NCCN GUIDELINES FOR PATIENTS®

2021

Stomach Cancer

Presented with support from: NCCN FOUNDATION Guiding Treatment. Changing Lives. | Debbie's Dream Foundation: Curing Stomach Cancer | Hope for Stomach Cancer: Prevent. Treat. Live. | No Stomach for Cancer®: Supporting Research. Empowering Families.

Available online at NCCN.org/patients

It's easy to get lost in the cancer world

Let NCCN Guidelines for Patients® be your guide

- ✓ Step-by-step guides to the cancer care options likely to have the best results
- ✓ Based on treatment guidelines used by health care providers worldwide
- ✓ Designed to help you discuss cancer treatment with your doctors

About

National Comprehensive Cancer Network®

NCCN Guidelines for Patients® are developed by the National Comprehensive Cancer Network® (NCCN®)

NCCN

- ✓ An alliance of leading cancer centers across the United States devoted to patient care, research, and education

Cancer centers that are part of NCCN:
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- ✓ Developed by doctors from NCCN cancer centers using the latest research and years of experience
- ✓ For providers of cancer care all over the world
- ✓ Expert recommendations for cancer screening, diagnosis, and treatment

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- ✓ Present information from the NCCN Guidelines in an easy-to-learn format
- ✓ For people with cancer and those who support them
- ✓ Explain the cancer care options likely to have the best results

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NCCN FOUNDATION
NATIONAL COMPREHENSIVE CANCER NETWORK
Guiding Treatment. Changing Lives.

and supported by funding from NCCN Foundation®

These NCCN Guidelines for Patients are based on the NCCN Guidelines® for Gastric Cancer, Version 4.2021 – August 3, 2021.

NCCN Foundation seeks to support the millions of patients and their families affected by a cancer diagnosis by funding and distributing NCCN Guidelines for Patients. NCCN Foundation is also committed to advancing cancer treatment by funding the nation's promising doctors at the center of innovation in cancer research. For more details and the full library of patient and caregiver resources, visit NCCN.org/patients.

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Debbie's Dream Foundation: Curing Stomach Cancer

As an organization whose mission includes providing free education and support services internationally to stomach cancer patients, families, and caregivers, Debbie's Dream Foundation: Curing Stomach Cancer (DDF) is dedicated to raising awareness about stomach cancer, advancing funding for research, and seeking the ultimate goal of making the cure for stomach cancer a reality. DDF is proud to support this important and comprehensive resource for patients and their families.
DebbiesDream.org

Hope for Stomach Cancer

Hope for Stomach Cancer is a nonprofit that is focused on serving the stomach cancer community starting with the patient and their granular immediate needs. Hope for Stomach Cancer is dedicated to our mission which is to provide free support, resources and awareness to those affected by stomach cancer. Through research, early detection and prevention, we serve the stomach cancer community helping to save lives and working to find a cure. Our vision is to bridge the gap between research and patient care. We are pleased to support the NCCN Guidelines for Stomach Cancer as an invaluable resource for those facing stomach cancer.
StoCan.org

No Stomach For Cancer

We are an organization that works diligently to advance stomach cancer education and awareness within the medical and scientific community and to share that information with patients and their caregivers. In keeping with the organization's mission, NSFC supports research efforts for screening, early detection, treatment and prevention of stomach cancer. No Stomach For Cancer is proud to support this comprehensive guideline for patients and their families.
nostomachforcancer.org

To make a gift or learn more, please visit NCCNFoundation.org/donate or e-mail PatientGuidelines@NCCN.org.

Contents

1
Stomach cancer basics

The stomach is a large, hollow organ that secretes enzymes and acid to aid in the digestion of food. It is part of the digestive system. The digestive system takes in food, breaks it down, absorbs nutrients, and removes waste from the body.

The stomach

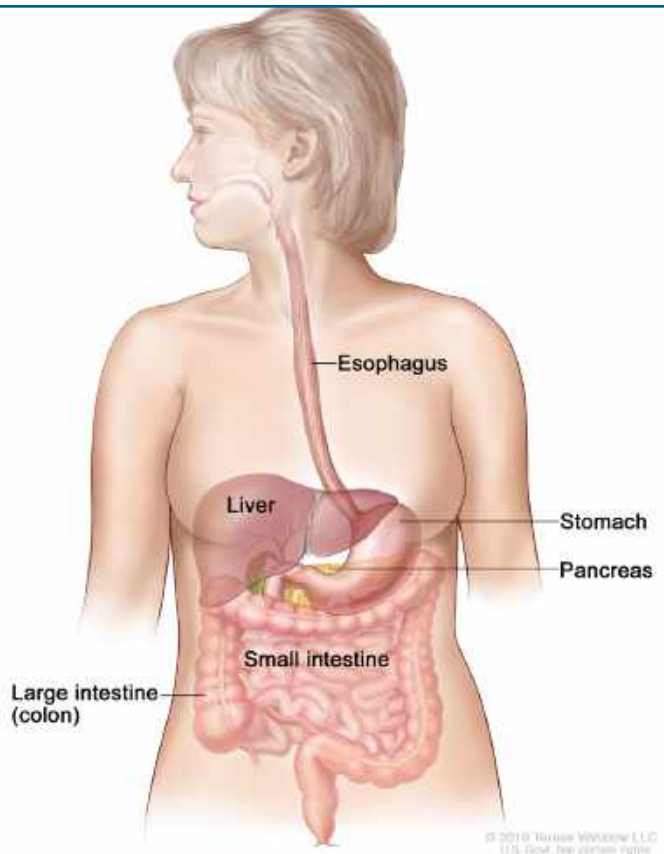
The stomach is a muscular, hollow organ located between the esophagus and the small intestine. It secretes enzymes and acid that convert what you eat and drink into a liquid called chyme. When empty, your stomach is about the size of your fist.

The stomach is part of the digestive system. The digestive system takes in and breaks down food, absorbs nutrients, and removes waste from the body. It includes organs like your liver, gallbladder, stomach, pancreas, and intestines. The digestive or gastrointestinal (GI) tract is part of the digestive system. It includes the esophagus, stomach, small intestine, colon, and rectum.

Food and drink enter the mouth and move through the esophagus into the stomach. Stomach contractions along with enzymes and acid break down food into chyme. From the stomach, chyme enters the small intestine where nutrients are absorbed into the bloodstream. Since only small amounts of chyme are released into the small

The digestive system

The digestive system takes in and breaks down food, absorbs nutrients, and removes waste from the body. It includes organs like your liver, gallbladder, stomach, pancreas, and intestines.



intestine at a time, the stomach also serves as a temporary holding chamber. The large intestine prepares unused food to be moved out of the body.

There is not much activity where the stomach connects to the esophagus and small intestine. However, the main body of the stomach is very active during digestion.

Parts of the stomach

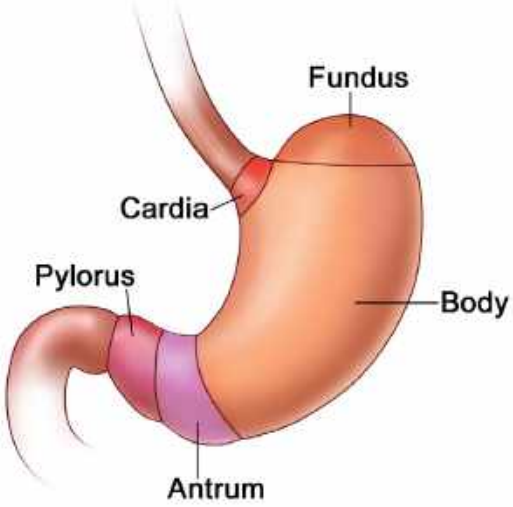
The parts of the stomach include:

- **Cardia** – the opening where the esophagus connects to the stomach.
- **Fundus** – the upper part of the stomach, which forms a bulge higher than the opening of the esophagus (farthest from the pylorus). It stores undigested food and gases released from digestion.
- **Body** – the main part of the stomach.
- **Antrum** – the lower portion of the stomach where the food mixes with enzymes and acid.
- **Pylorus** – connects the stomach to the first part of the small intestine (duodenum). The pylorus is a valve that opens and closes during digestion. This allows partly digested food and other stomach contents to pass from the stomach to the small intestine.

The esophagus joins the stomach just below the diaphragm at the esophagogastric junction (EGJ). The diaphragm is the thin breathing muscle below the lungs and heart that separates the chest from the abdomen. The EGJ might be referred to as the gastroesophageal junction (GEJ).

Parts of the stomach

The parts of the stomach include the cardia, the fundus, the body, the antrum, and the pylorus. The stomach is part of the digestive system. Many lymph nodes can be found along the lesser and greater curvatures of the stomach.



Stomach wall

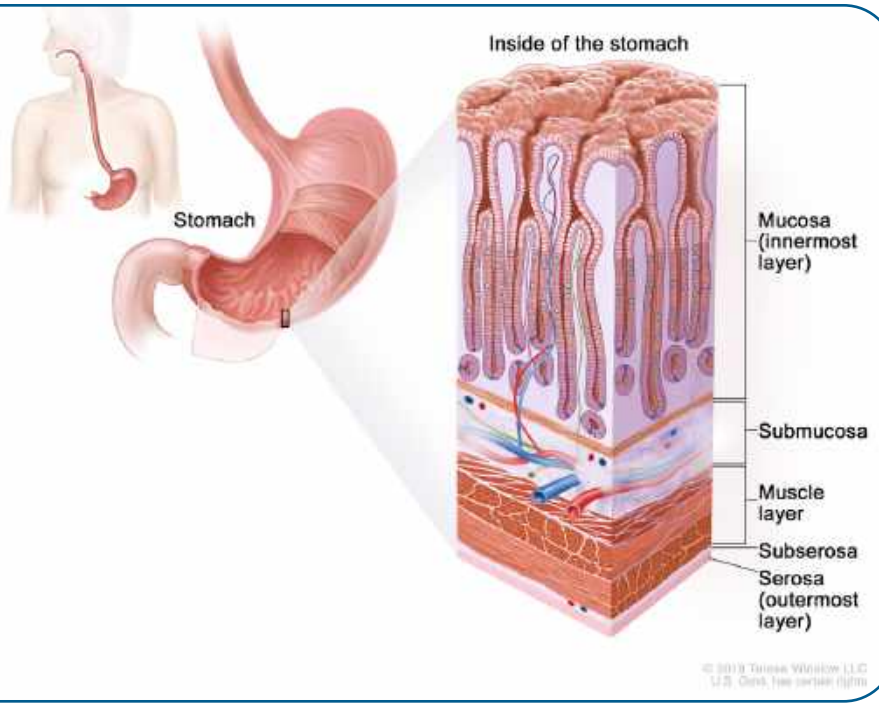
The stomach is made up of several layers. The inner and outer layers are membranes. A membrane is a very thin layer that covers a surface. In between these membranes are layers of muscle and connective tissue.

The wall of the stomach is made of 5 main layers.

- **Mucosa –** Inner membrane that is in contact with food. It consists of 3 layers:
  - Surface epithelium - A thin, moist layer of cells that forms the interior stomach lining. Epithelium makes a sticky, thick liquid called mucus that protects the stomach.
  - Lamina propria - A type of connective tissue found under the epithelium membrane. Within and supported by the lamina propria are stomach glands formed by cells that have the functions of producing enzymes, acid, mucus, and hormones.
  - Muscularis mucosae – A thin strip of muscle that separates the mucosa from the submucosa.
- **Submucosa –** A layer of connective tissue, blood vessels, and nerve cells. It also contains larger lymph vessels and channels.
- **Muscle –** A type of soft tissue that helps move food through the stomach. It is also called muscularis propria.
- **Subserosa –** A layer of connective tissue that supports the serosa.
- **Serosa –** An outer membrane that covers the stomach. The serosa is also called the serous membrane. This membrane allows the stomach to move smoothly against other organs.

Layers of the stomach wall

The wall of the stomach is made up of 5 layers: mucosa, submucosa, muscle layer, subserosa, and serosa.



In the absence of food, the stomach deflates inward, and its mucosa and submucosa fall into large folds called rugae.

Stomach cancer

Most stomach (gastric) cancers start in the cells that line the inside of the stomach and make mucus. These are called adenocarcinomas. Almost all stomach cancers are adenocarcinomas. Adenocarcinomas of the stomach are the focus of this book.

There are 2 major types of stomach adenocarcinomas.

- Intestinal - Cells of the intestinal type stick together and form tube- and gland-shaped structures. This type is more likely to have mutations that can be treated with targeted therapy.
- Diffuse - Cells of the diffuse type don't stick together and appear scattered over a wide area that can be easily seen on the surface. This type is less common.

Treatment is based on the type of stomach cancer and the location of the tumor.

Esophageal cancer

Many tumors that start in the stomach are treated as stomach cancers. However, tumors that start in the fundus of the stomach and cross over into the area between the esophagus and stomach (esophagogastric junction) are treated as esophageal cancers.

For more information, see *NCCN Guidelines for Patients: Esophageal Cancer*, available at NCCN.org/patientguidelines.

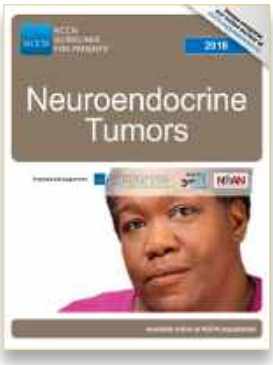
Gastrointestinal stromal tumors

Gastrointestinal stromal tumors (GISTs) are soft, fragile tumors. Although GISTs can start anywhere in the digestive tract, most start in the stomach.

For more information on GISTs or other types of sarcomas of the stomach, see *NCCN Guidelines for Patients: Soft Tissue Sarcoma*, available at NCCN.org/patientguidelines.

Neuroendocrine tumors

Neuroendocrine tumors (NETs) start in cells in the stomach (or other parts of the digestive tract) that act like nerve cells in some ways and like hormone-making (endocrine) cells in others.



For more information, see *NCCN Guidelines for Patients: Neuroendocrine Tumors*, available at NCCN.org/patientguidelines.

How stomach cancer spreads

Stomach cancer starts in the innermost layer and grows outward through the layers of the stomach wall. Cancer can spread to nearby lymph nodes, veins, arteries, and organs such as the liver, pancreas, and spleen. It might also grow into nearby lymphatic or blood vessels, and from there spread to nearby lymph nodes or to other parts of the body.

Stomach cancers tend to develop slowly over many years. Before cancer develops, pre-cancerous changes often occur in the inner lining (mucosa) of the stomach. Since these early changes rarely cause symptoms, they often go undetected.

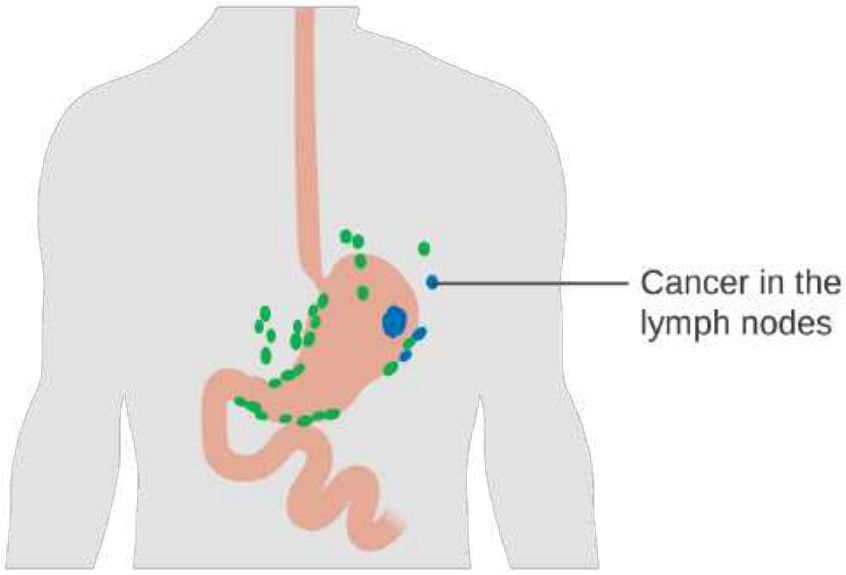
Those with stomach cancer can be grouped into 3 main categories, depending on how far the cancer has spread.

- **Early-stage stomach cancer** has not grown beyond the first layer (mucosa) of the stomach wall. The tumor is often small (2 centimeters or less) and is not in any lymph nodes.
- **Locoregional or locally advanced stomach cancer** has invaded other layers of the stomach wall and/or spread to the lymph nodes or organs near the stomach.
- **Metastatic stomach cancer** has spread to other parts of the body. The most common metastatic sites are the liver, abdominal lining (peritoneum), and distant lymph nodes. It may also spread to the lung or bone.

Cancer in regional lymph nodes

In locoregional or locally advanced stomach cancer, cancer may have spread to the lymph nodes near the stomach.

https://commons.wikimedia.org/wiki/File:Diagram_showing_stomach_cancer_cells_in_the_lymph_nodes_CRUK_274.svg



Key points

- The stomach is part of the digestive system. The digestive system takes in and breaks down food, absorbs nutrients, and removes waste from the body.
- Most stomach cancers start in cells that line the inside of the stomach wall and secrete mucus. These stomach cancers are called adenocarcinomas.
- The stomach wall is made up of 5 main layers: mucosa, submucosa, muscle, subserosa, and serosa. Cancer starts in the innermost layer and grows outward through the layers of the stomach wall.
- Stomach cancers tend to develop slowly over many years. Before cancer develops, pre-cancerous changes often occur in the inner lining (mucosa) of the stomach.
- Early-stage stomach cancer has not grown beyond the first layer (mucosa) of the stomach wall. The tumor is often small and is not in any lymph nodes.
- In locoregional or locally advanced stomach cancer, cancer has invaded the second layer (submucosa) of the stomach or beyond. Cancer might be found in nearby (regional) lymph nodes.
- Cancer can spread to distant parts of the body through the blood or lymphatic system. This is called metastatic stomach cancer. A distant metastasis could be in the liver, abdominal lining, or distant lymph nodes.

We want your feedback!

Our goal is to provide helpful and easy-to-understand information on cancer.

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

NCCN.org/patients/feedback

2
Diagnosing stomach cancer

Treatment planning starts with testing. This chapter presents an overview of the tests you might receive and what to expect.

Test results

Results from blood tests, imaging studies, and biopsy will be used to determine your treatment plan. It is important you understand what these tests mean. Ask questions and keep copies of your test results. Online patient portals are a great way to access your test results.

Keep these things in mind:

- Bring someone with you to doctor visits, if possible.
- Write down questions and take notes during appointments. Don't be afraid to ask your care team questions. Get to know your care team and let them get to know you.
- Get copies of blood tests, imaging results, and reports about the specific type of cancer you have.
- Organize your papers. Create files for insurance forms, medical records, and test results. You can do the same on your computer.
- Keep a list of contact information for everyone on your care team. Add it to your phone. Hang the list on your fridge or keep it in a place where someone can access it in an emergency. Keep your primary care physician informed of changes to this list.

Create a medical binder

A medical binder or notebook is a great way to organize all of your records in one place.

- Make copies of blood tests, imaging results, and reports about your specific type of cancer. It will be helpful when getting a second opinion.
- Choose a binder that meets your needs. Consider a zipper pocket to include a pen, small calendar, and insurance cards.
- Create folders for insurance forms, medical records, and tests results. You can do the same on your computer.
- Use online patient portals to view your test results and other records. Download or print the records to add to your binder.
- Organize your binder in a way that works for you. Add a section for questions and to take notes.
- Bring your medical binder to appointments. You never know when you might need it!

General health tests

Medical history

A medical history is a record of all health issues and treatments you have had in your life. Be prepared to list any illness or injury and when it happened. Bring a list of old and new medicines and any over-the-counter medicines, herbals, or supplements you take. Tell your doctor about any symptoms you have. A medical history will help determine which treatment is best for you. It is sometimes called a health history.

Family history

Some cancers and other diseases can run in families. Your doctor will ask about the health history of family members who are blood relatives. This information is called a family history. You can ask family members about their health issues like heart disease, cancer, and diabetes, and at what age they were diagnosed.

Physical exam

During a physical exam, your health care provider may:

- Check your temperature, blood pressure, pulse, and breathing rate
- Weigh you
- Listen to your lungs and heart
- Look in your eyes, ears, nose, and throat
- Feel and apply pressure to parts of your body to see if organs are of normal size, are soft or hard, or cause pain when touched. Tell your doctor if you feel pain.
- Feel for enlarged lymph nodes in your neck, underarm, and groin. Tell your doctor if you have felt any lumps or have any pain.

Doctors should perform a thorough physical exam along with a complete health history.

Nutritional assessment

You should meet with a nutritionist before starting treatment. The nutritionist or dietician can assess the impact of the cancer on your health. Stomach cancer can make you lose your appetite. You may also feel full after eating very little. These changes may have caused you to lose too much weight or make you feel weak and tired.

It is important that you receive adequate and sustained nutrition before you start treatment. You might receive food through a plastic tube that is placed through the skin of the abdomen into stomach or small intestine.

During and after treatment, your treatment team will monitor for weight loss and other signs you aren't getting enough nutrition.

For possible tests, see Guide 1.

Blood tests

Blood tests check for signs of disease and how well organs are working. They require a sample of your blood, which is removed through a needle placed into your vein.

Complete blood count

A complete blood count (CBC) measures the levels of red blood cells, white blood cells, and platelets in your blood. Your doctor will want to know if you have enough red blood cells to carry oxygen throughout your body, white blood cells to fight infection, and platelets to control bleeding.

Guide 1
Possible tests: Stomach (gastric) cancer

Medical history and physical exam. Screen for family history.
Upper GI endoscopy and biopsy
CT of chest, abdomen, and pelvis with oral and IV contrast
FDG-PET/CT evaluation (skull base to mid-thigh) if no evidence of M1 disease or as needed
CBC and comprehensive chemistry profile
Endoscopic ultrasound (EUS) if early-stage disease suspected or if early versus locally advanced disease needs to be determined (preferred)
Endoscopic resection (ER) is essential for the accurate staging of early-stage cancers (T1a or T1b). Early-stage cancers can best be diagnosed by ER.
Biopsy of metastatic disease as needed
Testing for MSI and MMR is recommended in all newly diagnosed patients
HER2 and PD-L1 testing if metastatic adenocarcinoma is documented or suspected
Assess Siewert category
Nutritional assessment and counseling
Smoking cessation advice, counseling, and medicine as needed

Comprehensive chemistry profile

A comprehensive chemistry profile provides important information about how well your kidneys and liver are working, among other things. It is usually part of a comprehensive metabolic panel (CMP). A CMP measures 14 different substances in your blood.

CA 19-9 and CEA

Cancer antigen 19-9 (CA 19-9) and carcinoembryonic antigen (CEA) are occasionally made by tumors and can be detected in the blood. These tumor markers may be followed if elevated at the time of diagnosis.

Bring a list of any medications, vitamins, over-the-counter drugs, herbals, or supplements you are taking.

Imaging tests

Imaging tests take pictures of the inside of your body. Images can be made with scanning machines or scoping tools. Imaging tests may show if the tumor involves any veins, arteries, and other organs. A radiologist, an expert in interpreting imaging tests, will write a report and send this report to your doctor. Your doctor will discuss the results with you.

CT scan

A computed tomography (CT or CAT) scan uses x-rays and computer technology to take pictures of the inside of the body. It takes many x-rays of the same body part from different angles. All the images are combined to make one detailed three-dimensional (3D) picture.

A CT scan of your chest, abdomen, and/or pelvis may be one of the tests to look for cancer. In most cases, contrast will be used. Contrast material is used to improve the pictures of the inside of the body. Contrast materials are not dyes, but substances that help enhance and improve the images of several organs and structures in the body. It is used to make the pictures clearer. The contrast is not permanent and will leave the body in your urine immediately after the test.

Tell your doctors if you have had allergic reactions to contrast in the past. This is important. You might be given medicines, such as Benadryl® and prednisone, to avoid the effects of those allergies. Contrast might not be used if you have a serious allergy or if your kidneys aren't working well.

PET scan

A positron emission tomography (PET) scan uses a radioactive drug called a tracer. A tracer is a substance injected into a vein to see where cancer cells are in the body and if they are using sugar to grow. Cancer cells show up as bright spots on PET scans. However, not all tumors will appear on a PET scan. Also, not all bright spots are cancer. It is normal for

the brain, heart, kidneys, and bladder to be bright on PET. When a PET scan is combined with CT, it is called a PET/CT scan. It may be done with one or two machines depending on the cancer center. An FDG-PET scan uses 18-fluorodeoxyglucose as its tracer.

Ultrasound

An ultrasound (US) uses high-energy sound waves to form pictures of the inside of the body. A probe will be pressed onto your abdomen. This is similar to the sonogram used for pregnancy. Ultrasound is painless and does not use x-rays, so it can be repeated as needed. It can show small areas of cancer that are near the surface of the body. Sometimes, an ultrasound or CT is used to guide a biopsy.

Scoping tests

Some imaging tests use a thin, tube-shaped tool called a scope that is inserted into the body to take pictures. One end of the scope has a small light and camera lens to see inside your body. The image is sent to a television monitor. This will help guide your doctor in a biopsy, stent placement, or other tasks. The scope is guided into the body through a natural opening, such as the mouth, nose, or anus. It may also be inserted through a small surgical cut.

More than one type of scope may be used for imaging tests. The type of scope often used for stomach cancer is called an endoscope. An endoscope is often guided into the body through the mouth. Endoscopy is an important tool in the diagnosis, staging, treatment, and care of those with stomach cancer. Before an endoscopy, you will be given medicine to help you relax or sleep during the procedure.

Endoscopic procedures are best performed in centers with experienced doctors.

Imaging tests with scopes might include:

- Endoscopic ultrasound (EUS)
- Esophagogastroduodenoscopy (EGD)
- Laparoscopy

Endoscopic ultrasound

An ultrasound (US) uses high-energy sound waves to form pictures of the inside of the body. Endoscopic ultrasound (EUS) uses both imaging and an endoscope to see how deep the tumor has grown into the stomach wall. Signs of cancer within lymph nodes and other nearby organs can also be detected. An EUS in an important part of cancer diagnosis and staging.

You are most likely to have an endoscopic ultrasound if your doctor suspects that the cancer hasn't grown far into the stomach wall (early-stage disease), or to determine whether the cancer is early stage or locally advanced.

EGD or upper endoscopy

In an EGD, a device is guided down the throat into the esophagus, stomach, and upper parts of the small intestine (duodenum). An EGD is used to inspect the lining of these organs and to look for any signs of cancer or other abnormalities such as dilated blood vessels or ulcers. An EGD can also be referred to as an upper GI endoscopy or duodenoscopy.

Your doctor will record where the tumor is in your stomach or esophagus. If the tumor is near the esophagus, the distance from the esophagogastric junction (EGJ) may also be recorded. The EGJ is a muscle found just beneath the diaphragm. After the endoscopy, your throat may feel sore and you may feel some swelling.

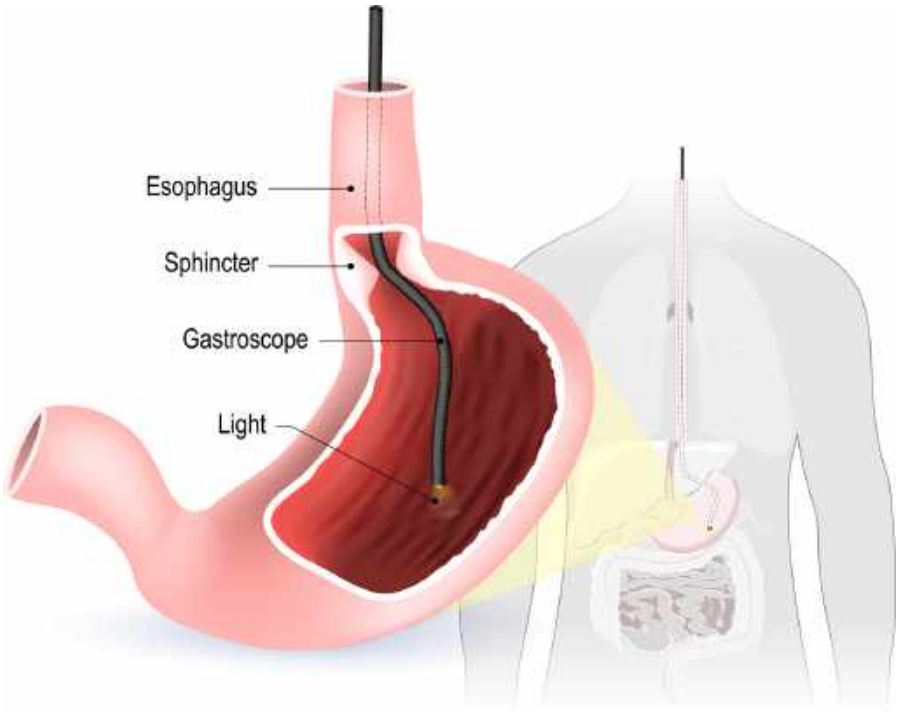
Laparoscopy

Laparoscopy (key-hole surgery) is a type of surgical procedure that allows your surgeon to see the inside of your abdomen. It uses a tool like an endoscope called a laparoscope. For this test, the laparoscope will be inserted through a tiny cut in your abdomen. Laparoscopy is done under general anesthesia. This is a controlled loss of wakefulness from drugs.

Laparoscopy may only be used in certain cases. It can be used to determine the stage of disease and rule out metastasis by detecting cancer spread inside your abdomen that may have been missed on imaging scans. It can also be used to obtain biopsy samples. Sometimes, laparoscopy is used to determine if you are a surgical candidate.

Upper endoscopy

Upper endoscopy allows your doctor to see the inner wall of your stomach and esophagus. If ultrasound is used, your doctor will be able to see the deeper wall layers and nearby organs.



Biopsy

A biopsy removes a sample of tissue or fluid during an endoscopy. Several samples may be taken from the tumor, wall of your stomach or esophagus, lymph nodes, or organs next to your stomach, such as your liver. The samples will be sent to a pathologist, an expert in examining cells under a microscope to find disease.

Other types of biopsies may include:

- **Fine-needle aspiration (FNA) or core biopsy (CB)** uses needles of different sizes to remove a sample of tissue or fluid. An ultrasound (US) may guide the FNA for diagnosis.
- **Brushings or washings** involve removing tumor or cell samples with a small brush at the end of an endoscope.
- **Fluid samples** from ascites (fluid in abdominal cavity) can be used to look for cancer cells (called paracentesis).
- **Liquid biopsy** uses a sample of blood for testing.

Biopsy of metastases

A metastasis is the spread of cancer to an area of the body such as the lining of the abdomen (peritoneum) or liver. A biopsy of the metastasis may be needed to confirm the presence of cancer. If there is more than one metastasis, each site may be biopsied. The type of biopsy used depends on the location of the suspected metastases and other factors.

Biomarker testing

A sample from a biopsy of your tumor may be tested to look for specific DNA (deoxyribonucleic acid) mutations/alterations, protein levels, or other molecular features. This information is used to choose the best treatment for you. It is sometimes called molecular testing or tumor profiling.

Biomarker testing includes tests of genes or their products (proteins). It identifies the presence or absence of mutations and certain proteins that might suggest treatment. Proteins are written like this: NTRK. Genes are written like this: *NTRK.*

Immunohistochemistry (IHC), fluorescence in situ hybridization (FISH), polymerase chain reaction (PCR), or next-generation sequencing (NGS) are types of tests used to look for biomarkers.

Testing for HER2 status, microsatellite (MS) status, programmed death ligand 1 (PD-L1) expression, and neurotrophic tropomyosin-related kinase (*NTRK*) gene fusions are important for the treatment and management of metastatic stomach cancer.

Liquid biopsy

Some mutations can be found by testing circulating tumor DNA (ctDNA) in the blood. In a liquid biopsy, a sample of blood is taken to look for cancer cells or for pieces of DNA from tumor cells.

Those who have metastatic or advanced stomach cancer and are unable to undergo a traditional biopsy might have a liquid biopsy. Sometimes, testing can quickly use up a tumor sample and a liquid biopsy might be an option in this case.

Tumor mutation burden

When there are 10 or more mutations per million base pairs of tumor DNA, it is called tumor mutational burden-high (TMB-H). TMB-H can be used to help predict response to cancer treatment using immune checkpoint inhibitors that target the proteins PD-1 or PD-L1.

Tumor mutation testing

A sample of your tumor or blood may be used to see if the cancer cells have any specific DNA mutations. This is a different type of DNA testing than the genetic testing for mutations you may have inherited from your parents. In tumor mutation testing, only the tumor is tested and not the rest of your body. Some mutations such as *NTRK* gene fusions can be targeted with specific therapies.

HER2

Human epidermal growth factor receptor 2 (HER2) is a protein involved in normal cell growth. It is found on the surface of all cells. When amounts are high, it causes cells to grow and divide. This is called HER2 positive, overexpression, or amplification.

There might be higher amounts of HER2 in your stomach cancer. A sample of your tumor might be tested for HER2. If your tumor makes too much HER2, you might receive a targeted therapy called trastuzumab (Herceptin®) or a biosimilar, or trastuzumab deruxtecan (Enhertu®). A biosimilar is a drug that is very much like one that has been approved by the U.S. Food and Drug Administration (FDA). It must be used in the exact same way and at the same dose as the other drug.

MSI-H/dMMR

Microsatellites are short, repeated strings of DNA. When errors or defects occur, they are fixed by mismatch repair (MMR) proteins. Some cancers prevent these errors from being fixed. This is called microsatellite instability (MSI) or deficient mismatch repair (dMMR). When cancer cells have more than a normal number of microsatellites, it is called microsatellite instability-high (MSI-H). This is often due to dMMR genes.

All patients with newly diagnosed stomach cancer should be tested for MMR or MSI. When testing for MMR, immunohistochemistry (IHC) is recommended. When testing for MSI, polymerase chain reaction (PCR) is recommended.

NTRK gene fusions

In a tumor with an *NTRK* gene fusion, a piece of the *NTRK* gene and a piece of another gene fuse, or join. This activates the *NTRK* gene in a way that causes uncontrolled cell growth. Larotrectinib (Vitrakvi®) and entrectinib (Rozlytrek™) might be used to target advanced or metastatic cancer that is *NTRK* gene fusion-positive.

PD-L1

Programmed death-ligand 1 (PD-L1) is an immune protein. This protein can cause your immune cells to ignore the cancer cells and suppress the anti-tumor immune response. If any of the cells in your tumor sample have (express) the PD-L1 protein, you might have treatment that combines chemotherapy and immunotherapy. This is designed to activate your immune system to better fight off the cancer cells.

PD-L1 testing may be considered for those with locally advanced, recurrent, or metastatic cancer who are candidates for treatment with PD-1 inhibitors.

FISH

Fluorescence in situ hybridization (FISH) is a method that involves special dyes called probes that attach to pieces of DNA, the genetic material in a person's cells.

Immunohistochemistry

Immunohistochemistry (IHC) is a special staining process that involves adding a chemical marker to cancer or immune cells. The cells are then studied using a microscope.

Next-generation sequencing

Next-generation sequencing (NGS) is a high-throughput method used to determine a portion of a person's DNA sequence. This method would only be used if enough tumor tissue remains after other biomarker testing has been completed.

PCR

A polymerase chain reaction (PCR) is a lab process that can make millions or billions of copies of your DNA (genetic information). PCR is very sensitive. It can find 1 abnormal cell among more than 100,000 normal cells. These copies called PCR product might be used for NGS.

Genetic testing

Genetic testing is done using blood or saliva (spitting into a cup). The goal is to look for gene mutations inherited from your parents called germline mutations. Some mutations can put you at risk for more than one type of cancer. You can pass these genes on to your children. Also, family members might carry these mutations. Tell your doctor if there is a family history of cancer. Depending on your family history or other features of your cancer, your health care provider might refer you for hereditary genetic testing to learn more about your cancer. A genetic counselor will speak to you about the results.

Hereditary syndromes

Certain genetic (inherited) syndromes may put someone at risk for developing stomach cancer. A syndrome is a group of signs or symptoms that occur together and suggest the presence of or risk for a disease. A genetic risk assessment will identify if you carry a cancer risk and if you may benefit from genetic testing, additional screening, or preventive interventions. Depending on the genetic risk assessment, you might undergo genetic testing and genetic counseling.

Hereditary syndromes most closely related to stomach cancer include:

- Hereditary diffuse gastric cancer (HDGC)
- Lynch syndrome (LS)
- Juvenile polyposis syndrome (JPS)
- Peutz-Jeghers syndrome (PJS)
- Familial adenomatous polyposis (FAP) or attenuated FAP (AFAP)

Key points

- Tests are used to find cancer, plan treatment, and check how well treatment is working.
- A medical history and physical exam inform your doctor about your overall health.
- Getting good nutrition is important before starting treatment. You should meet with a nutritionist before starting treatment.
- Blood tests check for signs of disease and how well organs are working.
- Imaging tests take pictures of the inside of your body. Images can be made with scanning machines or scoping tools.
- A biopsy removes a sample of tissue or fluid during an endoscopy.
- A sample from a biopsy of your tumor may be tested to look for specific DNA (deoxyribonucleic acid) mutations, protein expression levels, or other molecular features. Some mutations and proteins can be targeted with specific therapies.
- Genetic testing might be done to look for gene mutations inherited from your parents called germline mutations.
- Results from blood tests, imaging studies, and biopsy will determine your treatment plan. Often, information is collected over time, even as treatment begins.
- Online portals are a great way to access your test results.

Imaging and other tests are not always accurate. A multidisciplinary team should review the results.

3
Stomach cancer stages

Cancer staging is used to make treatment decisions. It describes the size and location of the tumor, if the tumor has grown through the layers of the stomach wall, and if cancer has spread to lymph nodes, organs, or other parts of the body. This chapter explains stomach cancer stages.

Overview

Stomach cancer staging is often done twice.

- Clinical stage (c) is the rating given before any treatment. It is based on a physical exam, biopsy, and imaging tests. An example might look like cN2 or cM1.
- Pathologic stage (p) or surgical stage is determined by examining tissue removed during an operation. An example might be pN2. If you are given drug therapy before surgery, then the stage might look like ypT3.

Clinical stage

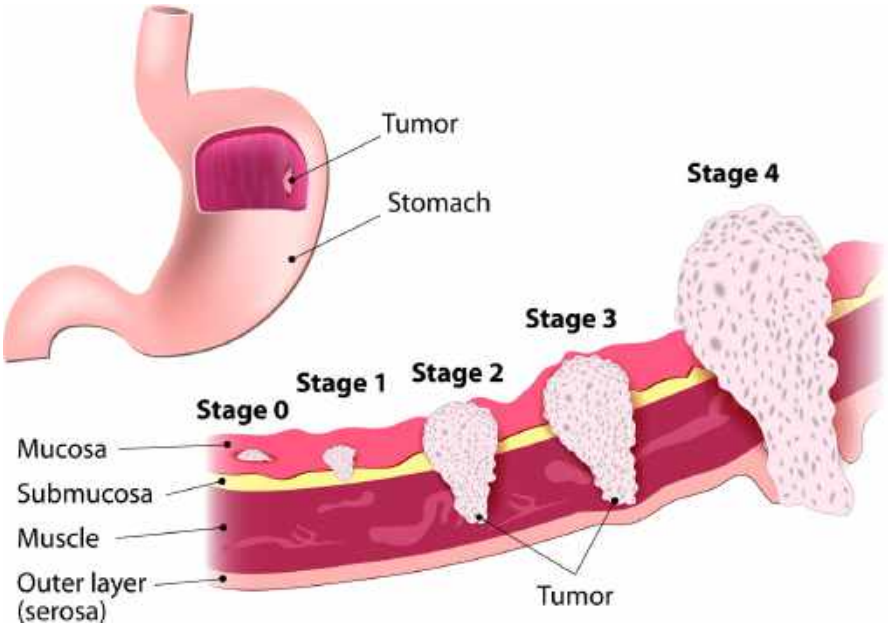
The clinical (before surgery) stage is based on the endoscopic ultrasound (EUS) and other imaging or biopsy results. These tests are done before any treatment as part of an initial diagnosis. Surgery is needed to know exactly how much cancer is in the body.

Pathologic stage

The pathologic (after surgery) stage is based on information gained after surgery to remove all or part of the stomach and nearby lymph nodes. This gives a more accurate picture of how far the cancer has spread and is used to determine your treatment options after surgery. The removal of tumor tissue and nearby lymph nodes is an important part of pathologic staging.

Stages of stomach cancer

Stomach cancer starts in the innermost layer and grows outward through the layers of the stomach wall.



Staging

A cancer stage is a way to describe the extent of the cancer at the time you are first diagnosed. The American Joint Committee on Cancer (AJCC) created a staging system to determine how much cancer is in your body, where it is located, and what subtype you have. AJCC is just one type of staging system.

Staging is based on a combination of information to reach a final numbered stage. Often, not all information is available at the initial evaluation. More information can be gathered as treatment begins. Doctors may explain your cancer stage in different ways than described next.

TNM scores

The tumor, node, metastasis (TNM) system is used to stage stomach cancer. In this system, the letters T, N, and M describe different areas of cancer growth. Based on imaging and pathology results, your doctor will assign a score or number to each letter. The higher the number, the larger the tumor or the more the cancer has spread to lymph nodes or other organs. These scores will be combined to assign the cancer a stage. A TNM example might look like this: T1N0M0 or T1, N0, M0.

The TNM letters represent the following:

- **T (tumor) –** Depth and spread of the main (primary) tumor in the stomach wall
- **N (node)** – If cancer has spread to nearby (regional) lymph nodes
- **M (metastasis)** – If cancer has spread to distant parts of the body or metastasized

Grade

Grade describes how abnormal the tumor cells look under a microscope (called histology). Higher-grade cancers tend to grow and spread faster than lower-grade cancers. GX means the grade can't be determined, followed by G1, G2, and G3. Well differentiated (G1) means the cancer cells look similar to normal cells. Poorly differentiated (G3) means the cancer cells look very different compared to normal cells. G3 is the highest grade for stomach (gastric) cancers.

- **GX** – Grade cannot be determined
- **G1** – Well differentiated
- **G2** – Moderately differentiated
- **G3** – Poorly differentiated or undifferentiated

Guide 2
Stomach cancer stages: Clinical (c)

Stage 0	• Tis, N0, M0
Stage 1	• T1 or T2, N0, M0
Stage 2A	• T1 or T2, N1 or N2 or N3, M0
Stage 2B	• T3 or T4a, N0, M0
Stage 3	• T3 or T4a, N1 or N2 or N3, M0
Stage 4A	• T4b, Any N, M0
Stage 4B	• Any T, Any N, M1

Numbered stages

Numbered stages are based on TNM scores. Stages range from stage 1 to stage 4, with 4 being the most advanced. Doctors write these stages as stage I, stage II, stage III, and stage IV. For example, stage 1 might be T1, N0, M0.

For clinical (before surgery) stomach cancer stages, see Guide 2.

For pathologic (after surgery) stomach cancer stages, see Guide 3.

Other terms might be used instead of numbered cancer stages. This book will use the following terms to describe stomach cancer:

- **Resectable** – Tumor can be removed completely with surgery.
- **Unresectable** – Tumor cannot be removed with surgery. It might involve nearby veins and arteries making it unsafe to remove.
- **Locoregional or locally advanced** – Tumor might be any size and could be in any layer of the stomach. Cancer might be in nearby lymph nodes, organs, and tissues.
- **Metastatic** – Cancer that has spread to other parts of the body, including distant lymph nodes. The most common sites are the liver, abdominal lining (peritoneum), and distant lymph nodes. It may also spread to the lung or bone.

Guide 3
Cancer stages: Pathologic (p)

Stage 0	• Tis, N0, M0
Stage 1A	• T1, N0, M0
Stage1B	• T1, N1, M0 • T2, N0, M0
Stage 2A	• T1, N2, M0 • T2, N1, M0 • T3, N0, M0
Stage 2B	• T1, N3a, M0 • T2, N2, M0 • T3, N1, M0 • T4a, N0, M0
Stage 3A	• T2, N3a, M0 • T3, N2, M0 • T4a, N1 or N2, M0 • T4b, N0, M0
Stage 3B	• T1, N3b, M0 • T2, N3b, M0 • T3, N3a, M0 • T4a, N3a, M0 • T4b, N1 or N2, M0
Stage 3C	• T3, N3b, M0 • T4a, N3b, M0 • T4b, N3a or N3b, M0
Stage 4	• Any T, Any N, M1

T = Tumor

A tumor can grow through the layers of the stomach wall and into nearby structures.

- **Tis** – Carcinoma *in situ* (cancer has not grown beyond the epithelium)
- **T1a** – Tumor invades the lamina propria or muscularis mucosae of the first layer of the stomach wall (the mucosa).
- **T1b** – Tumor invades the second layer of the stomach wall (the submucosa).
- **T2** – Tumor invades the third layer of the stomach wall (the muscle layer called muscularis propria).
- **T3** – Tumor penetrates the subserosa connective tissue between the third and outer layer of the stomach wall. It has not reached the serosa or nearby structures.
- **T4a** – Tumor invades the outer layer of the stomach wall (the serosa called the visceral peritoneum).
- **T4b** – Tumor has grown all the way through the stomach wall and into nearby structures, such as the diaphragm, liver, spleen, pancreas, adrenal gland, kidney, colon, small intestine, and abdominal wall.

Carcinoma *in situ* and T1a tumors are often considered early-stage cancer. This is cancer that has not grown beyond the first layer of the stomach wall. Stomach cancers are rarely found this early.

5 layers of the stomach wall

1. Mucosa – Inner membrane that is in contact with food.

Mucosa consists of 3 layers:

- Surface epithelium – A thin, moist layer of cells that forms the interior stomach lining.
- Lamina propria – A type of connective tissue found under the epithelium membrane. Within and supported by the lamina propria are stomach glands formed by cells that have the functions of producing enzymes, acid, mucus and hormones.
- Muscularis mucosae – A thin strip of muscle that separates the mucosa from the submucosa.

2. Submucosa – A layer of connective tissue, blood vessels, and nerve cells.

3. Muscle – A type of soft tissue that helps move food through the stomach. Also called muscularis propria.

4. Subserosa – A layer of connective tissue that supports the serosa.

5. Serosa – An outer membrane that covers the stomach. The serosa is also called the serous membrane or visceral peritoneum.

N = Regional lymph node

There are hundreds of lymph nodes throughout your body. They work as filters to help fight infection and remove harmful things from your body. Regional lymph nodes are found near the stomach. Cancer found in a regional lymph node is called a lymph node metastasis. This is different than a distant metastasis, which is found far from the main tumor in the stomach.

Lymph drains from the stomach wall into lymphatic vessels in the mucosa and submucosa. From here it drains into lymph nodes outside the stomach. There are several groups of regional lymph nodes that drain the wall of the stomach. They include pyloric (pylorus area of stomach), perigastric, pericardiac at the esophagogastric junction, and lymph nodes near organs and arteries such as the pancreas, spleen (splenic), and liver (hepatic).

The largest group of stomach lymph nodes are the perigastric lymph nodes found along the lesser and greater curves of the stomach and in the omenta. The omentum is a fold of the thin tissue that lines the abdomen (peritoneum) that surrounds the stomach and other organs in the abdomen.

The removal of lymph nodes is called lymph node or nodal dissection. At least 16 regional nodes should be removed and tested. However, the removal of more than 30 regional lymph nodes is advised.

- **N0** – There is no cancer in nearby lymph nodes.
- **N1** – 1 or 2 nearby nodes have cancer.
- **N2** – 3 to 6 nearby nodes have cancer.
- **N3a** – 7 to 15 nearby lymph nodes have cancer.
- **N3b** – 16 or more nearby lymph nodes have cancer.

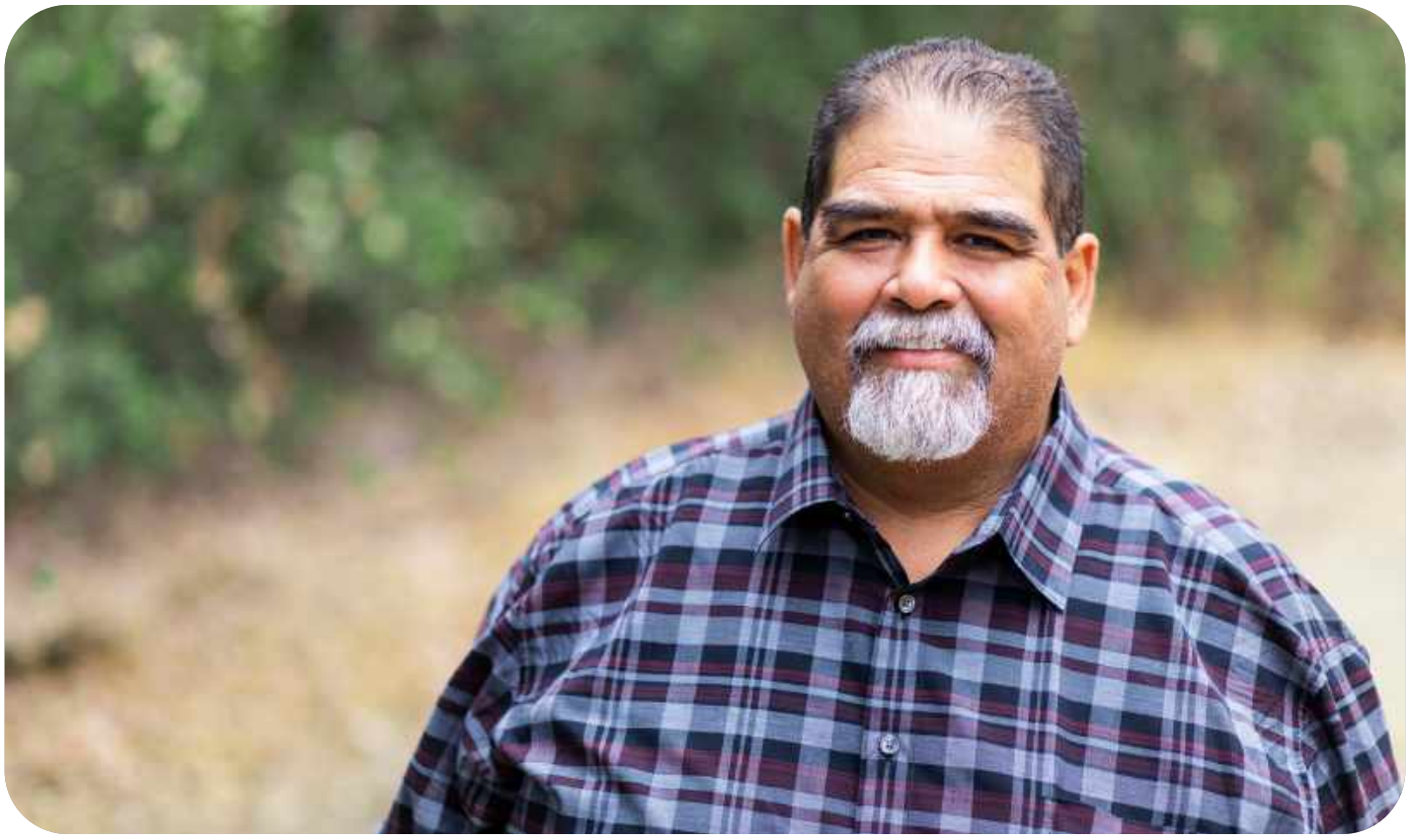
M = Metastasis

Cancer that has spread to distant parts of the body is shown as M1. The most common site for metastasis is the liver, abdominal lining, and distant lymph nodes.

Key points

- Staging is used to make treatment decisions.
- Doctors rate the extent of stomach cancer in the body using the tumor, node, metastasis (TNM) system.
- Stomach cancer staging is often done twice, before and after surgery.
- The clinical stage (c) of stomach cancer is based on the results of testing before surgery. It is written as cTNM.
- The pathologic stage (p) of stomach cancer is based on the results of surgery. It is written as pTNM.
- Regional lymph nodes are found near the stomach.
- Cancer that has spread to distant parts of the body is metastatic cancer.
- Doctors may explain your cancer stage in different ways to make it less confusing.

4
Treatment overview



There is more than one treatment for stomach cancer. This chapter describes treatment options and what to expect. Together, you and your doctor will choose a treatment plan that is best for you.

Treatment team

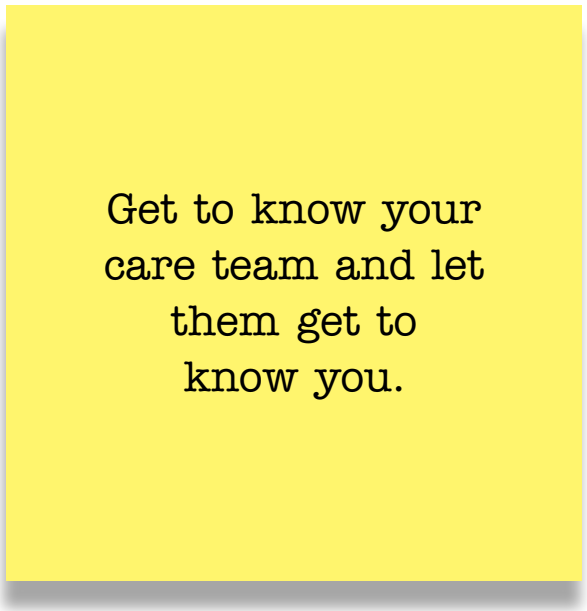
Those with stomach cancer should seek treatment at experienced cancer centers.

Treating stomach cancer takes a team approach. Treatment decisions should involve a multidisciplinary team (MDT). An MDT is a team of doctors, health care workers, and social care professionals from different professional backgrounds who have knowledge (expertise) and experience with your type of cancer. This team is united in the planning and implementing of your treatment. Ask who will coordinate your care.

Some members of your care team will be with you throughout cancer treatment, while others will only be there for parts of it. Get to know your care team and let them get to know you.

Depending on your diagnosis, your team might include the following specialists:

- **A gastroenterologist** is an expert in diseases of the digestive tract.
- **A pathologist** analyzes the cells, tissues, and organs removed during a biopsy or surgery and provides cancer diagnosis, staging, and information about biomarker testing.



- **A diagnostic radiologist** reads the results of x-rays and other imaging tests.
- **An interventional radiologist** performs needle biopsies, performs endoscopies, and places ports for treatment.
- **A surgical oncologist** performs operations to remove cancer.
- **A medical oncologist** treats cancer in adults using systemic therapy. A radiation oncologist prescribes and plans radiation therapy to treat cancer.
- **An anesthesiologist** gives anesthesia, a medicine so you do not feel pain during surgery or procedures.
- **Palliative care nurses and advanced practice providers** help provide an extra layer of support with your cancer-related symptoms.
- **Residents and fellows** are doctors who are continuing their training, some to become specialists in a certain field of medicine.

- **Oncology nurses** provide your hands-on care, like giving systemic therapy, managing your care, answering questions, and helping you cope with side effects. Sometimes, these experts are called nurse navigators.
- **Nutritionists and dietitians** can provide guidance on what foods are most suitable for your condition.
- **Psychologists and psychiatrists** are mental health experts who can help manage issues such as depression, anxiety, or other mental health conditions that can affect how you feel.
- **Social workers** help people solve and cope with problems in their everyday lives.
- **Research team** helps to collect research data if you are in a clinical trial.

You know your body better than anyone. Help other team members understand:

- How you feel
- What you need
- What is working and what is not

Keep a list of names and contact information for each member of your team. This will make it easier for you and anyone involved in your care to know whom to contact with questions or concerns.

If you smoke or vape

If you smoke tobacco or use e-cigarettes, it is very important to quit. Smoking can limit how well cancer treatment works. Smoking greatly increases your chances of having side effects after surgery. It also increases your chances of developing other cancers.

Nicotine is the chemical in tobacco that makes you want to keep smoking. Nicotine withdrawal is challenging for most smokers. The stress of having stomach cancer may make it even harder to quit. If you smoke, ask your doctor about counseling and medicines to help you quit.

For online support, try these websites:

- SmokeFree.gov
- BeTobaccoFree.gov
- CDC.gov/tobacco

Surgery

Surgery is an operation or procedure to remove cancer from the body. Often, surgery is the main or primary treatment to remove the cancer from the stomach. This is only one part of a treatment plan. Surgery can also provide supportive care by easing pain or discomfort. This is called palliative surgery.

When preparing for surgery, seek the opinion of an experienced surgeon. The surgeon should be an expert in performing your type of surgery. Surgery for stomach cancer should be done at a high-volume center that does at least 15 to 20 stomach surgeries each year. Hospitals that perform many surgeries often have better results. You can ask for a referral to a hospital or cancer center that has experience in treating your type of cancer.

The removal of the cancer through surgery can be accomplished in different ways depending on the specific circumstances, such as the size and location of the tumor, and if there is cancer in any surrounding organs and tissues. Surgery is based on the safest and best way to remove the cancer.

Open surgery

Open surgery or laparotomy removes tissue through one large surgical cut below your ribs. The large cut lets your doctor directly view and access the tumor in your stomach to remove it. Open surgery may take several hours or longer. After the surgery, you will need to stay in the hospital for several days or longer to recover.

Minimally invasive surgery

Minimally invasive surgery (key-hole surgery) uses a few small incisions. Small tools are inserted through each incision to perform the surgery. One of the tools, called a laparoscope, is a long tube with a video camera at the end. The camera lets your doctor see your stomach and other tissues inside your abdomen. Other tools are used to remove the tumor. Laparoscopic surgery can also be done using robotic arms to control the surgical tools. This is called robot-assisted laparoscopic surgery.

Tumor resection

Imaging tests will be ordered to see if your cancer is resectable (can be removed completely by surgery) or unresectable (cannot be removed completely by surgery). Sometimes, imaging tests cannot clearly show one way or the other.

Goal of surgery

The goal of surgery or tumor resection is to remove all of the cancer. To do so, the tumor is removed along with some normal-looking tissue around its edge called the surgical margin. The surgical margin may look normal, but cancerous cells may be found when viewed under a microscope by a pathologist. A clear or negative margin (R0) is when no cancer cells are found in the tissue around the edge of the tumor. In a positive margin cancer cells are found in normal-looking tissue around the tumor.

You may receive treatment before surgery called neoadjuvant or preoperative therapy. Neoadjuvant therapy will help reduce the size of the tumor and the amount of cancer in the body.

Surgical margin

The goal of surgery is a cancer-free surgical margin. After surgery, you may receive treatment such as radiation, chemoradiation, or systemic therapy to kill any remaining cancer cells.

- In a clear or negative margin (R0), no cancerous cells are found in the tissue around the edge of the tumor.
- In an R1 positive margin, the surgeon removes all the visible tumor, but the microscopic margins are still positive for tumor cells. Despite best efforts this can happen.
- In an R2 positive margin, the surgeon is unable to remove all the visible tumor or there is metastatic disease (M1).

A negative margin (R0) is the best result. Your surgeon will look carefully for cancer not only along the surgical margin, but in other nearby areas. An intraoperative pathology consultation is often used by surgeons. This includes inspecting the resected stomach for cancer location and distance to margins, examining by microscope frozen sections of proximal and distal margins, and examining by microscope for possible intra-abdominal metastasis such as liver or peritoneal metastasis. Intraoperative pathology consultation serves an important role in guiding the surgery.

Despite best efforts, it is not always possible to find all of the cancer. Sometimes, surgeons can't safely remove the tumor with a cancer-free margin.

You might have more than one surgery. You might also have a wound drain to prevent fluid from collecting in the body after surgery. These drains are usually removed a few days after surgery.

Endoscopic resection

For early-stage stomach cancer, endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD) might be options. Early-stage stomach cancer has not grown beyond the first layer (mucosa) of the stomach wall. The tumor is often very small (2 centimeters or less) and is not in any lymph nodes.

Endoscopic mucosal resection (EMR) is a procedure to remove pre-cancerous, early-stage cancer or other abnormal tissues (lesions) from the stomach. During EMR, the endoscope is passed down your throat to reach the lesion or tumor in your stomach. The lesion can be removed through suction or cutting it away. Talk to your doctor to learn more.

Endoscopic submucosal dissection (ESD) uses an endoscope to locate the tumor in the stomach wall. A tool is inserted through the endoscope that injects fluid between the tumor and layer of the stomach wall. Then a tool lifts and cuts away the tumor from the stomach wall.

Gastrectomy

A gastrectomy removes all or part of the stomach. Surgery that removes part of the stomach is called gastric resection. Gastric resection should include the removal of regional lymph nodes (lymphadenectomy). A nutritionist or dietician provides guidance on what foods are most suitable for you before and after surgery.

There are different types of gastrectomy.

Total gastrectomy

In a total gastrectomy, the whole stomach, nearby lymph nodes, and parts of your esophagus and small intestine are removed. The esophagus is reconnected to the small intestine. You will have a working digestive system that allows swallowing, eating, and digesting food, but in a much different way.

Partial gastrectomy

In a partial or subtotal gastrectomy, the part of the stomach with cancer is removed along with nearby lymph nodes, and possibly parts of other organs near the tumor.

Sleeve gastrectomy

In a sleeve gastrectomy, the left side of the stomach is removed.

Esophagogastrectomy

In an esophagogastrectomy, the top part of the stomach and distal part of the esophagus are removed.

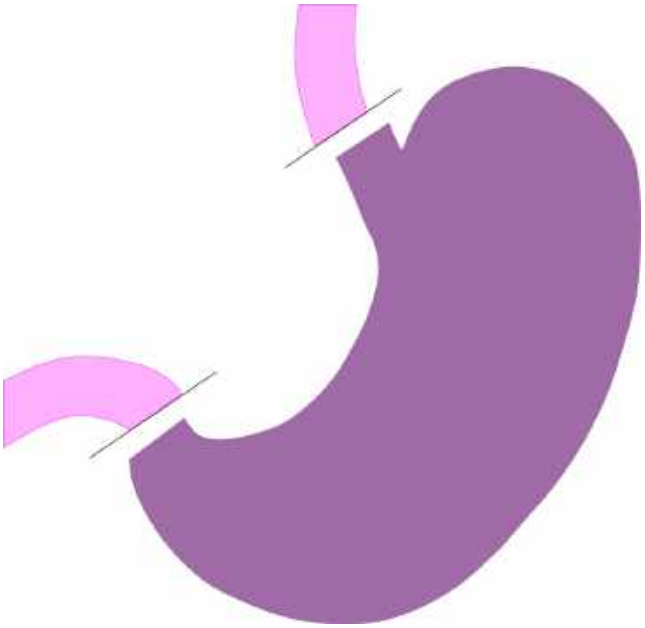
Total gastrectomy

In a total gastrectomy, the whole stomach and surrounding lymph nodes are removed. The esophagus is reattached to the middle part of the small intestine (jejunum).

Adapted from:

https://commons.wikimedia.org/wiki/Category:Gastrectomy#/media/File:Proximal_gastrectomy.png

https://commons.wikimedia.org/wiki/Category:Gastrectomy#/media/File:Distal_gastrectomy.png



Lymph node dissection

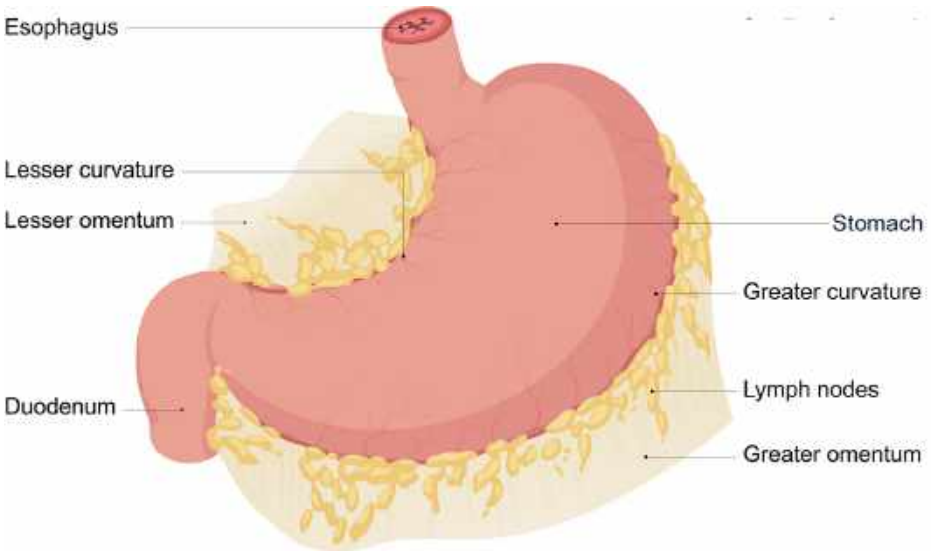
The removal of lymph nodes or groups of lymph nodes is called lymph node or nodal dissection. It might be referred to as a lymphadenectomy. At least 16 regional nodes (D1) should be removed and tested for cancer. However, the removal of more than 30 regional lymph nodes (D2) is advised.

Lymph node dissection may be classified as D0, D1, or D2 depending on the number of lymph nodes removed at the time of gastrectomy.

- D0 is an incomplete resection of lymph nodes along the lesser and greater curvature of the stomach. This means some lymph nodes were removed, but not the minimum of 16.
- D1 is the removal of at least 16 lymph nodes including the greater and lesser omenta. The omentum is a fold of the thin tissue that lines the abdomen (peritoneum). It surrounds the stomach and other organs in the abdomen. Several regional lymph nodes are found within the omenta.
- D2 is the removal of at least 30 lymph nodes. This involves D1 dissection plus the removal of all the lymph nodes along the left gastric (stomach) artery, common hepatic (liver) artery, celiac artery, and splenic (spleen) artery. This requires an experienced surgeon. D2 dissections should be performed in centers experienced with this technique.

Lymph nodes

At least 16 regional nodes should be removed and tested for cancer. However, the removal of more than 30 regional lymph nodes is recommended.



Gastrojejunostomy

A gastrojejunostomy is a surgery to re-route the path food takes from the stomach into the small intestine. The new path from the stomach will avoid (bypass) the blocked part of the duodenum. A gastrojejunostomy can be an open surgery or laparoscopic surgery. You might have a venting gastrostomy (gastrostomy tube or G-tube) and jejunostomy tube (J-tube) placement at the time of gastrojejunostomy.

G-tube

A gastrostomy tube (G-tube) is a soft, plastic tube placed through the skin of the abdomen directly into the stomach. It allows air and fluid to leave the stomach and can be used to give medicines and fluids, including liquid food. Giving food through a gastrostomy tube is a type of enteral nutrition. It is also called a percutaneous endoscopic gastrostomy (PEG) tube.

J-tube

A jejunostomy tube (J-tube) is a soft, plastic tube placed through the skin of the abdomen into the midsection of the small intestine. The tube delivers food and medicine until you are healthy enough to eat by mouth. A J-tube is possible with a gastrojejunostomy. You will learn how to care for the J-tube and the skin where the tube enters the body.

Gastrojejunostomy

A tumor can block the esophagus or small intestine. Surgery that reroutes the path food takes from the stomach to the small intestine is called a gastrojejunostomy.

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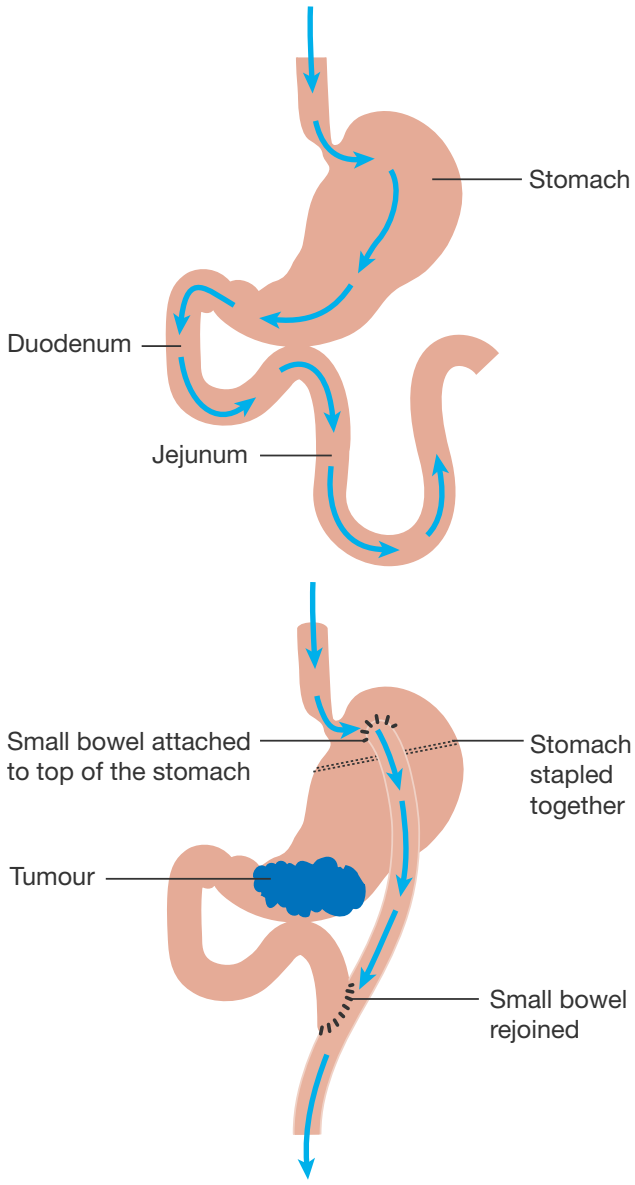


Systemic therapy

Systemic therapy works throughout the body. Types include chemotherapy, targeted therapy, and immunotherapy. Systemic therapy might be used alone or with other therapies. Goals of systemic therapy should be discussed before starting treatment. Your wishes about treatment are important.

- When systemic therapy or chemoradiation is given before surgery, it is called neoadjuvant or preoperative therapy.
- When systemic therapy is given before and after surgery, it is called perioperative therapy.
- When systemic therapy or radiation therapy is given after surgery, it is called adjuvant or postoperative therapy.
- When systemic therapy is given for advanced disease, it may be called palliative therapy.

Warnings!

You might be asked to stop taking or avoid certain herbal supplements when on a systemic therapy. Some supplements can affect the ability of a drug to do its job. This is called a drug interaction. It is critical to speak with your care team about any supplements you may be taking.

Some examples include:

- Turmeric
- Gingko biloba
- Green tea extract
- St. John's Wort

Certain medicines can also affect the ability of a drug to do its job. Antacids, heart medicine, and antidepressants are just some of the medicines that might interact with a systemic therapy. Therefore, it is important to tell your doctor about any medications, vitamins, over-the-counter (OTC) drugs, herbals, or supplements you are taking. Bring a list with you to every visit.

Chemotherapy

Chemotherapy kills fast-growing cells throughout the body, including cancer cells and some normal cells. All chemotherapies affect the instructions (genes) that tell cancer cells how and when to grow and divide. When chemotherapies are combined, it is called multi-agent or combination chemotherapy.

Some examples of chemotherapies include:

- Capecitabine (Xeloda®)
- Carboplatin
- Cisplatin
- Docetaxel (Taxotere®)
- Fluorouracil
- Irinotecan (Camptosar®)
- Oxaliplatin (Eloxatin®)
- Paclitaxel (Taxol®)

Chemoradiation

Treatment that combines chemotherapy with radiation therapy is called chemoradiation. Chemotherapy may improve how well radiation works, and that is why they are sometimes used together. Chemoradiation may be used to control symptoms caused by a tumor or to shrink the tumor before surgery.

Targeted therapy

Targeted therapy focuses on specific or unique features of cancer cells. Targeted therapies seek out how cancer cells grow, divide, and move in the body. These drugs stop or inhibit the action of molecules that help cancer cells grow and/or survive.

Some examples of targeted therapies include:

- Ramucirumab (Cyramza®) and trastuzumab deruxtecan (Enhertu®) or a biosimilar
- Entrectinib (Rozlytrek®) and larotrectinib (Vitrakvi®) are examples of TRK inhibitors used for *NTRK* gene fusion-positive tumors.
- Trastuzumab (Herceptin®) targets HER2 overexpression.

Immunotherapy

Immunotherapy is a targeted therapy that increases the activity of your immune system. By doing so, it improves your body's ability to find and destroy cancer cells. Immunotherapy can be given alone or with other types of treatment.

Examples of immunotherapies:

- Nivolumab (Opdivo®) targets PD-L1.
- Pembrolizumab (Keytruda®) targets MSI-H/dMMR or high tumor mutation burden (TMB-H).

For more information on checkpoint inhibitors and immunotherapy side effects, see *NCCN Guidelines for Patients: Immunotherapy Side Effects*, available at NCCN.org/patientguidelines.

Radiation therapy

Radiation therapy (RT) uses high-energy radiation from x-rays, photons, protons, electrons, and other sources to kill cancer cells and shrink tumors. RT can be given alone or with other treatments. Treatment may focus on individual tumors, a small area/region of the body, or specific lymph nodes. RT may be used as supportive care or palliative care to help ease pain or discomfort caused by cancer, or to control bleeding caused by a tumor. RT can also be given before or after surgery to treat or slow the growth of cancer, especially if the surgical margins have cancer cells.

A four-dimensional (4D) CT scan might be used to plan RT. A 4D-CT records multiple images over time. It allows playback of the scan as a video, so that internal movement can be tracked and observed.

EBRT

External beam radiation therapy (EBRT) uses a machine outside of the body to aim radiation at the tumor(s) or areas of the body.

Common types of EBRT that may be used to treat your cancer include the following:

- Three-dimensional conformal radiation therapy (3D-CRT) uses computer software and CT images to aim beams that match the shape of the tumor.
- Intensity-modulated radiation therapy (IMRT) uses small beams of different strengths to match the shape of the tumor.

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.

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

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 whom 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 meal 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.

Supportive care

Supportive care is health care that relieves symptoms caused by cancer or its treatment and improves quality of life. It might include pain relief (palliative care), emotional or spiritual support, financial aid, or family counseling. Supportive care is given during all cancer stages. Tell your care team how you are feeling and about any side effects. Best supportive care is used with other treatments to improve quality of life. Best supportive care, supportive care, and palliative care are often used interchangeably.

Bleeding

Bleeding is common in those with stomach cancer. It may be caused by the tumor or a result of treatment. An endoscopic treatment, radiation therapy (if not done before), and an angiography with embolization might be used to treat (stop) bleeding.

An angiography might be done when a blood vessel has narrowed or suddenly becomes blocked and does not allow blood to flow. In an angiography, a catheter (thin plastic tube) is inserted into an artery through a small incision in the skin and guided to the area with the use of x-rays. A contrast material is injected through the tube and x-ray images produce a picture of the blood vessel called an angiogram.

Embolization is the process of blocking blood flow through a blood vessel. This is performed by placing various materials through the angiography catheter while it is inside the blood vessel. The material can be a coil, small beads, or liquid medicine that causes the blood to clot and block the flow of blood.

Blocked esophagus

A tumor may block the esophagus, the esophagogastric junction (EGJ), or the stomach cardia. An esophageal stent is a tube that widens the esophagus so food can pass into the stomach.

Blocked stomach

A tumor may block food from passing out of your stomach through the first part of the small intestine (duodenum). This blockage can cause pain, vomiting, weight loss, and other problems. Treatments for a blocked stomach include a stent (enteral), a percutaneous endoscopic gastrostomy PEG tube, a stomach-duodenum bypass (gastrojejunostomy), systemic therapy, or radiation therapy.

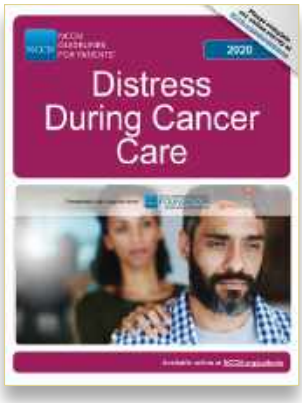
A stent is a metal or plastic tube that expands. It is placed in the stomach to keep your stomach open so food can pass through. A PEG tube is inserted through a cut in the abdomen and placed in the stomach. Food is given through this tube. A gastrojejunostomy is a surgery to re-route the path food takes from the stomach into the small intestine. The new path from the stomach will avoid (bypass) the blocked part of the duodenum. This surgery may also be done as a preventive measure if there is a high risk that your stomach may become blocked.

Distress

Distress is an unpleasant experience of a mental, physical, social, or spiritual nature. It can affect how you feel, think, and act. Distress might include feelings of sadness, fear, helplessness, worry, anger, and guilt.

Depression, anxiety, and sleeping problems are common in cancer. Talk to your doctor and with those whom you feel most comfortable about how you are feeling. There are services and people who can help you. Support and counseling services are available.

For more information, read *NCCN Guidelines for Patients: Distress During Cancer Care*, available at NCCN.org/patientguidelines.



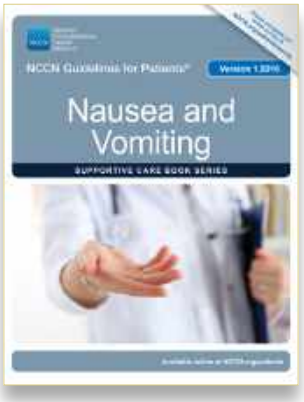
Fatigue

Fatigue is extreme tiredness and inability to function due to lack of energy. Fatigue may be caused by cancer or it may be a side effect of treatment. There are treatments for fatigue. Let your care team know how you are feeling and if fatigue is getting in the way of doing the things you enjoy. Eating a balanced diet, exercise, yoga, and massage therapy can help. You might be referred to a nutritionist or dietitian to help with fatigue.

Nausea and vomiting

Nausea and vomiting are a common side effect of treatment. You will be given medicine to prevent and treat nausea and vomiting.

For more information, read the *NCCN Guidelines for Patients: Nausea and Vomiting*, available at NCCN.org/patientguidelines.



Pain

Tell your care team about any pain or discomfort. You might meet with a palliative care specialist or with a pain specialist to manage pain.

Pain is common in those with a tumor causing a blockage or for metastatic stomach cancer. Severe abdominal pain can occur when the tumor grows into nearby nerves or presses against other organs. This pain is treated with around-the-clock medicine such as morphine or other opioids (narcotics). Sometimes, non-narcotic medicines are used to treat pain.

Some people may benefit from palliative radiation therapy, with or without systemic therapy, to help relieve the pain. During this treatment, a radiation beam is focused on the tumor.

Treatment side effects

All cancer treatments can cause unwanted health issues. Such health issues are called side effects. Side effects depend on many factors. These factors include the drug type and dose, length of treatment, and the person. Some side effects may be harmful to your health. Others may just be unpleasant.

Ask for a complete list of side effects of your treatments. Also, tell your treatment team about any new or worsening symptoms. There may be ways to help you feel better. There are also ways to prevent some side effects.

Trouble eating

Sometimes side effects from surgery, cancer, or other treatments might cause you to feel not hungry or sick to your stomach (nauseated). You might have a sore mouth. Healthy eating is important during treatment. It includes eating a balanced diet, eating the right amount of food, and drinking enough fluids. A registered dietitian who is an expert in nutrition and food can help. Speak to your care team if you have trouble eating or maintaining your weight.

Keep a pain diary

A pain diary is a written record that helps you keep track of when you have pain, how bad it is, what causes it, and what makes it better or worse. Use a pain diary to discuss your pain with your care team. You might be referred to a specialist for pain management.

Include in your pain diary:

- The time and dose of all medicines
- When pain starts and ends or lessens
- Where you feel pain
- Describe your pain. Is it throbbing, sharp, tingling, shooting, or burning? Is it constant, or does it come and go?
- Does the pain change at different times of day? When?
- Does the pain get worse before or after meals? Does certain food or drink make it better?
- Does the pain get better or worse with activity? What kind of activity?
- Does the pain keep you from falling asleep at night? Does pain wake you up in the night?
- Rate your pain from 0 (no pain) to 10 (worst pain you have ever felt)
- Does pain get in the way of doing the things you enjoy?

Key points

- Surgery is a main or primary treatment for stomach cancer. A gastrectomy removes all or part of the stomach.
- A resectable tumor can be removed with surgery. An unresectable tumor cannot be removed with surgery.
- You can live without a stomach. You will have a working digestive system that allows swallowing, eating, and digesting food, but in a much different way.
- Systemic therapy works throughout the body. It includes chemotherapy, targeted therapy, and immunotherapy.
- Targeted therapies can block the ways cancer cells grow, divide, and move in the body.
- Immunotherapy uses your body's natural defenses to find and destroy cancer cells.
- Radiation therapy (RT) uses high-energy radiation from x-rays, gamma rays, protons, photons, and other sources to kill cancer cells and shrink tumors.
- A clinical trial is a type of research that studies a treatment to see how safe it is and how well it works.
- Supportive care is health care that relieves symptoms caused by cancer or its treatment and improves quality of life. Supportive care is always given.
- All cancer treatments can cause unwanted health issues called side effects. It is important for you to tell your care team about all your side effects so they can be managed.

Did you know?

The terms "chemotherapy" and "systemic therapy" are often used interchangeably, but they are not the same. Chemotherapy, targeted therapy, and immunotherapy are all types of systemic therapy.

- Eating a balanced diet, drinking enough fluids, exercise, yoga, and massage therapy can help manage side effects. Tell your care team about all side effects so they can be treated.
- Pain may be treated with medication, or radiation with or without systemic therapy. A pain diary might help you manage pain.
- A registered dietitian who is an expert in nutrition and food can help if it is hard for you to eat or digest food.
- If you smoke or vape, it is important to quit for the best treatment results.

5
Early stage

Early-stage stomach cancer has not grown beyond the first layer of the stomach wall. Treatment is an endoscopic resection or surgery. Together, you and your doctor will choose a treatment plan that is best for you.

Carcinoma *in situ* (Tis) and T1a tumors are often considered early-stage cancer. This includes pre-cancer and cancer that has not grown beyond the lamina propria or muscularis mucosae of the first layer of the stomach wall (the mucosa).

Treatment

Treatment for early-stage stomach cancer is an endoscopic resection or surgery.

Surgery is not an option

Surgery is not for everyone. You must be healthy enough for surgery and not have other serious health issues. An endoscopic resection (ER) is an option instead of surgery. In this procedure, an endoscope is passed down your throat to remove the lesion or tumor in your stomach. After an ER, you will enter surveillance where you will be monitored for the return of cancer called recurrence.

Surgery is an option

Surgery to remove the tumor might be option if you are healthy enough for major surgery. A sample of your tumor removed during surgery will be tested and staged. This is called the pathologic stage. If tests confirm the cancer is early stage, then you will enter surveillance where you will be monitored for the return of cancer.

Follow-up care

After treatment, you will receive follow-up care. It is important to keep any follow-up doctor visits and imaging test appointments.

Tis

If your carcinoma *in situ* (Tis) was successfully treated with an endoscopic resection, then follow-up care might include:

- Medical history and physical exam every 3 to 6 months for 1 to 2 years, every 6 to 12 months for 3 to 5 years, and annually thereafter
- Complete blood count (CBC) and chemistry profile as needed
- Upper GI endoscopy (EGD) every 6 months for 1 year, then annually for 3 years
- Routine imaging (CT scan of chest/abdomen/pelvis with oral and IV contrast) as needed based on symptoms and concern for recurrence

pT1a
A T1a tumor has not grown beyond the lamina propria or muscularis mucosae of the first layer of the stomach wall (the mucosa).

If your T1a was successfully treated with an endoscopic resection or surgery, then follow-up care might include:

- Medical history and physical exam every 3 to 6 months for 1 to 2 years, every 6 to 12 months for 3 to 5 years, and annually thereafter
- CBC and chemistry profile as needed
- For those treated by endoscopic resection, upper GI endoscopy (EGD) every 6 months for 1 year, then annually for up to 5 years. Thereafter, as needed based on symptoms and/or test results
- For those treated by surgery, EGD as needed
- CT scan of chest/abdomen/pelvis with oral and IV contrast as needed
- Monitor for nutritional deficiency (such as B12 and iron) as needed

Key points

- Carcinoma *in situ* (Tis) is cancer that has not grown beyond the epithelium.
- A T1a tumor has not grown beyond the lamina propria or muscularis mucosae.
- The epithelium is part of the first layer of the stomach wall called the mucosa.
- Surgery is not for everyone. You must be healthy enough for surgery and not have other serious health issues.
- An endoscopic resection (ER) is an option instead of surgery.
- After treatment with an ER or surgery, you will receive follow-up care. It is important to keep any follow-up doctor visits and imaging test appointments.

Your wishes about treatment are always important. Talk to your care team and make your wishes known.

6
Locoregional

In locoregional stomach cancer, the tumor has invaded the second layer of the stomach wall and/or spread to the lymph nodes or organs near the stomach. Locoregional or locally advanced disease has not spread to distant sites in the body. Together, you and your doctor will choose a treatment plan that is best for you.

Treatment

Before treatment, you might have a laparoscopy to look for disease in the abdominal lining (peritoneum) and take biopsy samples.

Surgery is an option

Surgery to remove the tumor might be an option if you are healthy enough for major surgery. Ask what might be removed during surgery, how to prepare for surgery, and what to expect during recovery.

cT1b

A clinical stage T1b (cT1b) tumor has invaded the second layer of the stomach wall (the submucosa). Treatment is surgery to remove the tumor.

cT2

A cT2 tumor has invaded the third layer of the stomach wall (the muscle layer called muscularis propria).

It might be treated with:

- Surgery
- Chemotherapy before surgery (preferred)
- Chemoradiation before surgery

For chemotherapy and chemoradiation therapy options, see Guide 4.

You will have imaging tests after chemotherapy and chemoradiation treatment. If the tumor is resectable, then surgery is the preferred treatment option.

Guide 4
Treatment options: Clincal stage T2 tumor

Chemotherapy before surgery	• Fluorouracil, leucovorin, oxaliplatin, and docetaxel (FLOT) (preferred) • Fluoropyrimidine and oxaliplatin (preferred) • Fluorouracil and cisplatin
Chemoradiation before surgery	• Paclitaxel and carboplatin • Fluorouracil and oxaliplatin • Fluorouracil and cisplatin • Fluoropyrimidine (fluorouracil or capecitabine)

After surgery

A sample of your tumor and lymph nodes removed during surgery will be tested and staged. Find out if you are having a D1 or D2 lymph node dissection. Staging after information gained during surgery is the pathologic stage (p). Treatment is based on the pTNM score and if you had chemotherapy or chemoradiation before surgery.

R0

In a clear or negative margin (R0), no cancerous cells are found in the tissue around the edge of the tumor (resection margins). Cancer may be in regional lymph nodes.

If you received preoperative chemoradiation, then you will enter surveillance and be monitored for recurrence or progression. If you received chemotherapy before surgery, then you will have more chemotherapy.

If you had surgery only, then next steps are based on how far the tumor has grown into the wall of the stomach and if there was any cancer in regional lymph nodes.

- For a pT1 or pT2 tumor with no cancer in lymph nodes (N0), you will enter surveillance. This monitors for the return of cancer.
- For some with a pT2 tumor and no cancer in lymph nodes (N0) or tumors with less than a D2 dissection, treatment will be fluoropyrimidine (fluorouracil or capecitabine) before and after fluoropyrimidine-based chemoradiation.
- For those who have undergone a D2 lymph node dissection, treatment will be chemotherapy. Preferred agents are capecitabine with oxaliplatin or fluorouracil with oxaliplatin.

R1

In an R1 positive margin, the surgeon removes all the visible tumor, but the microscopic margins are still positive for tumor cells. Despite best efforts this can happen. Treatment is fluoropyrimidine-based chemoradiation if not received before. You might have another surgery.

R2

In an R2 positive margin, the surgeon is unable to remove all the visible tumor or there is metastatic disease (M1). Treatment is fluoropyrimidine-based chemoradiation or palliative care. Palliative care aims to manage symptoms, improve quality of life, and extend life. More information on palliative care can be found in the next chapter.

Surgery is not an option

Surgery is not for everyone. You must be healthy enough for surgery and not have other serious health issues. If you aren't healthy enough for surgery, then treatment will focus on palliative management. This is care to manage symptoms, improve quality of life, and extend life. Your wishes about treatment are always important. More information on palliative care can be found in the next chapter.

Unresectable

Not all tumors can be removed with surgery. An unresectable tumor cannot be removed completely with surgery. Unresectable cancer might be treated first with chemoradiation or systemic therapy. This is sometimes called neoadjuvant or preoperative therapy. The goal is to try to shrink the tumor to make it easier to remove during surgery. Neoadjuvant therapy might cause an unresectable tumor to become resectable.

After neoadjuvant treatment, you will have imaging and blood tests to restage the cancer. If the tumor is now resectable and can be removed, then surgery is the preferred treatment. You must be healthy enough for surgery. If the tumor remains unresectable, then treatment will focus on palliative management found in the next chapter.

Follow-up care

If your tumor was treated with surgery, then follow-up care might include:

- Medical history and physical exam every 3 to 6 months for 1 to 2 years, every 6 to 12 months for 3 to 5 years, and annually thereafter

The following as needed:

- Complete blood count (CBC) and chemistry profile
- Upper GI endoscopy (EGD)
- CT scan of chest/abdomen/pelvis with oral and IV contrast and/or an FDG-PET/CT
- Monitor for nutritional deficiency (such as B12 and iron)

Order of treatments

Most people with stomach (gastric) cancer will receive more than one type of treatment. Next is an overview of the order of treatments and what they do.

- **Neoadjuvant (before)** treatment is given to shrink the tumor before primary treatment (surgery). This might change an unresectable tumor into a resectable tumor.
- **Primary treatment** is the main treatment given to rid the body of cancer. Surgery is often the main treatment for resectable stomach cancer. You must by healthy enough for surgery.
- **Adjuvant (after) treatment** is given after primary treatment to rid the body of any cancer cells left behind from surgery. It is also used when the risk of cancer returning (recurrence) is felt to be high.
- **First-line treatment** is the first set of systemic (drug) treatment given.
- **Second-line treatment** is the next set of treatment given if cancer progresses during or after systemic therapy.

Talk to your doctor about your treatment plan and what it means for your stage of stomach cancer.

Key points

- In locoregional or locally advanced disease, the tumor may be any size and cancer may be in lymph nodes and nearby organs.
- In locoregional or locally advanced stomach cancer, the tumor has grown beyond the first layer of the stomach wall and/or spread to nearby lymph nodes or organs.
- Locoregional stomach cancer is not metastatic disease.
- Surgery is not for everyone. You must be healthy enough for surgery and not have other serious health issues. If you aren't healthy enough for surgery, then treatment will focus on palliative care. Your wishes are always important.
- Palliative care is given to manage symptoms, improve quality of life, and extend life.
- Not all tumors can be removed with surgery. This is an unresectable tumor. Unresectable cancer might be treated with chemoradiation or systemic therapy. If the tumor shrinks, then surgery might be possible.
- You will have follow-up care after surgery to monitor for cancer recurrence.

Let us know what you think!

Please take a moment to complete an online survey about the NCCN Guidelines for Patients.

NCCN.org/patients/response

7
Recurrence and metastasis

This chapter discusses treatment options for recurrence and metastatic disease. Recurrence is the return of cancer. Stomach cancer that has spread to distant sites in the body is called metastatic disease. Together, you and your doctor will choose a treatment plan that is best for you.

Overview

When cancer returns near the stomach, it is called locoregional recurrence. Surgery might be an option for those with a locoregional resectable tumor and those who are healthy enough for surgery. Palliative care is also an option. Stomach cancer that has spread to distant sites in the body is called metastatic disease. It might be referred to as stage 4 cancer. The goal of treatment is to reduce the amount of cancer, called cancer burden, and to prevent the further spread of cancer.

For unresectable locoregional recurrence, metastatic disease, or those who aren't healthy enough for surgery, treatment will focus on palliative care. Options are based on your performance status (PS). PS is a person's general level of fitness and ability to perform daily tasks. Your state of general health will be rated using a PS scale called the ECOG (Eastern Cooperative Oncology Group) or the Karnofsky Performance Status (KPS).

ECOG PS

The ECOG PS scores range from 0 to 4.

- PS 0 means you are fully active.
- PS 1 means you are still able to perform light to moderate activity.
- PS 2 means you can still care for yourself but are not active.
- PS 3 means you are limited to a chair or bed more than half of the time.
- PS 4 means you need someone to care for you and are limited to a chair or bed.

In stomach cancer, PS might be referred to as good or poor. Good PS is usually PS 0 or PS 1.

Karnofsky PS

The KPS score ranges from 0 to 100.

- 0 to 49 means you cannot care for yourself.
- 50 to 79 means you cannot work and need some help to take care of yourself.
- 80 to 100 means you can carry out daily tasks.

Palliative care

Treatment for recurrence and metastatic disease is referred to as palliative management. It is care to manage symptoms, improve quality of life, and extend life. Your wishes about treatment are always important. Those with good or high performance status (PS) might have HER2, PD-L1, and MSI/MMR tumor testing, if not done before.

Best supportive care

Best supportive care is an option for anyone. Best supportive care, supportive care, and palliative care are often used interchangeably.

- Those with an ECOG PS of 0, 1, or 2 or with a Karnofsky PS of 60 or more might receive chemoradiation, system therapy, or best supportive care.
- Those with an ECOG PS of 3 or 4 or with a Karnofsky PS of 59 or less will receive best supportive care.

Systemic therapy

First-line therapies are tried first. Options are based on the systemic therapy you had before and your PS. A biosimilar might be used in place of trastuzumab. A biosimilar is a drug that is very much like one that has been approved by the U.S. Food and Drug Administration (FDA). It must be used in the exact same way and at the same dose as the other drug. Ask your doctor why one therapy might be chosen over another. The reason might be related to tumor mutations, cost, toxicity, or availability. Your wishes are also important.

First-line systemic therapy options can be found in Guide 5.

Next-line systemic therapy options can be found in Guide 6.

A biosimilar is a drug that is very much like one that has been approved by the FDA. It must be used in the exact same way and at the same dose as the other drug.

Guide 5
First-line therapy options based on prior therapy and PS

Preferred options	For HER2 overexpression positive tumors: • Fluoropyrimidine (fluorouracil or capecitabine) and oxaliplatin and trastuzumab • Fluoropyrimidine (fluorouracil or capecitabine) and cisplatin and trastuzumab
	For HER2 overexpression negative tumors: • Fluoropyrimidine (fluorouracil or capecitabine), oxaliplatin, and nivolumab (PD-L1 CPS 5 or more) • Fluoropyrimidine (fluorouracil or capecitabine) and oxaliplatin • Fluoropyrimidine (fluorouracil or capecitabine) and cisplatin
Other recommended	For HER2 overexpression positive tumors: • Fluoropyrimidine (fluorouracil or capecitabine) and cisplatin and trastuzumab and pembrolizumab • Fluoropyrimidine (fluorouracil or capecitabine) and oxaliplatin and trastuzumab and pembrolizumab
	Other tumors: • Fluorouracil and irinotecan • Paclitaxel with or without cisplatin or carboplatin • Docetaxel with or without cisplatin • Fluoropyrimidine (fluorouracil or capecitabine) • Docetaxel, cisplatin or oxaliplatin, and fluorouracil • Docetaxel, carboplatin, and fluorouracil
Used in some cases	• For HER2 overexpression negative tumors, fluoropyrimidine (fluorouracil or capecitabine), oxaliplatin, and nivolumab (PD-L1 CPS 1-4)

Notes:
An FDA-approved biosimilar might be used for trastuzumab.
Leucovorin might be added to fluorouracil-based regimens.

Guide 6
Next-line therapy options based on prior therapy and PS

Preferred options	• Ramucirumab and paclitaxel • Fam-trastuzumab deruxtecan-nxki for HER2 overexpression positive adenocarcinoma • Docetaxel • Paclitaxel • Irinotecan • Fluorouracil and irinotecan (leucovorin might be added) • Trifluridine and tipiracil for third-line or subsequent therapy
Other recommended	• Ramucirumab • Irinotecan and cisplatin • Fluorouracil and irinotecan with ramucirumab (leucovorin might be added) • Irinotecan and ramucirumab • Docetaxel and irinotecan
Used in some cases	• Entrectinib or larotrectinib for *NTRK* gene fusion-positive tumors • Pembrolizumab for MSI-H or dMMR tumors • Pembrolizumab for TMB-high tumors (10 or more mutations per megabase)

Key points

- When cancer returns near the stomach, it is called locoregional recurrence.
- Stomach cancer that has spread to distant sites in the body is called metastatic disease.
- Surgery might be an option for those with a locoregional resectable tumor and those who are healthy enough for surgery.
- For unresectable locoregional recurrence, metastatic disease, or those who aren't healthy enough for surgery, then treatment will focus on palliative management. This is care to manage symptoms, improve quality of life, and extend life.
- Options for managing recurrence and metastatic disease are based on your performance status (PS). PS is a person's general level of fitness and ability to perform daily tasks.
- Best supportive care is an option for anyone. Chemoradiation or systemic therapy may be an option if your PS is good or high.
- First-line therapies are tried first. Options are based on the systemic therapy you had before and your PS.

Need help paying for medicine or treatment?

Ask your care team what options are available.

8
Survivorship

After treatment, you will be monitored for any new or ongoing health issues. It is important to keep any follow-up doctor visits and imaging test appointments. Maintain your weight, eat a healthy diet, exercise, limit alcohol, and if you smoke or vape, seek help to quit.

Monitoring

In addition to monitoring for the possible return of cancer called recurrence, you should seek good routine medical care, including regular doctor visits for preventive care and cancer screening. Routine stomach cancer-specific tests such as imaging, endoscopy, or tumor tests are not recommended after 5 years. It is important to keep any follow-up doctor visits and imaging test appointments.

General health

Stomach cancer survivors are monitored for long-term side effects. Side effects can be managed. Talk to your doctor about how you are feeling.

In general:

- Maintain a healthy body weight throughout life.
- Adopt a physically active lifestyle and avoid inactivity. The goal is at least 30 minutes of moderate-intensity activity most days of the week.
- Eat a mostly plant-based diet.
- Limit alcohol.
- If you smoke or vape, seek help to quit.

For more information on survivorship, see NCCN.org/patientguidelines.

Weight loss

After a gastrectomy, your weight will be monitored for changes. Healthy eating is important after treatment. It includes eating a balanced diet, eating the right amount of food, and drinking enough fluids. Eat often and avoid fluids with meals. A registered dietitian who is an expert in nutrition and food can help if you have trouble eating or maintaining weight.

Diarrhea

Diarrhea is frequent and watery bowel movements. Your care team will tell you how to manage diarrhea and may recommend medicines to stop the diarrhea. It is important to drink lots of fluids. Changes to your diet might help.

Neuropathy
Neuropathy is a nerve problem that causes pain, numbness, tingling, swelling, or muscle weakness in different parts of the body. It usually begins in the hands or feet and gets worse over time. Neuropathy caused by chemotherapy is called chemotherapy-induced neuropathy. You might be referred to occupational, rehabilitation, and/or physical therapy.

Fatigue
Fatigue is extreme tiredness and inability to function due to lack of energy. There are treatments for fatigue. Let your care team know how you are feeling and if fatigue is getting in the way of doing the things you enjoy. Eating a balanced diet, exercise, yoga, and massage therapy can help. You might be referred to a nutritionist or dietitian to help with fatigue.

Bone health
You will be screened for low bone density at regular intervals. You may receive medicine to manage low bone density. In addition, your doctor may consider vitamin D testing as needed. Talk to your doctor before taking any over-the-counter (OTC) supplements, vitamins, or medicines.

After a partial gastrectomy

In a partial or subtotal gastrectomy, part of the stomach is removed. In a proximal gastrectomy, the top half of the stomach is removed. In a distal gastrectomy, the bottom half of the stomach is removed.

Indigestion
Indigestion is a general term that describes discomfort in your upper abdomen. Indigestion is also called dyspepsia or an upset stomach.

To prevent indigestion:

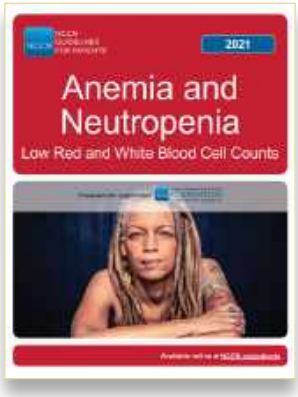
- Avoid foods that increase acid production such as citrus juices, tomato sauces, and spicy foods.
- Avoid foods that lower gastroesophageal sphincter tone such as caffeine, peppermint, and chocolate.

Low vitamin B12
Those who had a distal gastrectomy will be monitored for low levels of vitamin B12 called vitamin B12 deficiency. This vitamin is needed to make red blood cells, which carry oxygen to all parts of your body. A complete blood count (CBC) and B12 levels should be done every 3 months for up to 3 years, then every 6 months for up to 5 years, and once a year after 5 years. You may be given vitamin B12 supplements, if needed.

Low iron

Those who had a distal gastrectomy will be monitored for low levels of iron called iron deficiency. A CBC and iron levels should be done at least once a year. You may be given iron supplements, if needed.

Low iron levels can cause too few healthy red blood cells in the body called anemia. For more information, read the *NCCN Guidelines for Patients: Anemia and Neutropenia,* available at NCCN.org/patientguidelines.



Looking for help to quit smoking?

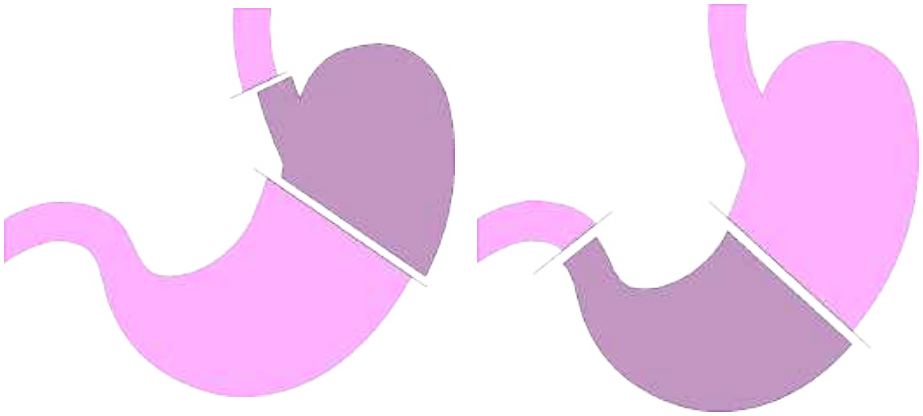
- ✓ SmokeFree.gov
- ✓ BeTobaccoFree.gov
- ✓ CDC.gov/tobacco

Partial gastrectomy

In a proximal gastrectomy, the top half of the stomach is removed. In a distal gastrectomy, the bottom half of the stomach is removed.

https://commons.wikimedia.org/wiki/Category:Gastrectomy#/media/File:Proximal_gastrectomy.png

https://commons.wikimedia.org/wiki/Category:Gastrectomy#/media/File:Distal_gastrectomy.png



Proximal gastrectomy **Distal gastrectomy**

After a total gastrectomy

In a total gastrectomy, the entire stomach, nearby lymph nodes, and parts of your esophagus and small intestine are removed. Your esophagus is reconnected to your small intestine so you can continue to eat and swallow. A nutritionist or dietician can provide guidance on what foods are most suitable for you.

Fullness after meals and eating issues

Eat small portions and eat more often to cope with feeling full after meals. Also, avoid drinking liquids with meals. Continue to drink fluids in between meals.

Dumping syndrome

Dumping syndrome occurs when food empties into the small intestine too quickly. This may happen within 30 minutes after eating a meal (early dumping syndrome) or within 2 to 3 hours of eating (late dumping syndrome).

Symptoms of early dumping syndrome include palpitations, diarrhea, nausea, and cramps. Late dumping syndrome tends to cause dizziness, hunger, cold sweats, and faintness.

To help manage the symptoms of dumping syndrome:

- Eat often throughout the day
- Avoid drinking liquids with meals
- Eat a diet high in protein and fiber and low in simple carbohydrates and sugars

Low vitamin B12

You will be monitored for low levels of vitamin B12 called vitamin B12 deficiency. This vitamin is needed to make red blood cells, which carry oxygen to all parts of your body. A complete blood count (CBC) and B12 levels should be done every 3 months for up to 3 years, then every 6 months for up to 5 years, and once a year after 5 years. You may be given vitamin B12 supplements, if needed.

Low iron

You will be monitored for low levels of iron called iron deficiency. A CBC and iron levels should be done at least once a year. You may be given iron supplements, if needed. Certain iron supplements will need to be avoided. Ask your health care provider for more information.

Blind loop syndrome

Blind loop syndrome is a bacterial overgrowth in the small intestine. After a total gastrectomy, food doesn't follow the normal digestion route and bypasses a section of your intestine. This can cause an infection. One of the main symptoms of blind loop syndrome is unexplained weight loss. To help prevent blind loop syndrome, eat a diet high in protein and low in carbohydrates.

Cancer screening

Schedule cancer screenings and vaccinations as recommended by your doctor based on your age, risk, and other factors.

Screenings for cancer include:

- Breast
- Colorectal
- Lung
- Prostate

Key points

- Surgery to remove all or part of your stomach can cause health problems. Your health will be monitored.
- A nutritionist or dietician provides guidance on what foods are most suitable for your condition.
- Continue to see your primary health care provider on a regular basis and have preventive cancer screenings as recommended by your doctor.
- Maintain a healthy weight and lifestyle.
- Eat often throughout the day.
- Avoid drinking liquids with meals.
- Eat a mostly plant-based diet that is high in protein and fiber and low in simple carbohydrates and sugars.
- Limit alcohol.
- If you smoke or vape, seek help to quit.

9
Making treatment decisions

It's 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 or chemotherapy
- Your feelings about pain or side effects such as nausea and vomiting
- Cost of treatment, travel to treatment centers, and time away from school or 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 questions or come up with your own. Be clear about your goals for treatment and find out what to expect from treatment.

Questions to ask about testing and staging

1. What tests will I have? How often will they be repeated? Will my insurance pay for these tests?
2. When will I have a biopsy? Will I have more than one? What are the risks?
3. How will my biopsy be performed? What else might be done at this time?
4. How soon will I know the results and who will explain them to me?
5. Who will talk with me about the next steps? When?
6. What biomarker tests will I have? When? Will I have genetic testing?
7. What will you do to make me comfortable during testing?
8. Is my cancer resectable or unresectable? What does this mean?
9. Is my cancer early stage, locally advanced, or metastatic?
10. Is the cancer in any other areas like my liver, lungs, or bone?
11. What does my stage mean in terms of length of survival and quality of life?

Questions to ask your doctors about their experience

1. What is your experience treating stomach cancer?
2. What is the experience of those on your team?
3. Do you only treat stomach cancer? What else do you treat?
4. How many patients like me (of the same age, gender, race) have you treated?
5. Will you be consulting with experts to discuss my care? Whom will you consult?
6. How many procedures like the one you're suggesting have you done?
7. Is this treatment a major part of your practice?
8. How many of your patients have had complications? What were the complications?
9. How many stomach cancer surgeries have you done?
10. Who will manage my day-to-day care?

Questions to ask about options

1. What will happen if I do nothing?
2. How do my age, overall health, and other factors affect the options?
3. Am I a candidate for a clinical trial? Can I join a clinical trial at any time?
4. Which option is proven to work best for my cancer, age, and other risk factors?
5. Does any option offer long-term cancer control? Are the chances any better for one option than another? Less time-consuming? Less expensive?
6. Which treatment will give me the best quality of life? Which treatment will extend life? By how long?
7. What are my options if the treatment stops working?
8. Can I stop treatment at any time? What will happen if I stop treatment?
9. Is there a social worker or someone who can help me decide?
10. Is there a hospital or treatment center you can recommend for stomach cancer treatment? Can I go to one hospital for surgery and a different center for systemic or radiation therapy?

Questions to ask about treatment

1. What are my treatment choices? What are the benefits and risks? Which treatment do you recommend and why?
2. How will my age, performance status, cancer stage, and other health conditions limit my treatment choices?
3. Does the order of treatment matter?
4. How long do I have to decide about treatment?
5. Does this hospital or center offer the best treatment for me?
6. When will I start treatment? How long will treatment take?
7. How much will the treatment cost? How much will my insurance help pay for the treatment?
8. What are the chances my cancer will return? How will it be treated if it returns?
9. I would like a second opinion. Is there someone you can recommend?
10. How will treatment affect my ability to eat and digest food?
11. Will I be able to do things I enjoy?

Questions to ask about surgery

1. If my cancer is resectable, how much of my tumor will be removed? Will all or part of my stomach will be removed?
2. What other organs or tissues might be removed during surgery? What will this mean in terms of my survival and recovery?
3. What kind of surgery will I have? Will I have more than one surgery?
4. Does my cancer involve any veins or arteries? How might this affect surgery?
5. What are the chances you can remove the whole tumor and I will have a negative margin?
6. What happens if during surgery you find you can't remove the tumor?
7. How long will it take me to recover from surgery?
8. How much pain will I be in? What will be done to manage my pain?
9. What is the chance that this surgery will shorten my life?
10. What other side effects can I expect from surgery? What complications can occur from this surgery? How will surgery affect my ability to eat and digest food?
11. What treatment will I have before, during, or after surgery? What will this treatment do?
12. Will I need a feeding tube? How long will I need the feeding tube?

Questions to ask about food and nutrition

1. What changes will I need to make to my diet after surgery? How can I prepare?
2. What changes should I make to my diet now?
3. Who can help me with meal planning?
4. Should I keep a food diary?
5. I often do not feel well enough to cook or prepare meals. What do you recommend?
6. What can I do if other members of my household do not want to prepare my meals? Or eat the same foods?
7. How can you help if I have trouble paying for food? Or don't have access to the food you are suggesting I eat?

Questions to ask about radiation therapy

1. What type of radiation therapy (RT) will I have?
2. What will you target?
3. What is the goal of this RT?
4. How many treatment sessions will I require? Can you do a shorter course of RT?
5. Do you offer this type of RT here? If not, can you refer me to someone who does?
6. What side effects can I expect from RT?
7. Should I eat or drink before RT?
8. Will I be given medicine to help me relax during RT?
9. What should I wear?

Questions to ask about side effects

1. What are the side effects of systemic therapy? Surgery? A stent? Radiation therapy?
2. What are the side effects of stomach cancer?
3. How long will these side effects last? Do any side effects lessen or worsen in severity over time?
4. What side effects should I watch for? What side effects are expected and which are life threatening?
5. When should I call the doctor? Can I text? What should I do on weekends and other non-office hours?
6. What emergency department or ER should I go to? Will my treatment team be able to communicate with the ER team?
7. What medicines can I take to prevent or relieve side effects?
8. What can I do to help with pain and other side effects?
9. Will you stop treatment or change treatment if there are side effects? What do you look for?
10. What can I do to lessen or prevent side effects? What will you do?
11. What medicines may worsen side effects of treatment?

Questions to ask about clinical trials

1. What clinical trials are available for my type and stage of stomach cancer?
2. What are the treatments used in the clinical trial?
3. What does the treatment do?
4. Has the treatment been used before? Has it been used for other types of cancer?
5. What are the risks and benefits of this treatment?
6. What side effects should I expect? How will the side effects be controlled?
7. How long will I be in the clinical trial?
8. Will I be able to get other treatment if this doesn't work?
9. How will I know if the treatment is working?
10. Will the clinical trial cost me anything? If so, how much?

Resources

American Association for Clinical Chemistry
labtestsonline.org

American Cancer Society
cancer.org/cancer/stomachcancer/index

cancer.org/content/dam/cancer-org/cancer-control/en/worksheets/pain-diary.pdf

Cancer*Care*
cancercare.org

Cancer Support Community
cancersupportcommunity.org/quality-life-cancer-patients

Chemocare
chemocare.com

Debbie's Dream Foundation: Curing Stomach Cancer
DebbiesDream.org

Hope for Stomach Cancer
stocan.org

MedlinePlus
medlineplus.gov/stomachcancer.html

My Survival Story
mysurvivalstory.org

National Cancer Institute
cancer.gov/types/stomach

National Coalition for Cancer Survivorship
canceradvocacy.org/toolbox

National Hospice and Palliative Care Organization
nhpco.org/patients-and-caregivers

No Stomach For Cancer
nostomachforcancer.org

OncoLink
oncolink.org

Radiological Society of North America
radiologyinfo.org

Words to know

abdomen
The belly area between the chest and pelvis.

adenocarcinoma
Cancer of cells that form glands and may produce mucus.

ascites
Abnormal buildup of fluid in the abdomen.

best supportive care
Treatment that improves quality of life.

biopsy
A procedure that removes fluid or tissue samples to be tested for disease.

biosimilar
A drug that is very much like one that has been approved by the U.S. Food and Drug Administration (FDA). It must be used in the exact same way and at the same dose as the other drug.

cancer stage
A rating of the growth and spread of cancer.

chemoradiation
Treatment that combines chemotherapy with radiation therapy.

chemotherapy
Drugs that kill cancer cells by damaging or disrupting the making of the genetic code.

clinical stage (c)
Rating the extent of a tumor based on tests before treatment.

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

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

comprehensive chemistry profile
A panel of tests that gives information about the health and functions of the kidneys and the liver. Usually ordered as part of a comprehensive metabolic panel (CMP).

computed tomography (CT)
A test that uses x-rays to view body parts.

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

digestive system
A set of organs that breaks down food for the body to use.

digestive tract
A set of tube-shaped organs that breaks down food for the body to use. Part of the digestive system.

duodenum
First part of the small intestine.

ECOG (Eastern Cooperative Oncology Group) Performance Scale
A rating scale of one's ability to do daily activities.

endoscope
A thin, long tube fitted with tools that is guided down the mouth.

endoscopic mucosal resection (EMR)
Removal of early tumors with a snare that has been guided down the throat.

endoscopic resection (ER)
Treatment that removes early tumors with a tool guided down the throat.

endoscopic submucosal dissection (ESD)
Removal of early tumors with a special knife that has been guided down the throat.

endoscopic ultrasound (EUS)
A device guided down your throat to make pictures using sound waves.

epithelium
Cells that line the stomach wall.

esophagogastroduodenoscopy (EGD)
Use of a thin tool guided down the throat into the esophagus and stomach. Also called an upper GI endoscopy.

esophagogastric junction (EGJ)
The area where the esophagus and stomach join.

esophagus
The tube-shaped organ between the throat and stomach.

external beam radiation therapy (EBRT)
Radiation therapy received from a machine outside the body.

fine-needle aspiration (FNA)
Removal of a tissue sample with a thin needle.

gastrectomy
A surgery that removes some or all of the stomach.

gastroenterologist
A doctor who's an expert in digestive diseases. This system contains organs that break down food for the body to use.

gastrointestinal (GI) tract
The group of organs through which food passes after being eaten. Also called digestive tract.

hereditary
Passed down from parent to child through coded information in cells.

human epidermal growth factor receptor 2 (HER2)
A protein on the surface of a cell that sends signals for the cell to grow.

jejunostomy tube (J-tube)
A feeding tube that is inserted through a cut into the intestine.

imaging
A test that makes pictures (images) of the insides of the body.

immune system
The body's natural defense against infection and disease.

immunotherapy
A treatment with drugs that help the body find and destroy cancer cells.

infection
An illness caused by germs.

interventional radiologist
A doctor who is an expert in imaging tests and using image-guided tools to perform minimally invasive techniques to diagnose or treat disease.

intestine
The organ that food passes through after leaving the stomach.

intravenous (IV)
A method of giving drugs by a needle or tube inserted into a vein.

Karnofsky Performance Status (KPS)
A rating scale of one's ability to do daily activities.

lamina propria
Connective tissue within the mucosa of the stomach wall.

laparoscopy
Use of a thin tool inserted through a cut made into the belly area.

lymph
A clear fluid containing white blood cells.

lymph node
A small group of special disease-fighting cells located throughout the body.

lymph node dissection
A type of surgery that removes some disease-fighting structures called lymph nodes.

medical oncologist
A doctor who's an expert in cancer drugs.

metastasis
The spread of cancer cells from the first (primary) tumor to a new site.

microsatellite instability (MSI)
Errors made in small, repeated DNA parts during the copy process because of an abnormal repair system.

microsatellite instability-high (MSI-H)
Mutations in 30% or more microsatellites.

minimally invasive procedure
A procedure that uses small incisions or a tool placed into the opening of the body to reduce damage to body tissue.

mucosa
The first, inner layer of the stomach wall.

muscularis mucosae
A thin layer of muscle separating the mucosa from the submucosa of the stomach wall.

muscularis propria
The third layer of the stomach wall made mostly of muscle.

mutation
An abnormal change.

pathologic stage (p)
A rating of the extent of cancer based on microscopic review after treatment.

pathologist
A doctor who's an expert in examining tissue and cells to find disease.

pelvis
The area of the body between the hip bones.

peritoneum
The tissue that lines the abdominal wall and covers most of the organs in the abdomen (visceral peritoneum). Also called serosa.

positron emission tomography-computed tomography (PET/CT)
A test that uses radioactive material and x-rays to see the shape and function of body parts.

primary treatment
The main treatment used to rid the body of cancer.

radiation oncologist
A doctor who's an expert in radiation treatment.

radiation therapy
A treatment that uses high-energy rays.

radiologist
A doctor who is an expert in imaging tests.

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

resectable
Cancer that can be removed with surgery.

serosa
The outer lining of organs within the abdominal cavity, including the stomach. Also called visceral peritoneum.

side effect
An unhealthy or unpleasant physical or emotional response to treatment.

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

submucosa
The second layer of the stomach wall made mostly of connective tissue.

subserosa
A thin layer of connective tissue within the wall of the stomach.

subtype
A smaller group within a type of cancer that is based on certain cell features.

supportive care
Health care that includes symptom relief but not cancer treatment. Also called palliative care.

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

surgical oncologist
A surgeon who's an expert in performing surgical procedures in cancer patients.

targeted therapy
Drugs that stop the growth process specific to cancer cells.

tumor marker
A substance found in body tissue or fluid that may be a sign of cancer.

ultrasound (US)
A test that uses sound waves to take pictures of the insides of the body.

unresectable
Cancer that can't be removed by surgery.

upper endoscopy
Use of a thin tool guided down the throat into the esophagus and stomach. Also called esophagogastroduodenoscopy (EGD).

visceral peritoneum
The lining (serosa) that surrounds the internal organs in the abdomen.

widespread metastatic disease
The spread of cancer from the first tumor to many new sites in the body.

Take our survey

And help make the NCCN Guidelines for Patients better for everyone!

NCCN.org/patients/comments

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This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Gastric Cancer, Version 4.2021. It was adapted, reviewed, and published with help from the following people:

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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

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Stomach Cancer

2021

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