterial embolization* or *TAE*. In this procedure a catheter (a thin, flexible tube) is put into an artery through a small cut in the inner thigh and threaded up into the hepatic artery in the liver. A dye is usually injected into the blood at this time to help the doctor monitor the path of the catheter using [x-ray](#) pictures. Once the catheter is in the right place, tiny particles are injected into the artery to plug it up.
- **Chemoembolization** (also called *trans-arterial chemoembolization* or *TACE*) combines embolization with chemotherapy. Multiple treatments may be given over 4 to 6 weeks. Most often, this is done by using tiny beads that give off a chemotherapy drug for the embolization. TACE can also be done by giving chemotherapy through a catheter that's put right into the artery that feeds the tumor, then plugging up the artery. The catheter is threaded up into the hepatic artery in the liver through a small cut in the inner thigh.
- **Radioembolization** is a combination of embolization and radiation therapy. In the United States, it's done by injecting tiny beads (called *microspheres*) coated with radioactive yttrium-90 into the hepatic artery. The beads lodge in the blood vessels near the tumor. There, they give off small amounts of radiation for several days. The radiation travels a very short distance, so its effects are limited mainly to the tumor.

Side effects of embolization

Possible [side effects](#) after embolization include:

- Belly (abdominal) [pain](#)
- [Fever](#)
- [Nausea](#)
- [Infection](#) in the liver
- Gallbladder inflammation
- Blood clots in the main blood vessels of the liver

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

- [References](#)

Boas FE, Bodei L, Sofocleous CT. Radioembolization of Colorectal Liver Metastases: Indications, Technique, and Outcomes. *J Nucl Med.* 2017;58(Suppl 2):104S-111S.

Gruber-Rouh T, Marko C, Thalhammer A, et al. Current strategies in interventional oncology of colorectal liver metastases. *Br J Radiol.* 2016;89:20151060.

Li L, Wu K, Lai H, Zhang B. Clinical Application of CT-Guided Percutaneous Microwave Ablation for the Treatment of Lung Metastasis from Colorectal Cancer. *Gastroenterol Res Pract.* 2017;2017:9621585.

Libutti SK, Salz LB, Willett CG, Levine RA. Chapter 57: Cancer of the colon. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology.* 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Libutti SK, Willett CG, Salz LB, Levine RA. Chapter 60: Cancer of the rectum. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology.* 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Colon Cancer, Version 1.2018 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/colon.pdf on February 9, 2017.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Rectal Cancer, Version 4.2017 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/rectal.pdf on February 9, 2017.

Sigurdson ER, Benson AB, Minsky B. Cancer of the rectum. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology.* 5th ed. Philadelphia, Pa. Elsevier: 2014: 1336-1359.

Song P, Sheng L, Sun Y, et al. The clinical utility and outcomes of microwave ablation for colorectal cancer liver metastases. *Oncotarget.* 2017;8(31):51792-51799.

Van Schaeybroeck S, Lawler M, Johnston B, et al. Colorectal cancer. In: Neiderhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical*

Oncology. 5th ed. Philadelphia, Pa: Elsevier; 2014: 1278-1335.

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Radiation Therapy for Colorectal Cancer

Radiation therapy uses high-energy rays (such as x-rays) or particles to destroy cancer cells. It's more often used to treat people with rectal cancer than for people with colon cancer. For some colon and rectal cancers, treating with [chemotherapy](#) at the same time can make radiation therapy work even better. Using these 2 treatments together is called **chemoradiation** or **chemoradiotherapy**.

When is radiation therapy used for colorectal cancer?

Radiation for colon cancer

It's not common to use radiation therapy to treat **colon cancer**, but it may be used in select cases:

- Before surgery (along with chemo) to help shrink a tumor and make it easier to remove.
- After [surgery](#), if the cancer has attached to an internal organ or the lining of the belly (abdomen). If this happens, the surgeon can't be sure that all the cancer has been removed. Radiation therapy may be used to try to kill any cancer cells that may have been left behind.
- During surgery, right to the area where the tumor was, to kill any cancer cells that may be left behind. This is called intraoperative radiation therapy or IORT.
- Along with chemo to help control cancers if a person is not healthy enough for surgery.
- To ease symptoms if advanced cancer is causing intestinal blockage, bleeding, or pain.
- To help treat cancer that has spread to other areas, such as the bones or brain.

Radiation for rectal cancer

For **rectal cancer**, radiation therapy is a more common treatment and may be used:

- Either before and/or after [surgery](#) to help keep the cancer from coming back. In this case, it's often given along with [chemotherapy](#). Many doctors now favor giving radiation therapy before surgery, as it may make it easier to remove the cancer, especially if the cancer's size and/or location might make surgery difficult. In either case, nearby lymph nodes are usually treated too.
- During surgery, right to the area where the tumor was, to kill any cancer cells that may be left behind. This is called intraoperative radiation therapy or IORT.
- With or without chemo to help control rectal cancers if a person is not healthy enough for surgery or to ease symptoms if advanced cancer is causing intestinal blockage, bleeding, or pain.
- To retreat tumors that come back in the pelvis after radiation was given.
- To help treat cancer that has spread to other areas, such as the bones or brain.

Types of radiation therapy

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

External-beam radiation therapy (EBRT)

This is the type of radiation therapy used most often for people with colon or rectal cancer. The radiation is focused on the cancer from a machine outside the body. It's a lot like getting an x-ray, but the radiation is more intense. How often and how long a person gets radiation treatments depends on the reason the radiation is being given and other factors. Treatments might be given over the course of a few days or several weeks.

Internal radiation therapy (brachytherapy)

This type of radiation therapy might be used to treat some rectal cancers, but more research is needed to understand how to best use and when to use brachytherapy.

For this treatment, a radioactive source is put inside your rectum next to or into the tumor. This allows the radiation to reach the rectum without passing through the skin and other tissues of the belly (abdomen), so it's less likely to damage nearby tissues.

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

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

Radioembolization

Radiation can also be given during an embolization procedure. You can find more details in [Ablation and Embolization to Treat Colorectal Cancer](#).

Side effects of radiation therapy

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

- Skin irritation at the site where radiation beams were aimed, which can range from redness to blistering and peeling
- Problems with wound healing if radiation was given before surgery
- Nausea
- Rectal irritation, which can cause diarrhea, painful bowel movements, or blood in the stool
- Bowel incontinence (stool leakage)
- Bladder irritation, which can cause problems like feeling like you have to go often (called frequency), burning or pain while urinating, or blood in the urine
- Fatigue/tiredness
- Sexual problems (erection issues in men and vaginal irritation in women)
- Scarring, fibrosis (stiffening), and adhesions that cause the tissues in the treated area to stick to each other

Most side effects should get better over time after treatment ends, but some problems

may not go away completely. If you notice any side effects, talk to your doctor right away so steps can be taken to reduce or relieve them.

More information about radiation therapy

To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

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Chemotherapy for Colorectal Cancer

Chemotherapy (chemo) is often used to treat [colorectal cancer](#). It's the use of drugs to kill cancer cells.

How is chemotherapy given?

You can get chemotherapy in different ways.

- **Systemic chemotherapy:** Drugs are put right into your blood through a vein or you take them by mouth. The drugs enter your bloodstream and reach all areas of your body. This can help reduce the risk of colorectal cancer spreading to other parts of the body.
- **Regional chemotherapy:** Drugs are put right into an artery that leads to the part of the body with the tumor. This focuses the chemo on the cancer cells in that area. It reduces side effects by limiting the amount of drug reaching the rest of your body. **Hepatic artery infusion**, or chemo given directly into the hepatic artery, is an example of regional chemotherapy sometimes used for cancer that has spread to the liver.

Doctors give chemo in cycles, with each treatment followed by a rest period to give the

body time to recover. Chemotherapy cycles generally last about 2 to 4 weeks. People usually get at least several cycles of treatment.

When is chemotherapy used for colorectal cancer?

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

- **Adjuvant chemo** is given after surgery. The goal is to kill any cancer cells that might have been left behind at surgery because they were too small to see, as well as cancer cells that might have escaped from the main tumor and settled in other parts of the body but are too small to see on imaging tests. This helps lower the chance that the cancer will come back.
- **Neoadjuvant chemo** is given (sometimes with radiation) before surgery to try to shrink the cancer and make it easier to remove. This is often done for rectal cancer.
- **For advanced cancers** that have spread to other organs like the liver, chemo can be used to help shrink tumors and ease problems they're causing. While it's not likely to cure the cancer, this often helps people feel better and live longer.

Drugs used to treat colorectal cancer

Some drugs commonly used for colorectal cancer include:

- **5-Fluorouracil (5-FU)**
- **Capecitabine (Xeloda)**, which is in pill form. Once in the body, it is changed to 5-FU when it gets to the tumor site.
- **Irinotecan (Camptosar)**
- **Oxaliplatin (Eloxatin)**
- **Trifluridine and tipiracil (Lonsurf)**, a combination drug in pill form

In most cases, 2 or more of these drugs are combined, which makes them work better. Sometimes, chemo drugs are given along with a [targeted therapy](#) drug.

Side effects of chemo

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

effects.

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

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

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

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

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

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

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

More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

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Targeted Therapy Drugs for Colorectal Cancer

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

Drugs that target blood vessel formation (VEGF)

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

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

These drugs are given as infusions into your vein (IV) every 2 or 3 weeks, in most cases along with [chemotherapy](#). When combined with chemo, these drugs can often help people with advanced colon or rectal cancers live longer.

Possible side effects of drugs that target VEGF

Common side effects of these drugs include:

- High blood pressure
- Extreme tiredness (fatigue)
- Bleeding
- Low white blood cell counts (with increased risk of infections)
- Headaches
- Mouth sores
- Loss of appetite
- Diarrhea

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

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

Drugs that target cells with EGFR changes

Epidermal growth factor receptor (EGFR) is a protein that helps cancer cells grow. There's often a lot of it on the surface of cancer cells. Drugs that target EGFR can be

used to treat some advanced colon or rectal cancers. These include:

- **Cetuximab (Erbix)**
- **Panitumumab (Vectibix)**

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

These drugs don't work in colorectal cancers that have mutations (defects) in the *KRAS*, *NRAS* or *BRAF* gene. Doctors now commonly test the tumor for these gene changes before treatment, and only use these drugs in people who don't have these mutations.

Possible side effects of drugs that target EGFR

The most common side effects of these drugs are skin problems such as an acne-like rash on the face and chest during treatment, which can sometimes lead to infections. An antibiotic cream or ointment may be needed to help limit the rash and related infections. The skin problems with panitumumab can be more serious and might lead to the skin peeling off. Other side effects can include:

- Headache
- Tiredness
- Fever
- Diarrhea

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

Other targeted therapy drugs

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

This drug is used to treat advanced colorectal cancer, typically when other drugs are no longer helpful. It's taken as a pill.

Common side effects include fatigue, loss of appetite, hand-foot syndrome (redness and irritation of the hands and feet), diarrhea, high blood pressure, weight loss, and

abdominal pain.

Less common but more serious side effects can include severe bleeding or perforations (holes) in the stomach or intestines.

More information about targeted therapy

To learn more about how targeted drugs are used to treat cancer, see [Targeted Cancer Therapy](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

- [References](#)

Libutti SK, Salz LB, Willett CG, Levine RA. Chapter 57: Cancer of the colon. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Libutti SK, Willett CG, Salz LB, Levine RA. Chapter 60: Cancer of the rectum. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

National Cancer Institute. Colon Cancer Treatment (PDQ®)—Patient Version. December 7, 2017. Accessed at www.cancer.gov/types/colorectal/patient/colon-treatment-pdq on February 12, 2018.

National Cancer Institute. Rectal Cancer Treatment (PDQ®)—Patient Version. May 19, 2017. Accessed at www.cancer.gov/types/colorectal/patient/rectal-treatment-pdq on February , 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Colon Cancer, Version 1.2018 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/colon.pdf on February 12, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Rectal Cancer, Version 4.2017 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/rectal.pdf on February 12, 2018.

Riley JM, Cross AW, Paulos CM, et al. The clinical implications of immunogenomics in

colorectal cancer: A path for precision medicine. *Cancer*. 2018 Jan 9.

Sigurdson ER, Benson AB, Minsky B. Cancer of the rectum. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014: 1336-1359.

Van Schaeybroeck S, Lawler M, Johnston B, et al. Colorectal cancer. In: Neiderhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa: Elsevier; 2014: 1278-1335.

Wright M, Beaty JS, Ternent CA. Molecular Markers for Colorectal Cancer. *Surg Clin North Am*. 2017;97(3):683-701.

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Immunotherapy for Colorectal Cancer

Immunotherapy is the use of medicines to help a person's own immune system better recognize and destroy cancer cells. Immunotherapy can be used to treat some people with advanced [colorectal cancer](#).

Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking the body's normal cells. To do this, it uses "checkpoint" proteins on immune cells, which act like switches that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to keep the immune system from attacking them. But drugs that target these checkpoints hold a lot of promise as cancer treatments.

Pembrolizumab (Keytruda) and **Nivolumab (Opdivo)** are drugs that target PD-1 (*programmed cell death protein 1*). PD-1 is a protein found on immune system cells called *T cells*. It normally helps keep these cells from attacking "good" cells in the body.

Pembrolizumab and nivolumab block the cancer cells' ability to attach to PD-1, so, the immune system can then "see" the cells as "bad." This boosts the immune response against the cancer cells and can shrink some tumors or slow their growth.

These drugs can be used for people whose colorectal cancer cells have [tested positive for specific gene changes](#), such as a high level of *microsatellite instability (MSI-H)*, or changes in one of the *mismatch repair (MMR)* genes. The drugs are used for people whose cancer is still growing after treatment with [chemotherapy](#). They might also be used to treat people whose cancer can't be removed with surgery, has come back (recurred) after treatment, or has spread to other parts of the body (metastasized).

Pembrolizumab (Keytruda) is given as an intravenous (IV) infusion. Treatment takes about 30 minutes and is given every 3 weeks.

Nivolumab (Opdivo) is given as an (IV infusion) that takes 1 hour. It's given every 2 weeks.

Possible side effects

Side effects can include:

- Fatigue
- Fever
- Cough
- Shortness of breath
- Itching
- Skin rash
- Nausea
- Loss of appetite
- Diarrhea
- Constipation
- Muscle and/or joint pain

Other, more serious side effects occur less often. Checkpoint inhibitors work by basically removing the brakes on the body's immune system. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, or other organs.

It's very important to tell your cancer care team about new side effects right away. Let them know about any changes you notice. If serious side effects do occur, treatment

may need to be stopped and you may get high doses of steroids to suppress your immune system.

More information about immunotherapy

To learn more about how targeted drugs are used to treat cancer, see [Cancer Immunotherapy](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#).

- [References](#)

Bristol-Myers Squibb. Opdivo. Accessed at www.opdivo.com on February 14, 2018.

Merck Sharp & Dohme Corp. Keytruda. Accessed at www.keytruda.com on February 14, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Colon Cancer, Version 1.2018 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/colon.pdf on February 14, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Rectal Cancer, Version 4.2017 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/rectal.pdf on February 14, 2018.

Overman MJ et al. Nivolumab in patients with metastatic DNA mismatch repair-deficient or microsatellite instability-high colorectal cancer (CheckMate 142): an open-label, multicentre, phase 2 study. *Lancet Oncol*. 2017 Jul 19.

US Food and Drug Administration. FDA approves first cancer treatment for any solid tumor with a specific genetic feature. [News Release] 2017. Accessed at www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm560167.htm on May 24, 2017.

US Food and Drug Administration. FDA grants nivolumab accelerated approval for MSI-H or dMMR colorectal cancer. [News Release] 2017. Accessed at www.fda.gov/drugs/informationondrugs/approveddrugs/ucm569366.htm on August 23, 2017.

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Treatment of Colon Cancer, by Stage

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

People with colon cancers that have not spread to distant sites usually have [surgery](#) as the main or first treatment. [Chemotherapy](#) may also be used after surgery (called adjuvant treatment). Most adjuvant treatment is given for about 6 months.

Treating stage 0 colon cancer

Since stage 0 colon cancers have not grown beyond the inner lining of the colon, [surgery](#) to take out the cancer is often the only treatment needed. In most cases this can be done by removing the polyp or taking out the area with cancer through a colonoscope (local excision). Removing part of the colon (partial colectomy) may be needed if a tumor is too big to be removed by local excision.

Treating stage I colon cancer

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

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

If the cancer in the polyp is high grade (see [Colorectal Cancer Stages](#) for more on this), or there are cancer cells at the edges of the polyp, more surgery might be recommended. You might also be advised to have more surgery if the polyp couldn't be removed completely or if it had to be removed in many pieces, making it hard to see if cancer cells were at the edges.

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

Treating stage II colon cancer

Many stage II colon cancers have grown through the wall of the colon, and maybe into nearby tissue, but they have not spread to the [lymph nodes](#).

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

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

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

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

Treating stage III colon cancer

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

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

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

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

Treating stage IV colon cancer

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

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

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

If the cancer has spread too much to try to cure it with surgery, chemo is the main treatment. Surgery might still be needed if the cancer is blocking the colon or is likely to do so. Sometimes, such surgery can be avoided by putting a [stent](#) (a hollow metal or plastic tube) into the colon during a colonoscopy to keep it open. Otherwise, operations such as a colectomy or [diverting colostomy](#) (cutting the colon above the level of the cancer and attaching the end to an opening in the skin on the belly to allow waste out) may be used.

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

Most people with stage IV cancer will get chemo and/or [targeted therapies](#) to control the cancer. Some of the most commonly used regimens include:

- FOLFOX: leucovorin, 5-FU, and oxaliplatin (Eloxatin)
- FOLFIRI: leucovorin, 5-FU, and irinotecan (Camptosar)
- CAPEOX or CAPOX : capecitabine (Xeloda) and oxaliplatin
- FOLFOXIRI: leucovorin, 5-FU, oxaliplatin, and irinotecan
- One of the above combinations plus either a drug that targets VEGF, (bevacizumab [Avastin], ziv-aflibercept [Zaltrap], or ramucirumab [Cyramza]), or a drug that targets

- EGFR (cetuximab [Erbix] or panitumumab [Vectibix])
- 5-FU and leucovorin, with or without a targeted drug
 - Capecitabine, with or without a targeted drug
 - Irinotecan, with or without a targeted drug
 - Cetuximab alone
 - Panitumumab alone
 - Regorafenib (Stivarga) alone
 - Trifluridine and tipiracil (Lonsurf)

The choice of regimens depends on several factors, including any previous treatments you've had and your overall health.

If one of these regimens is no longer working, another may be tried. For people with certain gene changes in their cancer cells, another option after initial chemotherapy might be treatment with an [immunotherapy drug](#) such as pembrolizumab (Keytruda).

For advanced cancers, [radiation therapy](#) can also be used to help prevent or relieve symptoms such as [pain](#). It may shrink tumors for a time, but it's not likely to cure the cancer. If your doctor recommends radiation therapy, it's important that you understand the goal of treatment.

Treating recurrent colon cancer

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

Local recurrence

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

Distant recurrence

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

If the cancer has spread too much to be treated with surgery, chemo and/or [targeted therapies](#) may be used. Possible regimens are the same as for stage IV disease.

For people whose cancers are found to have certain traits on lab tests, another option might be treatment with [immunotherapy](#).

Your options depend on which, if any, drugs you had before the cancer came back and how long ago you got them, as well as your overall health. You may still need surgery at some point to relieve or prevent blockage of the colon or other local problems. [Radiation therapy](#) may be an option to relieve symptoms as well.

Recurrent cancers can often be hard to treat, so you might also want to ask your doctor if [clinical trials](#) of newer treatments are available.

For more on recurrence, see [Understanding Recurrence](#).

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

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Treatment of Rectal Cancer, by Stage

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

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

Treating stage 0 rectal cancer

Stage 0 rectal cancers have not grown beyond the inner lining of the rectum. Removing or destroying the cancer is typically all that's needed. You can usually be treated with [surgery](#) such as a polypectomy (removing the polyp), local excision, or transanal resection.

Treating stage I rectal cancer

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

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

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

Additional treatment typically isn't needed after these operations, unless the surgeon finds the cancer is more advanced than was thought before surgery. If it is more advanced, a combination of [chemo](#) and [radiation therapy](#) is usually given. 5-FU and capecitabine are the chemo drugs most often used.

If you're too sick to have surgery, you may be treated with radiation therapy, although this hasn't been proven to work as well as surgery.

Treating stage II rectal cancer

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

Most people with stage II rectal cancer will be treated with [chemotherapy](#), [radiation](#)

[therapy](#), and [surgery](#), although the order of these treatments might be different for some people. For example, here's a common approach to treating these cancers:

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

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

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

Treating stage III rectal cancer

Stage III rectal cancers have spread to nearby [lymph nodes](#) but not to other parts of the body.

Most people with stage III rectal cancer will be treated with [chemotherapy](#), [radiation therapy](#), and [surgery](#), although the order of these treatments might differ.

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

Chemoradiation is followed by surgery to remove the rectal tumor and nearby lymph nodes, usually by low anterior resection (LAR), proctectomy with colo-anal anastomosis,

or abdominoperineal resection (APR), depending on where the cancer is in the rectum. If the cancer has reached nearby organs, a more extensive operation known as pelvic exenteration may be needed.

After surgery, chemo is given, usually for about 6 months. The most common regimens include FOLFOX (oxaliplatin, 5-FU, and leucovorin), 5-FU and leucovorin, CAPEOX (capecitabine plus oxaliplatin), or capecitabine alone. Your doctor will recommend the one best suited to your health needs.

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

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

Treating stage IV rectal cancer

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

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

- [Surgery](#) to remove the rectal tumor and distant tumors, followed by [chemo](#) (and/or [radiation therapy](#) in some cases)
- Chemo, followed by surgery to remove the rectal tumor and distant tumors, usually followed by chemo and radiation therapy (chemoradiation)
- Chemo, followed by chemoradiation, followed by surgery to remove the rectal tumor and distant tumors. This might be followed by more chemotherapy.
- Chemoradiation, followed by surgery to remove the rectal tumor and distant tumors. This might be followed by chemotherapy.

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

If the only site of cancer spread is the liver, you might be treated with chemo that's put right into the artery leading to the liver ([hepatic artery infusion](#)). This may shrink the

cancers in the liver better than if the chemo is given into a vein (IV) or by mouth.

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

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

The choice of regimens depends on several factors, including any previous treatments, your overall health, and how well you can tolerate treatment.

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

If the tumor doesn't shrink, a different drug combination may be tried. For people with certain gene changes in their cancer cells, another option after initial chemotherapy might be treatment with an [immunotherapy drug](#) such as pembrolizumab (Keytruda).

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

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

- Chemoradiation therapy
- Chemo alone

If tumors in the liver can't be removed by surgery because they are too big or there are too many of them, it may be possible to destroy them (partially or completely) with [ablation or embolization](#).

Treating recurrent rectal cancer

[Recurrent cancer](#) means that the cancer has come back after treatment. It may come back near the area of the initial rectal tumor (locally) or in distant organs, like the lungs or liver. If the cancer does recur, it's usually in the first 2 to 3 years after surgery, but it can also recur much later.

Local recurrence

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

Distant recurrence

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

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

If the cancer can't be removed by surgery, chemo and/or [targeted therapy drugs](#) may be used. For people with certain gene changes in their cancer cells, another option might be treatment with [immunotherapy](#). The regimen used will depend on what a person has received previously and on their overall health. If the cancer doesn't shrink, a different drug combination may be tried.

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

These cancers can often be hard to treat, so you might also want to ask your doctor if there are any [clinical trials](#) of newer treatments that might be right for you.

For more on recurrence, see [Understanding Recurrence](#).

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- [References](#)

Libutti SK, Willett CG, Salz LB, Levine RA. Chapter 60: Cancer of the rectum. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

National Cancer Institute. Rectal Cancer Treatment (PDQ®)—Patient Version. May 19, 2017. Accessed at www.cancer.gov/types/colorectal/patient/rectal-treatment-pdq on February , 14 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Rectal Cancer, Version 4.2017 -- January 18, 2018. Accessed at www.nccn.org/professionals/physician_gls/pdf/rectal.pdf on February 14, 2018.

Sigurdson ER, Benson AB, Minsky B. Cancer of the rectum. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014: 1336-1359.

American Cancer Society. *Colorectal Cancer Facts & Figures 2017-2019*. Atlanta, Ga: American Cancer Society; 2017.

Libutti SK, Salz LB, Willett CG, Levine RA. Chapter 57: Cancer of the colon. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Libutti SK, Willett CG, Salz LB, Levine RA. Chapter 60: Cancer of the rectum. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Sigurdson ER, Benson AB, Minsky B. Cancer of the rectum. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014: 1336-1359.

Steele SR, Johnson EK, Champagne B et al. Endoscopy and polyps-diagnostic and therapeutic advances in management. *World J Gastroenterol* 2013; 19(27): 4277-4288.

Van Schaeybroeck S, Lawler M, Johnston B, et al. Colorectal cancer. In: Neiderhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa: Elsevier; 2014: 1278-1335.

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