NCCN GUIDELINES FOR PATIENTS®

2025

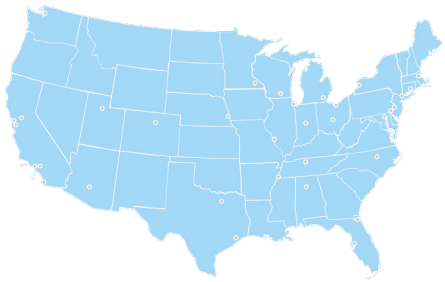
Inflammatory Breast Cancer

Presented with support from NCCN FOUNDATION® NATIONAL COMPREHENSIVE CANCER NETWORK® Guiding Treatment. Changing Lives.

Available online at NCCN.org/patientguidelines

About the NCCN Guidelines for Patients®

National Comprehensive Cancer Network®



Did you know that top cancer centers across the United States work together to improve cancer care? This alliance of leading cancer centers is called the National Comprehensive Cancer Network® (NCCN®).

Cancer care is always changing. NCCN develops evidence-based cancer care recommendations used by health care providers worldwide. These frequently updated recommendations are the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). The NCCN Guidelines for Patients plainly explain these expert recommendations for people with cancer and caregivers.

These NCCN Guidelines for Patients are based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer, Version 3.2025 – March 18, 2025.

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NCCN.org/patient-guidelines-process

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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.

National Comprehensive Cancer Network (NCCN) and NCCN Foundation
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1

About inflammatory breast cancer

Inflammatory breast cancer (IBC) is a rare, aggressive cancer where cancer cells block lymph vessels in the skin of the breast. This causes the breast to look red and swollen and feel warm to the touch.

What is inflammatory breast cancer?

Inflammatory breast cancer (IBC) is a type of invasive breast cancer. Most inflammatory breast cancers are invasive ductal carcinomas—cancer that starts in the cells that line the milk ducts and spreads into surrounding tissue. What makes IBC different from other breast cancers is its tendency to invade the drainage channels (lymphatics) of the breast and overlying skin. This causes the breast to rapidly swell with backed up fluid and turn red as if inflamed.

Possible signs of IBC:

- Peau d'orange (pitted or dimpled appearance of skin)
- Skin thickening (skin has an orange-peel texture)
- Edema (swelling caused by excess fluid in body tissue)
- Erythema (reddening of the skin, usually in patches)

Inflammatory breast cancer

In inflammatory breast cancer (IBC), cancer cells block lymph vessels in the skin of the breast. This causes the breast to look red and swollen and feel warm to the touch.

It's important not to dismiss any strange breast skin changes, including redness, swelling, or feeling warm to the touch. These changes could be an infection, but it's important to get medical attention right away.

Like other breast cancers, IBC can happen in those assigned male at birth. Although there are some differences between those assigned male and those assigned female at birth, treatment is very similar for all genders.

What are the parts of the breast?

The breast is a gland on the chest. The breast is made of milk ducts, fat, nerves, lymph and blood vessels, ligaments, and other connective tissue. Behind the breast is the pectoral (chest) muscle and ribs. Muscles and ligaments help hold the breast in place.

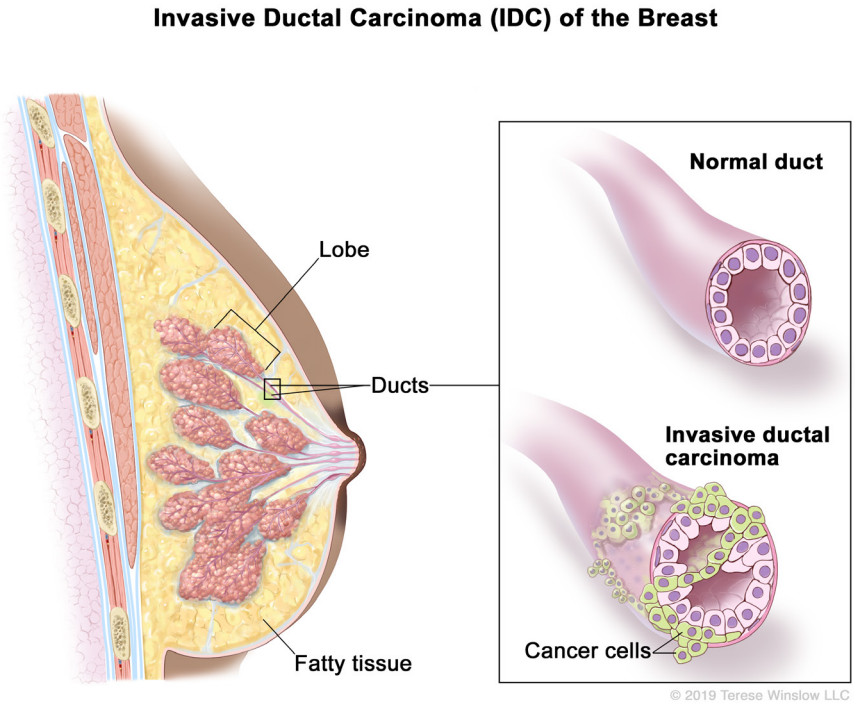
Breast tissue contains glands that can make milk. These milk glands are called lobules. Lobules look like tiny clusters of grapes. Small tubes called ducts connect the lobules to the nipple.

The ring of darker breast skin is called the areola. The raised tip within the areola is called the nipple. The nipple-areola complex (NAC) is a term that refers to both parts.

Lymph drains from breast tissue into lymph vessels and travels to lymph nodes near your armpit (axilla). Lymph is a clear fluid that gives cells water and food. It also helps to fight germs. Nodes near the armpit are called axillary lymph nodes (ALNs). Cancer cells can travel though lymph and lymph vessels to lymph nodes.

Invasive ductal carcinoma

Most inflammatory breast cancers (IBCs) are invasive ductal carcinomas. This means that cancer started in the cells that line the milk ducts and has spread into surrounding tissue.



What's in this book?

This book is organized into the following chapters:

Chapter 2: Testing for IBC provides an overview of tests you might receive, and the role of HER2 status, hormone receptors, genetic cancer risk, and biomarker testing.

Chapter 3: Breast cancer staging provides information on how inflammatory breast cancer is staged.

Chapter 4: Types of treatment gives a general overview of inflammatory breast cancer treatment and what to expect.

Chapter 5: Supportive care gives an overview of what supportive care is and possible side effects of treatment.

Chapter 6: Treatment before surgery details specific treatment options based on tumor HER2 and hormone receptor (HR) status.

Chapter 7: The breast after surgery offers more information on flat closure and breast reconstruction.

Chapter 8: Other resources provides information on patient advocacy groups and where to get help.

Why you should read this book

Making decisions about cancer care can be stressful. You may need to make tough decisions under pressure about complex choices.

The NCCN Guidelines for Patients are trusted by patients and providers. They clearly explain current care recommendations made by respected experts in the field. Recommendations are based on the latest research and practices at leading cancer centers.

Cancer care is not the same for everyone. By following expert recommendations for your situation, you are more likely to improve your care and have better outcomes as a result. Use this book as your guide to find the information you need to make important decisions.

What can you do to get the best care?

Advocate for yourself. You have an important role to play in your care. In fact, you're more likely to get the care you want by asking questions and making shared decisions with your care team. Find an oncologist who is willing to spend time answering all your questions. The better you understand the disease and your treatment options, the more informed decisions you can make. Consider seeking the opinion of a breast cancer specialist.

The NCCN Guidelines for Patients will help you understand cancer care. With better understanding, you'll be more prepared to discuss your care with your team and share your concerns. Many people feel more satisfied when they play an active role in their care.

You may not know what to ask your care team. That's common. Each chapter in this book ends with an important section called *Questions to ask*. These suggested questions will help you get more information on all aspects of your care.

Take the next step and keep reading to learn what is the best care for you!

"The NCCN Guidelines for Patients are seen as a trusted source by researchers, clinicians, and advocates. They set the standard for appropriate and effective breast cancer treatment, making them a good first step for newly diagnosed patients."

2
Testing for IBC

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

Inflammatory breast cancer (IBC) can be difficult to diagnose. Often, there is no lump that can be felt during a breast exam or seen on a mammogram. Since there is swelling (edema) and redness (erythema) of the breast, IBC can look like an infection. A small skin biopsy of the affected breast area may help diagnose IBC. However, this doesn't

"For weeks my bra had been feeling uncomfortably tight. I tried to ignore it but then felt sharp, shooting pains and the skin looked 'funny.' It took multiple office visits and finally to a surgeon to learn I had inflammatory breast cancer (IBC). I'm a nurse and didn't know you could have breast cancer without a lump."

Guide 1
Possible tests

Medical history and physical exam by multidisciplinary team. Medical photographs will also be taken.
Diagnostic mammogram. Ultrasound (US) and breast MRI, as needed.
Biopsy with pathology review
Complete blood count (CBC), comprehensive metabolic panel (CMP) including liver function tests (LFTs), and alkaline phosphatase (ALP)
Determine tumor status including: • Estrogen receptor (ER) and progesterone receptor (PR) hormone receptor (HR) status • HER2 status
Address fertility, birth control, and sexual health concerns
Genetic counseling and testing if at risk for hereditary breast cancer
Imaging: • Chest CT. Contrast might be used. • CT or MRI of abdomen with or without pelvis. Contrast will be used. • Bone scan or FDG-PET/CT

replace a breast tissue biopsy. IBC is a clinical diagnosis—a biopsy-proven breast cancer with inflammatory features. You can have IBC even if a skin biopsy does not find breast cancer in the lymphatics of the skin.

For possible tests see **Guide 1.**

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 (OTC) medicines, herbals, or supplements you take. Some supplements interact with and affect medicines that your care team may prescribe. Tell your care team about any symptoms you have. A medical history, sometimes called a health history, will help determine which treatment is best for you.

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. Ask family members on both sides of your family about their health issues like heart disease, cancer, and diabetes, and at what age they were diagnosed. It's important to know the specific type of cancer, or where the cancer started, and if it is in multiple locations, and if they had genetic testing.

Physical exam

During a physical exam, your health care provider may:

- Check your temperature, blood pressure, pulse, and breathing rate
- Check your height and weight
- 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
- Examine your breasts to look for clinical changes such as lumps, nipple discharge or bleeding, or skin changes
- Feel for enlarged lymph nodes in your neck, underarm, and groin

Clinical breast exam

Clinical breast exam (CBE) is a physical exam of the bare breast performed by a health care provider to check for lumps or other changes. It is done while you are seated and/or lying down. Your provider should take time to palpate (feel) the entire breast, including the armpit. A nurse or assistant might also be in the room during the exam.

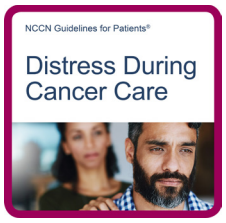
Distress screening

It is normal to have strong feelings about being diagnosed with cancer and your feelings can also change from day to day and week to week. Talk to your care team and those whom you feel most comfortable about how you are feeling. There are services, people, and medicine that can help you. Support and counseling are

available. Dealing with a cancer diagnosis may sometimes be stressful and may cause distress. Your treatment team will screen your level of distress. This is part of your cancer care.

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. You may also experience depression, anxiety, and sleep issues.

More information on distress can be found in the *NCCN Guidelines for Patients: Distress During Cancer Care* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



Performance status

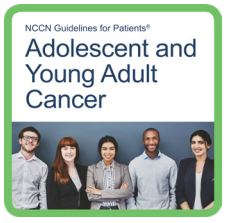
Performance status (PS) is a person's general level of fitness and ability to perform daily tasks. Your state of general health might be rated using a PS scale called the Eastern Cooperative Oncology Group (ECOG) score or the Karnofsky Performance Status (KPS). PS is one factor taken into consideration when choosing a treatment plan.

Fertility (all genders)

Some types of treatment such as chemotherapy can affect fertility, or the ability to have children. If you think you want children in the future, ask your care team how cancer and cancer treatment might change your fertility. To preserve your fertility, you may need to take action before starting cancer treatment. Those who want to have children in the future should be referred to a fertility specialist to discuss the options before starting treatment.

Fertility preservation is all about keeping your options open, whether you know you want to have children later in life or aren't sure at the moment. Fertility and reproductive specialists can help you sort through what may be best for your situation.

More information on fertility preservation can be found at *NCCN Guidelines for Patients: Adolescent and Young Adult Cancer* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



Changes in fertility

Treatment might cause your fertility to be temporarily or permanently impaired or interrupted. This loss of fertility is related to your age at time of diagnosis, treatment type(s), treatment dose, and treatment length. Talk to your care team about your concerns and if you are planning a pregnancy.

Preventing pregnancy during treatment

Preventing pregnancy during treatment is important. Cancer treatment can affect the ovaries, damage sperm, and hurt a developing baby. Therefore, becoming pregnant or having one's partner become pregnant during treatment should be avoided. Non-hormonal birth control methods such as intrauterine devices (IUDs) and barrier methods are preferred in those with a breast cancer diagnosis. Types of barrier methods include condoms, diaphragms, cervical caps, and the contraceptive sponge. If you are pregnant or breastfeeding at the time of your cancer diagnosis, treatments will need to be avoided.

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 a vein in your arm. Some blood tests you might have are described next.

Alkaline phosphatase

Alkaline phosphatase (ALP) is an enzyme found in the blood. High levels of ALP can be a sign cancer has spread to the bone or liver. A bone scan might be performed if you have high levels of ALP.

Complete blood count

A complete blood count (CBC) measures the levels of red blood cells (RBCs), white blood cells (WBCs), and platelets (PLTs) in your blood. Red blood cells carry oxygen throughout your body, white blood cells fight infection, and platelets control bleeding.

Comprehensive metabolic panel

A comprehensive metabolic panel (CMP) measures substances in your blood. It provides important information about how well your kidneys and liver are working, among other things.

Liver function tests

Liver function tests (LFTs) look at the health of your liver by measuring chemicals that are made or processed by the liver. Levels that are too high or low signal that the liver is not working well or that cancer has spread to the liver.

Pregnancy test

Those who can become pregnant will be given a pregnancy test before treatment begins.

Imaging tests

Imaging tests take pictures of the inside of your body. Imaging tests show the primary tumor, or where the cancer started, and look for cancer in other parts of the body.

A radiologist, a medical expert in interpreting imaging tests, will interpret the test and send a report to your doctor.

The imaging tests described on the following pages are not in order of importance. You will not have all of these tests.

Bone scan

A bone scan can assess if the cancer has spread to the bone.

The bone scan uses a radiotracer. A radiotracer is a substance that releases small amounts of radiation. Before the pictures are taken, the tracer will be injected into your vein. It can take a few hours for the tracer to enter your bones. However, the test is quick and painless.

A special camera will take pictures of the tracer in your bones as it moves over your body. Areas of bone damage take up more radiotracer than healthy bone and show up as bright spots on the pictures. Bone damage can be caused by cancer, cancer treatment, previous injuries, or other health issues.

Contrast material

Contrast material is a substance used to improve the quality of the pictures of the inside of the body. It is used to make the pictures clearer. Contrast might be taken by mouth (oral) or given through a vein (IV). Oral contrast does not get absorbed from your intestines and will be passed with your next bowel movements. IV contrast will leave the body in the urine immediately after the test. The types of contrast vary and are different for CT and MRI. Not all imaging tests require contrast, but many do.

Tell your care team if you have had allergic reactions to contrast in the past. This is important. You might be given medicines 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.

What's the difference between a screening and diagnostic mammogram?

A mammogram is a picture of the inside of your breast made using x-rays. During a mammogram, the breast is pressed between 2 plates while you stand in different positions. Multiple x-rays will be taken. A computer combines the x-rays to make detailed pictures.

- **Screening mammograms** are done on a regular basis when there are no signs or symptoms of breast cancer. Results take a few days.
- **Diagnostic mammograms** are used for those who have symptoms such as a lump, pain, nipple thickening or discharge, or those whose breasts have changed shape or size. An ultrasound (US) is often used with a diagnostic mammogram.
- **Diagnostic mammograms** are also used to take a closer look at an abnormal area found in a screening mammogram.
- A radiologist will evaluate the **diagnostic mammogram** while you wait so if additional testing is needed, it can be done right away.
- Both types of mammograms use low-dose x-rays to examine the breast. They may use either the standard 2-dimensional (2D) digital mammography or 3-dimensional (3D) mammograms known as tomosynthesis.

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 picture. Intravenous (IV) contrast is often used.

Diagnostic mammogram

A mammogram is a picture of the insides of your breast. The pictures are made using x-rays. A computer combines the x-rays to make detailed pictures. A bilateral mammogram includes pictures of both breasts. Mammogram results are used to plan treatment.

Diagnostic mammograms look at specific areas of your breasts, which may not be clearly seen on screening mammograms. They are used to see tumor and the size of the tumor(s).

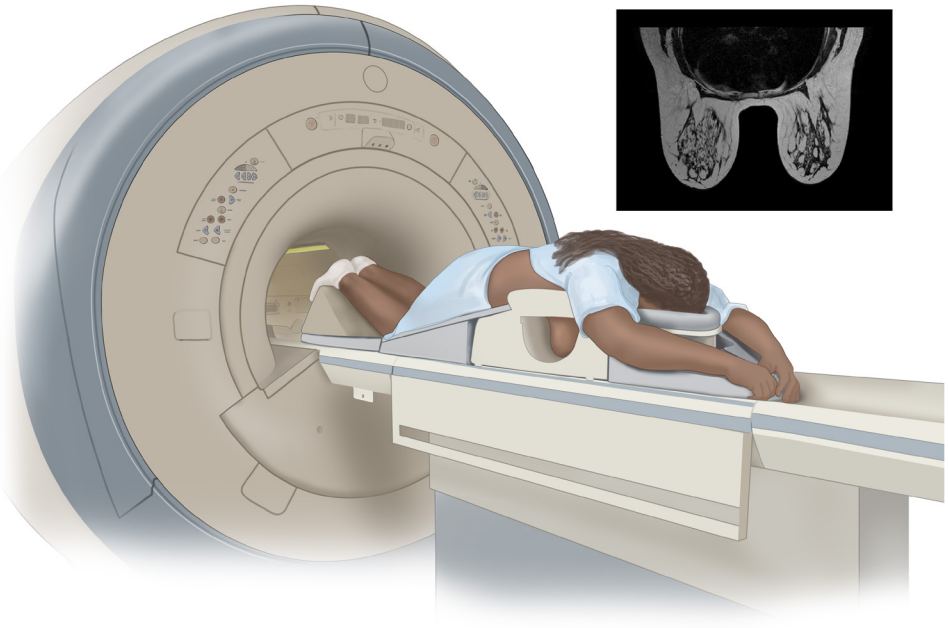
Diagnostic mammograms include extra compression in certain areas of the breast, magnification views, or rolling the breast to image additional areas of the breast. Other tests may include a breast MRI or ultrasound.

MRI scan

A magnetic resonance imaging (MRI) scan uses radio waves and powerful magnets to take pictures of the inside of the body. It does not use x-rays, which means there is no radiation delivered to your body during the test. Because of the very strong magnets used in the MRI machine, tell the technologist if you have any metal or a pacemaker in your body. During the test, you will likely be asked to hold your breath for 10 to 20 seconds as the technician collects the images. Contrast is often used.

Breast MRI

If needed, a breast MRI will be done in addition to a mammogram. In a breast MRI, you are positioned face down with your arms overhead.



A closed MRI has a capsule-like design where the magnet surrounds you. The space is small and enclosed. An open MRI has a magnetic top and bottom, which allows for an opening on each end. Closed MRIs are more common than open MRIs, so if you have claustrophobia (a dread or fear of enclosed spaces), be sure to talk to your care team about it. MRI scans take longer to perform than CT scans.

- **A breast MRI** might be used in addition to a mammogram. You will be positioned face down in the machine with your arms above your head.
- **A spine or brain MRI** can be used to detect breast cancer that has spread (metastasized) to the spine or brain.

PET scan

A PET (positron emission tomography) 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 how much sugar is being taken up by the cancer cells. This gives an idea about how fast the cancer cells are growing. 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 found on the PET scan are cancer. It is normal for the brain, heart, kidneys, and bladder to be bright on PET. Inflammation or infection can also show up as a bright spot. When a PET scan is combined with CT, it is called a PET/CT scan.

- **An FDG-PET/CT** uses a radiotracer called fluorodeoxyglucose (FDG). It is made of fluoride and a simple form of sugar called glucose. You cannot eat or drink for at least 4 hours before the scan.

Inflammatory breast cancer can be difficult to diagnose. Ask for a referral to a breast specialist, if possible.

This scan is most helpful when other imaging results are unclear.

- **A sodium fluoride PET/CT** uses a radiotracer made of sodium fluoride.
- **An FES-PET/CT** uses FES, which is a radioactive form of the hormone estrogen. An FES-PET/CT might be used when cancer is estrogen receptor-positive (ER+).

Ultrasound

An ultrasound (US) uses high-energy sound waves to form pictures of the inside of the body. This is similar to the sonogram used for pregnancy. A wand-like probe (transducer) will be held and moved on your bare breast using gel. It may also be placed below your armpit. Ultrasound is painless and does not use x-rays, so it can be repeated as needed. Ultrasound is good at showing small areas of cancer that are near the skin. Sometimes, a breast ultrasound or MRI is used to guide a biopsy.

Biopsy

A biopsy is the removal of a sample of tissue from your body for testing. A pathologist will examine the biopsy for cancer and write a report called a pathology report. Ask questions about your biopsy results and what it means for your treatment.

There are different types of biopsies. Some biopsies are guided using imaging, such as ultrasound or MRI. The primary or main tumor is biopsied first. Other tumors or tumors in different areas may also be biopsied. You may have tissue removed from the breast, lymph nodes, or both.

Types of possible biopsies include:

- **Fine-needle aspiration (FNA) or core biopsy (CB)** uses needles of different sizes to remove a sample of tissue or fluid. In a **vacuum-assisted core biopsy (VACB),** suction is used through a needle to remove the sample using a special vacuum device.
- **Excisional biopsy** removes the entire abnormal area. This is not the preferred type of biopsy, but may be necessary if other methods are not possible or when the biopsy results don't match the expected findings. An excisional biopsy is usually done under anesthesia in an operating room.
- **Skin biopsy** takes a small sample of inflamed skin on the breast.

Before biopsies are performed, usually the area is injected with numbing medicine. A core needle biopsy (CNB) removes more than one tissue sample, but usually through the same area on the breast. The samples are small.

The needle is often guided into the tumor with imaging. When mammography is used during a biopsy, it is called a stereotactic needle biopsy.

One or more clips may be placed near the breast tumor during a biopsy. The clips are small, painless, and made of metal. They will mark the site for future treatment and imaging. The clips will stay in place until surgery. If the area biopsied is benign, the clip will remain in place to mark the biopsy site on future imaging. The clips cause no problems, even if they are left in place for a long time. You will be able to go through airport security and have an MRI.

Axillary lymph node needle biopsy

An axillary lymph node (ALN) drains lymph fluid from the breast and nearby areas. In an axillary lymph node biopsy, a sample of lymph node near the armpit (axilla) is biopsied with a needle. This is to determine if abnormal lymph nodes seen on imaging tests contain cancer cells. An ultrasound-guided fine-needle aspiration (US-FNA) or core biopsy will be used. If cancer is found, it is called node positive (node+). A marker may be placed in the node so that it can be identified later if needed.

Sentinel lymph node biopsy

A sentinel lymph node (SLN) is the first lymph node that cancer cells are most likely to spread to from a primary tumor. Sometimes, there can be more than one sentinel lymph node. Removal of the sentinel lymph nodes during surgery is called a sentinel lymph node biopsy (SLNB or SNB). This procedure is done during surgery such as a mastectomy (surgery to remove the breast) or lumpectomy (surgery to remove the tumor) to determine if any cancer cells have traveled to the lymph nodes. The lymph nodes removed are called the sentinel nodes. They may or may not contain any cancer cells. Just because these nodes are removed, it does not mean that they are positive for cancer.

To find the sentinel lymph node, a radioactive material and other dyes are injected into the area where breast tumor is located. From here, the dye travels through the lymphatics in the breast to the lymph nodes. This helps the surgeon find which of the nodes are the sentinel lymph nodes. Once the nodes are found, those containing the radioactive material or dye are removed and tested by a pathologist. If cancer is found, then more than the sentinel lymph nodes may be removed.

Skin biopsy

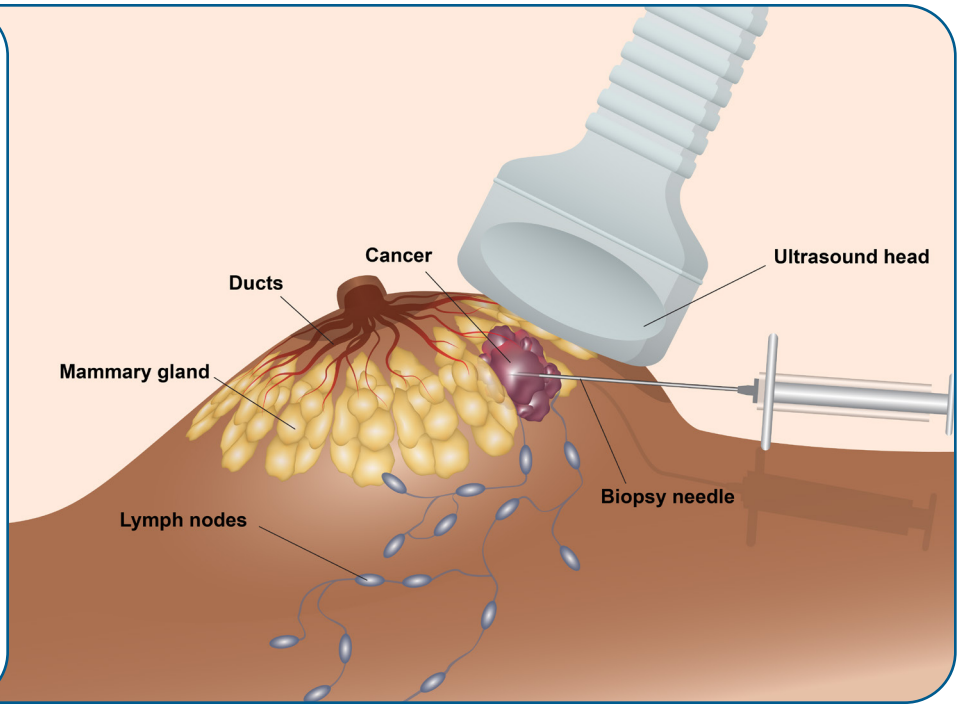
A sample of inflamed skin on the breast will likely be removed to diagnose inflammatory breast cancer.

Biopsy results

Histology is the study of the anatomy (structure) of cells, tissues, and organs under a microscope. It is used to make treatment decisions. Your pathology report will contain information about histology.

Biopsy

In a biopsy, a sample of tumor is removed. There are different types of biopsy. This image shows an ultrasound-guided needle biopsy.



HER2 status

Inflammatory breast cancers often produce greater than normal amounts of 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. Some breast cancers have too many HER2 genes or receptors. Too many HER2s is called HER2-positive (HER2+). You might hear it called HER2 overexpression or amplification.

There are 2 tests for HER2:

- **Immunohistochemistry (IHC)** measures receptors. If the IHC score is 3+, the cancer is HER2+. If the score is 0 or 1, it is considered HER2-negative (HER2-). If the score is 2+, further testing is needed.
- **In situ hybridization (ISH)** counts the number of copies of the *HER2* gene. This test is done mainly when the IHC score is unclear.

HER2 testing should be done on all new tumors. A tumor biopsy sample will be used. You might have more than one HER2 test.

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. IHC can find estrogen, progesterone, and HER2 receptors in breast cancer cells. A pathologist will measure how many cells have estrogen and/or progesterone receptors and the number of receptors inside each cell.

FISH or ISH

Fluorescence in situ hybridization (FISH) or other ISH methods like dual ISH are testing methods that involve special dyes called probes that attach to pieces of DNA, the genetic material in a person's cells.

Hormone receptor status

Your blood carries hormones throughout your body. A hormone is a substance made by a gland in your body. A receptor is a protein found inside or on the surface of a cell. When substances such as hormones attach (bind) to these receptors, it causes changes within the cell. When hormones attach to receptors inside breast cancer cells, they can cause cancer to grow. If found, these receptors may be targeted using endocrine therapy.

There are 2 types of hormone receptors:

- **Estrogen** – plays a role in ovary, uterus, and breast development
- **Progesterone** – plays a role in menstrual cycle and pregnancy

Hormone receptor (HR) testing should be done on any new tumors. A biopsy sample will be used.

Hormone receptor-positive

In hormone receptor-positive (HR+) or hormone-sensitive breast cancer, IHC finds estrogen receptors (ER+), progesterone hormone receptors (PR+), or both (ER+/PR+). Most breast cancers are ER+/PR+ or ER+/PR-.

- **Estrogen receptor (ER)** is stimulated by estrogen and provides survival and proliferation (rapid growth) signals. Cancer cells deprived of estrogen or that have their ER signal blocked with treatment may stop growing or die.
- **Progesterone receptor (PR)** binds progesterone and provides survival and proliferation signals. It is thought that PR expression also suggests the tumor is estrogen dependent. An ER-/PR+ tumor is relatively uncommon.

HR+ breast cancer is treated with endocrine therapy, which blocks estrogen receptor signaling or decreases estrogen production.

Hormone receptor-negative

Hormone receptor-negative (HR-) breast cancer cells do not have estrogen or progesterone hormone receptors. These cancers are sometimes simply called hormone negative. HR- cancers often grow faster than HR+ cancers. Both the estrogen and progesterone receptors need to be negative for the cancer to be considered HR-.

Biomarker testing

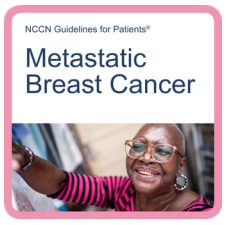
A sample from a biopsy of your tumor may be tested to look for specific DNA (deoxyribonucleic acid) mutations/alterations, protein levels, or other molecular features. This information is used to choose the best treatment for you. It is sometimes called molecular testing or tumor profiling, tumor sequencing,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

Estrogen receptor-positive (ER+) breast cancer cells

- In ER+ breast cancer, testing finds estrogen hormone receptors in at least 1 out of every 100 cancer cells.
- In ER-low–positive invasive breast cancer, testing finds estrogen hormone receptors in 1 to 10 out of every 100 cancer cells.

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: BRCA. Genes are written with italics like this: *BRCA*. HER2 and hormone receptor status are part of biomarker testing. Your treatment team will recommend the best types of biomarker testing that are important for you.

Biomarker testing or mutation testing is more commonly done in metastatic breast cancer. For more information, see *NCCN Guidelines for Patients: Metastatic Breast Cancer* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



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 birth parents. In tumor mutation testing, only the tumor is tested and not the rest of your body.

Testing is done using a variety of methods such as FISH, ISH, IHC, next-generation sequencing (NGS), and/or polymerase chain reaction (PCR). These methods are used to identify the presence of gene mutations, alterations, rearrangements, or fusions.

- Certain mutations such as *PIK3CA, AKT1, PTEN, ESR1, NTRK,* and *RET* can be targeted with specific therapies. Testing for *ESR1* and *RET* mutations is done on hormone receptor-positive (HR+) tumors.

PD-L1 testing

Programmed death ligand 1 (PD-L1) is an immune protein. If this protein is expressed on the surface of cancer cells, it can cause your immune cells to ignore the cancer and suppress the anti-tumor immune response. If your cancer expresses PD-L1, you might have treatment that combines chemotherapy and a checkpoint inhibitor therapy. This is designed to activate your immune system to better fight off the cancer cells.

Tumor mutational 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 protein PD-L1.

MSI-H/dMMR mutation

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

Tumor markers

Your blood or biopsy tissue may be tested for proteins called tumor markers. Knowing this information can help plan treatment. Examples of some tumor markers in breast cancer include carcinoembryonic antigen (CEA), CA 15-3, and CA 27.29. An increase in the level of certain tumor markers could mean that the cancer has grown or spread (progressed). However, not everyone has elevated levels of these markers and tumor markers alone are not a reliable method of detecting breast cancer. Therefore, they are not routinely checked and depend on your individual situation.

Liquid biopsy

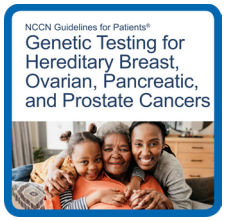
Some abnormal changes (mutations) can be found by testing circulating tumor DNA (ctDNA) in the blood. In a liquid biopsy, a sample of blood is taken to look for cancer cells or for pieces of DNA from tumor cells. Sometimes, testing can quickly use up a tumor sample and a liquid biopsy might be an option in this case.

Genetic cancer risk testing

About 1 out of 10 breast cancers are hereditary. 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 or trained provider will speak with you about the results. Test results may be used to guide treatment planning.

Genetic testing is done using blood or saliva (spitting into a cup or a cheek swab). The goal is to look for gene mutations inherited from your biological (birth) 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, other family members might carry these mutations. Tell your care team if there is a family history of cancer.

More information on genetic cancer risk testing can be found in the *NCCN Guidelines for Patients: Genetic Testing for Hereditary Breast, Ovarian, Pancreatic, and Prostate Cancers* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



Testing takes time. It might take days or weeks before all test results come in.

BRCA tests

Everyone has *BRCA* genes. Normal *BRCA* genes help to prevent tumor growth. They help fix damaged cells and help cells grow normally. *BRCA* mutations put you at risk for more than one type of cancer. Mutations in *BRCA1* or *BRCA2* increase the risk of breast, ovarian, prostate, colorectal, pancreatic, and melanoma skin cancers. Mutated *BRCA* genes can also affect how some treatments work. These tests might be repeated.

Other genes

Other genes such as *PALB2, p53, CHEK2,* and *ATM* might be tested. For example, *PALB2* normally helps prevent cancer. When *PALB2* mutates, it no longer works correctly. Those with a *PALB2* mutation have a higher risk of developing breast cancer.

Key points

- Inflammatory breast cancer (IBC) can be difficult to diagnose. Often, there is no lump that can be felt during a breast exam or seen on a mammogram. Since there is swelling (edema) and redness (erythema) of the breast, IBC can look like an infection. Often, a biopsy of the affected skin is done to diagnose the tumor.
- Treatment can affect your fertility or the ability to have children. You might be referred to a fertility specialist to discuss fertility preservation.
- A diagnostic mammogram includes detailed pictures of both breasts. It is different than a screening mammogram.
- During a biopsy, tissue or fluid samples are removed for testing. Samples are needed to confirm the presence of cancer and to perform cancer cell tests.
- A sample from a biopsy of your tumor will be tested for estrogen receptor (ER) status, progesterone receptor (PR) status, HER2 status, and grade (histology). This provides information about the behavior of your cancer, as well as treatments to which your cancer may respond. Other biomarker tests may be performed. IBC can vary in its expression of these receptors and is not confined to one subtype of breast cancer.
- A sentinel lymph node (SLN) is the first lymph node(s) that cancer cells are most likely to spread to from a primary tumor. A sentinel lymph node biopsy (SNLB) might be done to look for cancer in your lymph node(s).
- About 1 out of 10 breast cancers are hereditary. Depending on your family history or other features of your cancer, your health care provider might refer you for hereditary genetic testing or to speak with a genetic counselor.

Questions to ask

- What type(s) of biopsy will I have? Will I have a skin biopsy?
- What tests will be done on the tumor?
- When will the test results be ready and who will discuss the results with me?
- What is tumor HER2 and hormone receptor status?
- What tumor features or mutations will you test for?

3
Breast cancer staging

Cancer staging is used to reflect prognosis and to guide treatment decisions. It describes the size and location of the tumor and if cancer has spread to lymph nodes, organs, or other parts of the body. It also takes into account hormone receptor (HR) and HER2 status, and standard-of-care treatment results.

Most inflammatory breast cancers (IBCs) are invasive ductal carcinomas. This is cancer that started in the cells that line the milk ducts and has spread into surrounding tissue. At diagnosis, IBC is stage 3 or 4 disease. In stage 3, the tumor can be any size and in the lymph nodes, the lymph nodes can be fixed (or not moveable), or the cancer can involve the skin or chest wall. It is sometimes called advanced disease. In stage 4, cancer has spread to other parts of the body (metastasized).

How is breast cancer staged?

A cancer stage is a way to describe the extent of the cancer at the time you are first diagnosed. Based on testing, your cancer will be assigned a stage. Staging helps to predict prognosis and is needed to make treatment decisions. A prognosis is the course your cancer will likely take.

Information gathered during staging:

- **The extent (size) of the tumor (T):** How large is the cancer? Has it grown into nearby areas?
- **The spread to nearby lymph nodes (N):** Has the cancer spread to nearby lymph nodes? If so, how many? Where?
- **The spread (metastasis) to distant sites (M):** Has the cancer spread to distant organs such as the lungs or liver?
- **Estrogen receptor (ER) status:** Does the cancer have the protein called an estrogen receptor?
- **Progesterone receptor (PR) status:** Does the cancer have the protein called a progesterone receptor?
- **Human epidermal growth factor receptor 2 (HER2) status:** Does the cancer make too much of a protein called HER2?
- **Grade of the cancer (G):** How much do the cancer cells look like normal cells?
- **Biomarker testing:** Does the cancer have any genes, proteins, markers, or mutations that might suggest treatment?

Staging is based on a combination of information to reach a final numbered stage. It takes into account what can be felt during a physical exam, what can be seen on imaging tests, and what is found during a biopsy or surgery. Often, not all information is available at the initial evaluation. More information can be gathered as treatment begins.

Staging includes:

- **Anatomic** – based on extent of cancer as defined by tumor size (T), lymph node status (N), and distant metastasis (M).
- **Prognostic** – includes anatomic TNM plus tumor grade and the status of the biomarkers such as human epidermal growth factor receptor 2 (HER2), estrogen receptor (ER), and progesterone receptor (PR). Prognostic stage also includes the assumption that you are treated with the standard-of-care approaches.

Breast cancer staging is often done twice, before and after surgery. Staging after surgery provides more specific and accurate details about the size of the cancer and lymph node status.

Clinical stage

Clinical stage (c) is the rating given before any treatment. An example might look like cT1 or cN2. In breast cancer, the clinical stage is based on imaging and biopsy results. These tests are done before any treatment as part of an initial diagnosis.

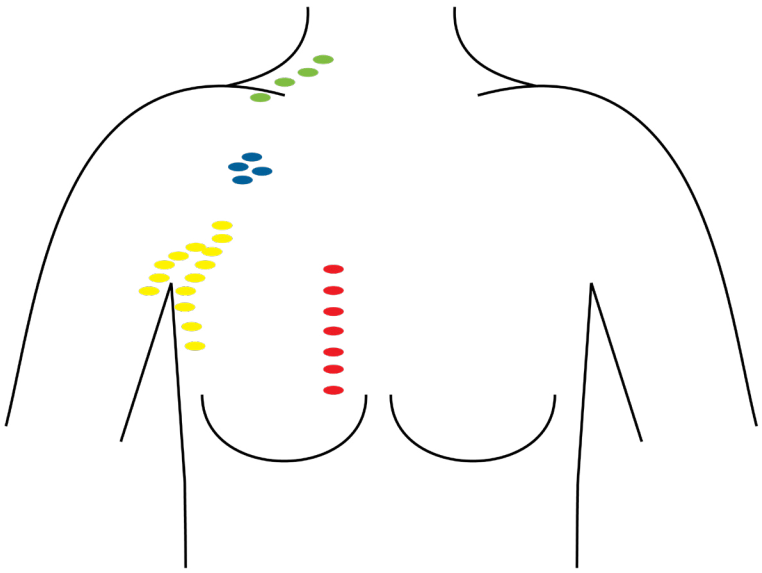
Pathologic stage

Pathologic stage (p) or surgical stage is determined by examining tissue removed during surgery. An example might be pN2. If you are given drug therapy before surgery, then the stage might add a y and look like ypT3.

Clinical staging

Clinical staging of lymph nodes is staging before surgery.

- **Cancer is in axillary nodes**
- **Cancer is in internal mammary nodes**
- **Cancer is in infraclavicular nodes**
- **Cancer is in supraclavicular nodes**



TNM scores

The tumor, node, metastasis (TNM) system is used to stage breast cancer. In this system, the letters T, N, and M describe different areas of cancer growth. Based on cancer test 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. These scores will be combined to assign the cancer a stage. A TNM example might look like this: T3N2M0 or T3, N2, M0.

- **T (tumor)** – Depth and spread of the main (primary) tumor(s) in one or both breasts
- **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

T = Tumor

The primary tumor size can be measured in centimeters (cm) or millimeters (mm). One inch is equal to 2.54 cm. A large pea is 1 cm (10 mm). A golf ball is 4 cm (40 mm). A tumor micrometastasis is a very small collection of cancerous cells smaller than 1 mm. It might be written as T1mi. Ipsilateral means on the same side of the body.

- **T1** – Tumor is 2 cm (20 mm) or less
- **T2** – Tumor is 2.1 cm to 5 cm
- **T3** – Tumor is more than 5 cm
- **T4** – Tumor is of any size and has invaded nearby structures such as the chest wall and skin of the breast
- **T4d** – Tumor is inflammatory carcinoma (IBC)

N = Regional lymph node

Lymph, a clear fluid containing cells that help fight infections and other diseases, drains through channels into lymphatic vessels. From here, lymph drains into lymph nodes. Lymph nodes work as filters to help fight infection.

Regional lymph nodes are those located near the breast in the armpit (axilla). If breast cancer spreads, it often goes first to nearby lymph nodes under the arm. It can also sometimes spread to lymph nodes near the collarbone or near the breastbone. However, it is possible for cancerous cells to travel through lymph and blood to other parts of the body without having gone to the lymph nodes first. Knowing if the cancer has spread to your lymph nodes helps doctors find the best way to treat your cancer.

- **N0** means no cancer is in the regional lymph nodes. Isolated tumor cells (ITCs) may be present. These are malignant cell clusters no larger than 0.2 mm.
- **N1mi** means micrometastases (approximately 200 cells, larger than 0.2 mm, but not larger than 2.0 mm) are found in lymph nodes.
- **N1, N2, N3** means regional lymph node metastases are found. The higher the number, the more lymph nodes that have metastases.

M = Metastasis

Cancer that has spread to distant parts of the body is shown as M1. This is metastatic breast cancer (MBC). The most common sites for metastasis are bone and lung.

- **M0** means no evidence of distant metastasis.
- **M1** means distant metastasis is found. This is metastatic breast cancer.

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. G3 is the highest grade for breast cancers. A low-grade tumor has a low risk of recurrence. A high-grade tumor has a higher risk of recurrence (of cancer returning).

- **GX** – Grade cannot be determined
- **G1** – Low
- **G2** – Intermediate
- **G3** – High

Numbered stages

Numbered stages are based on TNM scores and receptor (hormone and HER2) status. Stages range from stage 0 to stage 4, with 4 being the most advanced. They might be written as stage 0, stage I, stage II, stage III, and stage IV. Inflammatory breast cancer (IBC) is stage 3 (invasive) or 4 (metastatic).

- **Stage 0 is noninvasive** – Noninvasive breast cancer is rated stage 0. Ductal carcinoma in situ (DCIS) is found only in the ducts (Tis). It has not spread to the surrounding breast tissue, lymph nodes (N0), or distant sites (M0).
- **Stages 1, 2, and 3 are invasive but not metastatic** – Invasive breast cancer is rated stage 1, 2, or 3. It has grown outside the ducts, lobules, or breast skin. Cancer might be in the axillary lymph nodes.
- **Stage 4 is metastatic** – In stage 4 breast cancer, cancer has spread to distant sites. It can develop from earlier stages. Sometimes, the first diagnosis is stage 4 metastatic breast cancer (called de novo).

Key points

- Staging helps to predict prognosis and is needed to make treatment decisions. A prognosis is the course your cancer will likely take. IBC is either stage 3 or 4 at diagnosis.
- The tumor, node, metastasis (TNM) system is used to stage breast cancer.
- Breast cancer is often staged twice, before and after surgery.
- Clinical stage (c) is the rating given before any treatment. It is written as cTNM.
- Pathologic stage (p) or surgical stage is determined by examining tissue removed during surgery. It is written as pTNM.
- Grade describes how abnormal the tumor cells look under a microscope (called histology).
- Regional lymph nodes are found near the breast.

Questions to ask

- What is the cancer stage and tumor grade?
- What does the cancer stage and grade mean in terms of treatment options and prognosis?
- Is there more than one known cancer site?
- Is cancer in the lymph nodes? If so, which lymph nodes?
- What is the tumor HER2 and hormone status?

4
Types of treatment

This chapter provides an overview of treatment options and what to expect. Together, you and your care team will choose a treatment plan that is best for you.

Care team

Treating breast cancer takes a team approach. Treatment decisions should involve a multidisciplinary team (MDT). An MDT is a team of health care and psychosocial care professionals from different professional backgrounds who have knowledge (expertise) and experience in 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 help them get to know you.

Treatment overview

Inflammatory breast cancer (IBC) is treatable. Treatment can be local, systemic, or usually a combination of both.

Local therapy focuses on the breast, chest wall, and lymph node area. It includes:

- Surgery (mastectomy and lymph node surgery)
- Radiation therapy (RT)

Systemic therapy works throughout the body. It includes:

- Chemotherapy
- HER2-targeted therapy
- Inhibitors and other targeted therapies
- Immunotherapy
- Endocrine therapy

IBC is treated with systemic (drug) therapy to shrink the tumor, followed by surgery to remove the breast and lymph nodes, and then radiation therapy. Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. Systemic treatment is based on estrogen receptor (ER), progesterone receptor (PR), and HER2 expression.

Many factors play a role in how the cancer will respond to treatment. It is important to have regular talks with your care team about your goals for treatment and your treatment plan.

Mastectomy

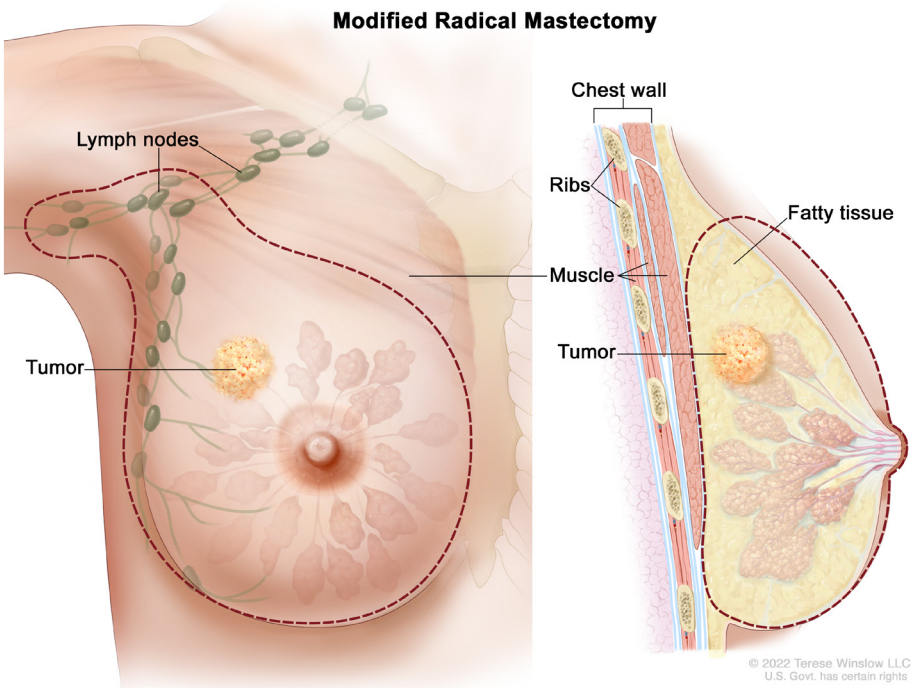
Surgery is an operation or procedure to remove cancer from the body. A mastectomy removes all or part of the breast. Inflammatory breast cancer is often treated with a modified radical mastectomy. In a modified radical mastectomy, the breast and underarm (axilla) sentinel lymph nodes (SLNs) are removed. Before removing the breast, the surgeon may do a sentinel lymph node biopsy (SLNB). Sentinel lymph nodes are the first lymph nodes cancer cells are likely to have spread from the primary tumor.

Breast reconstruction is an option after a mastectomy. If you opt for reconstruction, it will be done after finishing cancer treatment. This is called delayed reconstruction. Breast reconstruction is often done in stages. You might want to consult with a plastic surgeon.

When preparing for surgery, seek the opinion of an experienced surgeon. The surgeon should be an expert in performing your type of surgery. 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.

Modified radical mastectomy

The dotted line shows where the entire breast and some lymph nodes are removed. Part of the chest wall muscle may also be removed.



Lymph node surgery

Sentinel lymph node biopsy

Sentinel lymph node biopsy (SLNB or SNB) is done during a lumpectomy or mastectomy to determine if any cancer cells have traveled to the lymph nodes. The lymph nodes removed are called the sentinel nodes.

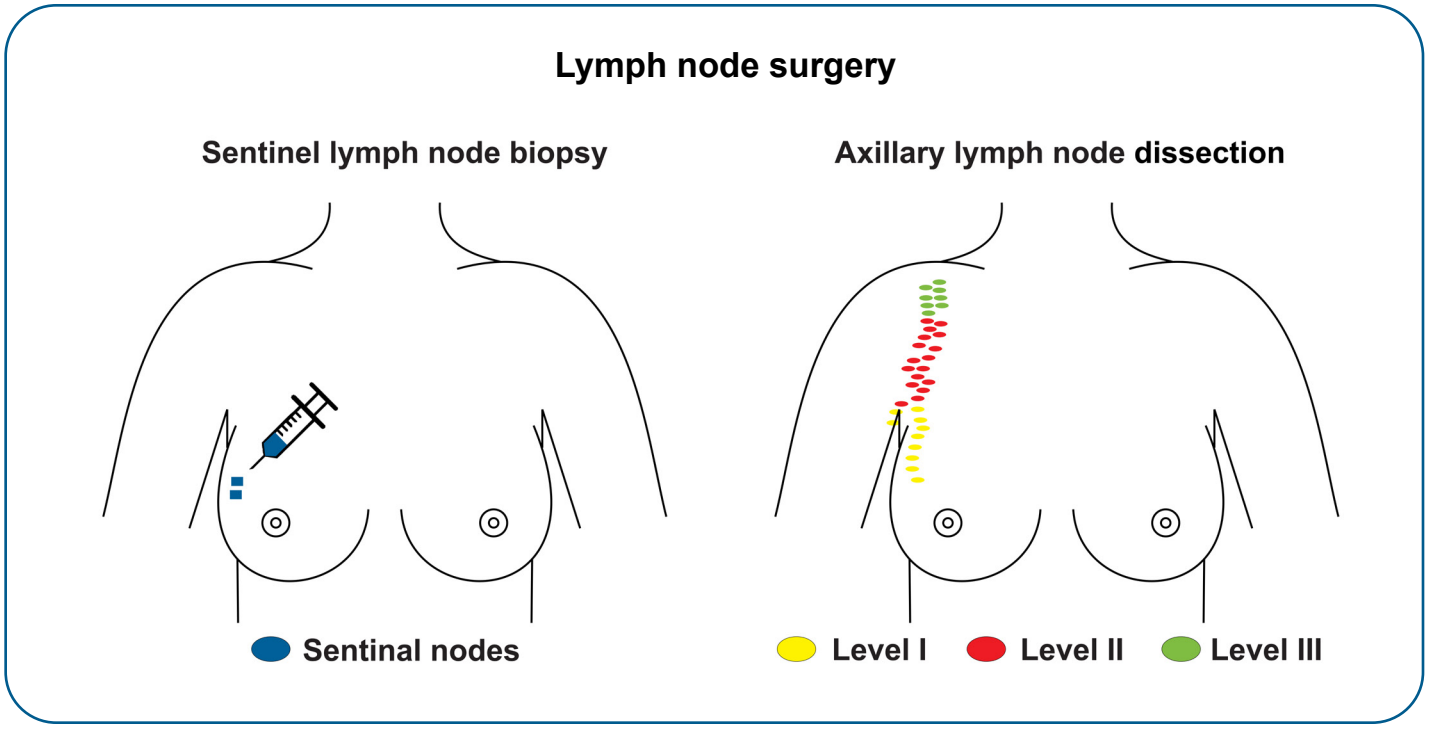
A sentinel lymph node (SLN) is the first lymph node or nodes that cancer cells are most likely to spread to from a primary tumor. Often, there is more than one sentinel lymph node. Just because these nodes are removed, it does not mean that they test positive for cancer.

To find the sentinel lymph nodes, a dye is injected into the breast. It may be a radioactive material, blue dye, or other tracer. The tracer travels through the lymph channels in the breast to the lymph nodes in the armpit. This helps the surgeon find which of the lymph nodes are the sentinel lymph nodes. The lymph nodes containing the tracer are removed and tested by a pathologist.

Axillary lymph node dissection

Axillary lymph node dissection (ALND) is surgery to remove axillary lymph nodes. This is performed after an axillary lymph node biopsy or SLNB shows cancer in the lymph nodes (called node positive). Then, an ALND will remove any other lymph nodes that contain cancer. Removing lymph nodes can cause lymphedema (fluid buildup) and other health issues.

When the axillary nodes are removed with the breast, it is called a modified radical mastectomy.



There are 3 levels of axillary lymph nodes:

- **Level I** – nodes located below the lower edge of the chest muscle
- **Level II** – nodes located underneath the chest muscle
- **Level III** – nodes located above the chest muscle near the collarbone

An ALND usually removes level I and II axillary lymph nodes. For more information about the timing of biopsies, talk with your care team.

Radiation therapy

Radiation therapy (RT) uses high-energy radiation from x-rays (photons), protons, and other sources to kill cancer cells and shrink tumors. Radiation therapy can be given alone or before or after surgery to treat or slow cancer growth. Sometimes, radiation is given with certain systemic (drug) therapies. It may be used as supportive care to help ease pain or discomfort caused by cancer. Treatment is given in small daily doses on weekdays, with weekends off.

You will see your radiation oncologist at least weekly to review treatment results and to help with side effects, such as sunburn-like rash. Ask your care team which radiation option(s) are best for your situation, if RT will be combined with chemotherapy, and what side effects to expect.

The following are types of radiation therapy used to treat breast cancer:

- **Whole breast radiation therapy (WBRT**) is used to treat the entire breast.
- **Lymph node radiation therapy** is used to treat the lymph nodes. It is also called regional nodal irradiation (RNI).

Radiation may be given to the breast and chest wall, infraclavicular region (below the collarbone), supraclavicular area (above the collarbone), or lymph nodes found inside the breast (intramammary), behind the ribcage (internal mammary), or axillary bed (armpit).

External beam radiation therapy

External beam radiation therapy (EBRT) uses a machine outside of the body called a linear accelerator (linac) to aim radiation at the whole breast (called whole breast radiation therapy or WBRT) and lymph nodes (called regional nodal irradiation or RNI).

Systemic therapy

Systemic therapy is drug therapy that works throughout the body. It is used before surgery to shrink the tumor or reduce the amount of cancer (called cancer burden).

- **Preoperative or neoadjuvant therapy** is systemic therapy given before surgery.
- **Postoperative or adjuvant therapy** is systemic therapy given after surgery.

Treatment options

Systemic treatment options are often described in the following ways:

- **Preferred therapies** have the most evidence they work better and may be safer than other therapies.
- **Other recommended therapies** may not work quite as well as preferred therapies, but they can still help treat cancer.
- **Therapies used in certain cases** work best for people with specific cancer features or health circumstances.

For a general list of systemic therapies, **see Guide 2.**

Chemotherapy

Chemotherapy kills fast-dividing cells throughout the body, including cancer cells and some normal cells. More than one chemotherapy may be used to treat inflammatory breast cancer. When only one drug is used, it's called a single agent. A combination or multi-agent regimen is the use of two or more chemotherapy drugs.

Some chemotherapy drugs are liquids given through a vein (IV) or injected under the skin with a needle. Other chemotherapy drugs may be given as a pill that is swallowed.

Some examples of chemotherapy drugs include the following:

- **Anthracyclines** include doxorubicin (Adriamycin), doxorubicin liposomal injection (Doxil), and epirubicin (Ellence).
- **Taxanes** include docetaxel, paclitaxel, and albumin-bound paclitaxel.
- **Antimetabolites** include capecitabine (Xeloda), fluorouracil, gemcitabine, and methotrexate.

Most chemotherapy is given in cycles of treatment days followed by days of rest. This allows the body to recover before the next cycle. Cycles vary in length depending on which drugs are used. The number of treatment days per cycle and the total number of cycles given also vary.

Antibody drug conjugates

An antibody drug conjugate (ADC) delivers cell-specific chemotherapy. It attaches to a protein found on the outside of the cancer cell, then enters the cell. Once inside the cell, chemotherapy is released. ADCs are given in cycles. ADC examples include ado-trastuzumab emtansine (Kadcyla), fam-trastuzumab deruxtecan-nxki (Enhertu, T-DXd), and sacituzumab govitecan-hziy (Trodelvy).

Guide 2
Systemic therapy examples

Chemotherapy examples	• Capecitabine (Xeloda) • Carboplatin • Cisplatin • Cyclophosphamide • Docetaxel (Taxotere) • Doxorubicin (Adriamycin) • Epirubicin (Ellence)	• Eribulin (Halaven) • Fluorouracil • Gemcitabine • Methotrexate • Paclitaxel • Vinorelbine
Targeted therapy examples	Antibody drug conjugate • Sacituzumab govitecan-hziy (Trodelvy)	
	CDK4/6 inhibitors • Abemaciclib (Verzenio), palbociclib (Ibrance), and ribociclib (Kisqali)	
	PARP inhibitors • Olaparib (Lynparza) and talazoparib (Talzenna)	
	PIK3CA, AKT1, PTEN, and mTOR inhibitors • Alpelisib (Piqray), capivasertib (Truqap), and everolimus (Afinitor)	
HER2-targeting therapy (antibody, inhibitor, and conjugate) examples	• Pertuzumab (Perjeta) • Trastuzumab (Herceptin) or trastuzumab substitutes (biosimilars) such as Kanjinti, Ogivri, Herzuma, Ontruzant, and Trazimera • Ado-trastuzumab emtansine (T-DM1) (Kadcyla) • Fam-trastuzumab deruxtecan-nxki (Enhertu, T-DXd)	• Lapatinib (Tykerb) • Margetuximab-cmkb (Margenza) • Neratinib (Nerlynx) • Tucatinib (Tukysa) • Phesgo as a substitute for combination therapy of trastuzumab with pertuzumab
Immunotherapy	• Pembrolizumab (Keytruda) and dostarlimab-gxly (Jemperli)	
Endocrine therapy	• Endocrine therapy can be found in **Guide 3.**	

HER2-targeted therapy

HER2 is a protein involved in normal cell growth. There might be higher amounts of HER2 in your breast cancer. If this is the case, it is called HER2-positive (HER2+) breast cancer. HER2-targeted therapy is drug therapy that treats HER2+ breast cancer. Some HER2-targeted therapy is given with chemotherapy. However, it might be used alone or in combination with endocrine therapy.

HER2-targeted therapies include:

- **HER2 antibodies** prevent HER2 growth signals from outside the cell. They also increase the attack of immune cells on cancer cells.
- **HER2 inhibitors** stop HER2 growth signals from within the cell.
- **HER2 conjugates or HER2 antibody drug conjugates (ADCs)** deliver cell-specific chemotherapy. They attach directly to HER2s then enter the cell. Once inside, chemotherapy is released.

Your heart will be monitored before and during treatment with HER2-targeted therapy. Tests will measure the left ventricular ejection fraction (LVEF), the amount of blood pumping from the left side of the heart.

Warnings about supplements and drug interactions

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
- Ginkgo biloba
- Green tea extract
- St. John's Wort
- Antioxidants

Certain medicines can also affect the ability of a drug to do its job. Antacids, heart or blood pressure medicine, and antidepressants are just some of the medicines that might interact with a systemic therapy or supportive care medicines given during systemic therapy. Therefore, it is very important to tell your care team about any medicines, vitamins, over-the-counter (OTC) drugs, herbals, or supplements you are taking.

Bring a list with you to every visit.

Other targeted therapies

This section is for inhibitors that are different from inhibitors used in HER2-targeted therapy.

CDK4/6 inhibitors

Cyclin-dependent kinase (CDK) is a cell protein that helps cells grow and divide. For hormone receptor-positive (HR+), HER2-negative (HER2-) cancer, taking a CDK4/6 inhibitor with endocrine therapy may help control cancer longer and improve survival. With all CDK4/6 regimens, those who are premenopausal must also receive ovarian ablation or suppression. CDK4/6 inhibitors include abemaciclib (Verzenio), palbociclib (Ibrance), and ribociclib (Kisqali).

PARP inhibitors

Cancer cells often become damaged. PARP is a cell protein that repairs cancer cells and allows them to survive. Blocking PARP can cause cancer cells to die. Olaparib (Lynparza) and talazoparib (Talzenna) are examples of a PARP inhibitor (PARPi).

PIK3CA, PTEN, and AKT1 inhibitors

The *PIK3CA* gene is one of the most frequently mutated genes in breast cancers. *PTEN* and *AKT* are also part of this important pathway in cancer cells and can be altered less commonly in breast cancers. A mutation or alteration in these genes can lead to increased growth of cancer cells and resistance to various treatments. Alpelisib (Piqray) is an example of a PIK3CA inhibitor and capivasertib (Truqap) is an AKT1 inhibitor.

mTOR inhibitors

mTOR is a cell protein that helps cells grow and divide. Endocrine therapy may stop working if mTOR becomes overactive. mTOR inhibitors are used to get endocrine therapy working again.

Everolimus (Afinitor) is an mTOR inhibitor. Most often, it is taken with exemestane. For some, it may be taken with fulvestrant or tamoxifen.

Immunotherapy

Immunotherapy is a type of systemic treatment that tries to reactivate the immune system against tumor cells. The immune system has many on and off switches. Tumors take advantage of off switches. Immunotherapy can block these off switches, which helps the immune system turn on. Immunotherapy can be given alone or with other types of treatment. Pembrolizumab (Keytruda) and dostarlimab-gxly (Jemperli) are examples of immunotherapy.

Endocrine therapy

Endocrine therapy blocks estrogen or progesterone to treat hormone receptor-positive (HR+) breast cancer. The endocrine system is made up of organs and tissues that produce hormones. Hormones are natural chemicals released into the bloodstream.

There are 4 hormones that might be targeted in endocrine therapy:

- **Estrogen** is made mainly by the ovaries, but is also made by other tissues in the body such as fat tissue.
- **Progesterone** is made mainly by the ovaries.
- **Luteinizing hormone-releasing hormone (LHRH)** is made by a part of the brain called the hypothalamus. It tells the ovaries to make estrogen and progesterone and testicles to make testosterone. LHRH is also called gonadotropin-releasing hormone (GnRH).
- **Androgen** is made by the adrenal glands, testicles, and ovaries.

Hormones may cause breast cancer to grow. Endocrine therapy will stop your body from making hormones or it will block what hormones do in the body. This can slow tumor growth or shrink the tumor for a period of time.

Endocrine therapy is sometimes called hormone therapy or anti-estrogen. It is not the same as hormone replacement therapy (HRT) used for menopause.

Endocrine therapy will suppress the production of hormones and affect one's ability to become pregnant during treatment. Those who want to have children in the future should be referred to a fertility specialist before starting endocrine therapy.

Types of endocrine therapy can be found in **Guide 3.**

Testosterone

For those assigned male at birth whose bodies continue to make testosterone, endocrine therapy includes tamoxifen or an aromatase inhibitor (AI) with a testosterone-suppressing therapy.

Premenopause

If you have menstrual periods, you are in premenopause. In premenopause, the ovaries are the main source of estrogen and progesterone.

GnRH agonists may be used to temporarily induce menopause for those in premenopause. A combination of GnRH agonists and tamoxifen or aromatase inhibitors may be considered as endocrine therapy for those in premenopause. Ovarian suppression or ablation is frequently considered for higher risk ER+ breast cancers.

Menopause

In menopause, the ovaries permanently stop producing hormones and menstrual periods stop. Estrogen and progesterone levels are low, but the adrenal glands, liver, and body fat continue to make small amounts of estrogen. If you don’t have periods, a test

using a blood sample may be used to confirm your status.

Cancer treatment can cause a temporary menopause. If you stopped having periods due to removal of your uterus (hysterectomy) but you still have your ovaries, then you should have your menopausal status confirmed with a blood test. If both ovaries have been removed (with or without your uterus), you are in menopause.

Guide 3
Endocrine therapy types

Bilateral oophorectomy	Surgery to remove both ovaries.
Ovarian ablation	Radiation to permanently stop the ovaries from making hormones.
Ovarian or testosterone suppression	Drugs to temporarily stop the ovaries or testicles from making hormones such as LHRH and GnRH. • LHRH agonists include goserelin (Zoladex) and leuprolide (Lupron Depot). These are injected every 4 or 12 weeks. They do not affect estrogen made by the ovaries. • GnRH agonists might be used to suppress ovarian hormone or testosterone production.
Aromatase inhibitors (AIs)	Drugs to stop a type of hormone called androgen from changing into estrogen by interfering with an enzyme called aromatase. They do not affect estrogen made by the ovaries. Nonsteroidal AIs include anastrozole (Arimidex) and letrozole (Femara). Exemestane (Aromasin) is a steroidal AI.
Estrogen receptor (ER) modulators or anti-estrogens	• **Selective estrogen receptor modulators (SERMs)** block estrogen from attaching to hormone receptors. Tamoxifen and toremifene (Fareston) are SERMs. • **Selective estrogen receptor degraders (SERDs)** block and destroy estrogen receptors. Fulvestrant (Faslodex) and elacestrant (Orserdu) are SERDs.
Hormones	Hormone examples include ethinyl estradiol, fluoxymesterone, and megestrol acetate (Megace).

Bone-strengthening therapy

Medicines that target the bones may be given to help relieve bone pain or reduce the risk of bone-related problems. Some medicines work by slowing or stopping bone breakdown, while others help increase bone thickness.

When breast cancer spreads to distant sites, it may metastasize in your bones. This puts your bones at risk for injury and disease. Such problems include fractures, bone pain, high calcium levels in the blood, and squeezing (compression) of the spinal cord. Some treatments for breast cancer, like aromatase inhibitors or GnRH agonists, can cause bone loss (osteoporosis), which puts you at an increased risk for fractures.

Drugs used to prevent bone loss and fractures:

- Oral bisphosphonates
- Zoledronic acid (Zometa)
- Pamidronate (Aredia)
- Denosumab (Prolia)

Drugs used to treat bone metastases:

- Zoledronic acid (Zometa)
- Pamidronate (Aredia)
- Denosumab (Xgeva)

You may be screened for bone weakness (osteoporosis) using a bone mineral density test. This measures how much calcium and other minerals are in your bones. It is also called a dual-energy x-ray absorptiometry (DEXA) scan and is painless. Bone mineral density tests look for osteoporosis and help predict your risk for bone fractures.

Standard of care is the best known way to treat a particular disease based on past clinical trials. There may be more than one treatment regimen that is considered standard of care. Ask your care team what treatment options are available and if a clinical trial might be right for you.

Zoledronic acid, pamidronate, and denosumab

Zoledronic acid, pamidronate, and denosumab are used to prevent bone loss (osteoporosis) and fractures caused by endocrine therapy. Zoledronic acid and denosumab are also used in those with metastatic inflammatory breast cancer who have bone metastases to help reduce the likelihood of fractures, pain, or other complications arising from cancer in bone. You might have blood tests to monitor kidney function, calcium levels, and magnesium levels. A calcium and vitamin D supplement will likely be recommended by your doctor.

Let your dentist know if you are taking any of these medicines. Also, ask your care team how these medicines might affect your teeth and jaw. Osteonecrosis, or bone tissue death of the jaw, is a rare but serious side effect. Tell your care team about any planned trips to the dentist and surgeries or dental procedures that might also affect the jawbone. It will be important to take care of your teeth and to see a dentist before starting treatment with any of these drugs.

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

Clinical trials

A clinical trial is a type of medical research study. After being developed and tested in a lab, potential new ways of treating 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 and are done in phases.

- **Phase 1** trials study the safety and side effects of an investigational drug or treatment approach.
- **Phase 2** trials study how well the drug or approach works against a specific type of cancer.
- **Phase 3** trials test the drug or approach against a standard treatment. If the results are good, it may be approved by the FDA.
- **Phase 4** trials study the safety and benefit of an FDA-approved treatment.

Who can enroll?

It depends on the clinical trial's rules, called eligibility criteria. The rules may be about age, cancer type and stage, treatment history, or general health. They 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 research team. This group of experts 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 it with people you trust. Keep in mind that you can leave and seek treatment outside of the clinical trial at any time.

Will I get a placebo?

Placebos (inactive versions of real medicines) are almost never used alone in cancer clinical trials. It is common to receive either a placebo with a standard treatment, or a new drug with a standard treatment. You will be informed, verbally and in writing, if a placebo is part of a clinical trial before you enroll.

Are clinical trials free?

There is no fee to enroll in a clinical trial. The study sponsor pays for research-related costs, including the study drug. But you may need to pay for other services, like transportation or childcare, due to extra appointments. During the trial, you will continue to receive standard cancer care. This care is often covered by insurance.

Key points

- Inflammatory breast cancer (IBC) is treated with systemic therapy to shrink the tumor, followed by a mastectomy, and radiation therapy. Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. Systemic treatment is based on estrogen receptor (ER), progesterone receptor (PR), and HER2 expression.
- Radiation therapy (RT) uses high-energy radiation from x-rays (photons, electrons), protons, and other sources to kill cancer cells.
- Some breast cancers grow because of estrogen. These cancers are estrogen receptor-positive (ER+) and are often treated with endocrine therapy to reduce the risk of cancer recurrence.
- A clinical trial is a type of research that studies a treatment to see how safe it is and how well it works.

Questions to ask

- What is your experience treating inflammatory breast cancer?
- How many breast cancer surgeries have you done?
- What treatment will I have before and after surgery?
- Is there a social worker or someone who can help me decide about treatment?
- Who will coordinate my care?

5
Supportive care

Supportive care helps manage the symptoms of inflammatory breast cancer (IBC) and the side effects of treatment. This chapter discusses possible side effects.

What is supportive care?

Supportive care helps improve your quality of life during and after cancer treatment. The goal is to prevent or manage side effects and symptoms, like pain, nausea, and fatigue. It also addresses the mental, social, and spiritual concerns faced by those with cancer.

Supportive care is available to everyone with cancer and their families, not just those at the end of life. Palliative care is another name for supportive care.

Supportive care can also help with:

- Making treatment decisions
- Coordinating your care
- Paying for care
- Planning for advanced care and end of life

Side effects

All cancer treatments can cause unwanted health issues 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 just be unpleasant. Others may be harmful to one's health. Treatment can cause several side effects. Some are very serious. Tell your care team about any new or worsening symptoms.

Blood clots

Cancer or cancer treatment can cause blood clots to form. This can block blood flow and oxygen in the body. Blood clots can break loose and travel to other parts of the body causing breathing problems, stroke, or other health issues. Venous thromboembolism (VTE) refers to blood clots in the veins.

Bone health

Breast cancer may spread to your bones. Some breast cancer treatments may also weaken your bones. Both can put your bones at increased risk for injury and disease. Such problems include bone fractures, bone pain, and squeezing (compression) of the spinal cord. High levels of calcium in the blood, called hypercalcemia, may also occur.

Medicine may be given to help relieve bone pain and reduce the risk of other bone problems. Some medicines work by slowing or stopping bone breakdown, while others help increase bone thickness. It is recommended that you take calcium and vitamin D with these bone health medicines. Talk to your care team first.

Diarrhea

Diarrhea is frequent and watery bowel movements. Your care team will tell you how to manage diarrhea. It is important to drink lots of fluids.

Distress

Depression, anxiety, and sleeping issues are common and are a normal part of cancer diagnosis. Talk to your care team and with those whom you feel most comfortable about how you are feeling. There are services, people, and medicine that can help you.

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. 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, acupuncture, and massage therapy can help. You might be referred to a nutritionist or dietitian to help with fatigue.

Hair loss

Chemotherapy may cause hair loss (alopecia) all over your body—not just on your scalp. Some chemotherapy drugs are more likely than others to cause hair loss. Dosage might also affect the amount of hair loss. Most of the time, hair loss from chemotherapy is temporary. Hair often regrows 3 to 6 months after treatment ends. Your hair may be a different shade or texture at first. Scalp cooling (or scalp hypothermia) might help lessen hair loss in those receiving certain types of chemotherapy.

All cancer treatments can cause unwanted health issues called side effects. It is important to tell your care team about all of your side effects so they can be managed.

Infections

Infections occur more frequently and are more severe in those with a weakened immune system. Drug treatment for breast cancer can weaken the body's natural defense against infections. If not treated early, infections can be fatal.

Neutropenia, a low number of white blood cells, can lead to frequent or severe infections. When someone with neutropenia also develops a fever, it is called febrile neutropenia (FN). With FN, your risk of infection may be higher than normal. This is because a low number of white blood cells leads to a reduced ability to fight infections. FN is a side effect of some types of systemic therapy.

Loss of appetite

Sometimes side effects from surgery, cancer, or its treatment 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 weight.

Low blood cell counts

Some cancer treatments can cause low blood cell counts.

- **Anemia** is a condition where your body does not have enough healthy red blood cells, resulting in less oxygen being carried to your body tissues. You might tire easily or feel short of breath if you are anemic.
- **Neutropenia** is a decrease in neutrophils, the most common type of white blood cell. This puts you at risk for infection.
- **Thrombocytopenia** is a condition where there are not enough platelets found in the blood. This puts you at risk for bleeding.

Lymphedema

Lymphedema is a condition in which lymph fluid builds up in tissues and causes swelling. It may be caused when part of the lymph system is damaged or blocked, such as during surgery to remove lymph nodes, or by radiation therapy. Cancers that block lymph vessels can also cause lymphedema. Swelling usually develops slowly over time. It may develop during treatment, or it may start years after treatment. If you have lymphedema, you may be referred to an expert in lymphedema management. The swelling may be reduced by exercise, massage, compression devices, and other means.

Nausea and vomiting

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

Neurocognitive or neuropsychological effects

Some treatments can damage the nervous system (neurotoxicity) causing problems with concentration and memory. Survivors are at risk for neurotoxicity and might be recommended for neuropsychological testing. Neuropsychology looks at how the health of your brain affects your thinking and behavior. Neuropsychological testing can identify your limits and doctors can create a plan to help with these limits.

Neuropathy and neurotoxicity

Some treatments can damage the nervous system (neurotoxicity) causing neuropathy and problems with concentration, memory, and thinking. 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 with additional cycles of treatment. Most of the time, neuropathy improves gradually and may eventually go away after treatment.

Organ issues

Treatment might cause your kidneys, liver, heart, and pancreas to not work as well as they should.

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.

Palliative care

Palliative care is appropriate for anyone, regardless of age, cancer stage, or the need for other therapies. It focuses on physical, emotional, social, and spiritual needs that affect quality of life.

Quality of life

Cancer and its treatment can affect your overall well-being or quality of life (QOL). For more information on quality of life, see *NCCN Guidelines for Patients: Palliative Care* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.

Late effects

Late effects are side effects that occur months or years after a disease is diagnosed or after treatment has ended. Late effects may be caused by cancer or cancer treatment. They may include physical, mental, and social health concerns, and second cancers. The sooner late effects are treated the better. Ask the care team about what late effects could occur. This will help you know what to look for.

Survivorship

A person is a cancer survivor from the time of diagnosis until the end of life. After treatment, your health will be monitored for side effects of treatment and the return of cancer. This is part of your survivorship care plan. It is important to keep any follow-up care and imaging test appointments. Seek good routine medical care, including regular doctor visits for preventive care and cancer screening.

Supportive care resources

More information on supportive care is available at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.

A personalized survivorship care plan will contain a summary of possible long-term effects of treatment called late effects and a list of follow-up tests. Find out how your primary care provider will coordinate with specialists for your follow-up care.

Tell your care team about any symptoms such as headaches, menstrual spotting between periods or new onset of spotting after menopause (if prior tamoxifen), shortness of breath that you notice with walking, or bone pain. Side effects can be managed. Continue to take all medicine such as endocrine therapy exactly as prescribed and do not miss or skip doses.

Key points

- Supportive care is health care that relieves symptoms caused by treatment and improves quality of life. Supportive care is always given.
- All cancer treatments can cause unwanted health issues 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 are very rare. Ask your care team what to expect.
- Tell your care team about any new or worsening symptoms.

Questions to ask

- Who will coordinate my care?
- Who should I call when I have questions or notice changes in my condition?
- How long should I wait if I notice changes in my condition?
- What should I do on weekends and other non-office hours?
- Will my care team be able to communicate with the emergency department or urgent care team?

6
Treatment before surgery

Since inflammatory breast cancer (IBC) spreads quickly, treatment starts with systemic (drug) therapy to stop the spread of cancer. Together, you and your care team will choose a treatment plan that is best for you.

How is IBC treated?

IBC is treated with systemic therapy to shrink the tumor, followed by surgery to remove the breast and lymph nodes (modified radical mastectomy), and then radiation therapy to the chest wall. Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue.

If you choose breast reconstruction after a mastectomy with radiation, then delayed breast reconstruction is recommended. Radiation can slow the healing process. Therefore, it is better to wait until you have healed from radiation therapy before having breast reconstruction.

Like other breast cancers, IBC can develop in those assigned male at birth.

Where does treatment start?

Treatment for IBC starts with preoperative systemic (drug) therapy. Preoperative therapy is treatment given before surgery. It is based on HER2 and hormone receptor (HR) expression status of the tumor cells.

Cancer can still progress during preoperative systemic therapy. If cancer progresses, then another systemic (drug) therapy will be given.

Treatment before surgery is described next.

"My 3-month-old son stopped nursing on my left breast and it was swollen and painful. The doctor said it was mastitis, but this didn't feel the same as when I'd had that before. Even with the antibiotic, it didn't improve. An ultrasound showed a questionable area in that breast and a biopsy confirmed inflammatory breast cancer (IBC)."

HER2-

In HER2-negative (HER2-) breast cancer, tumor cells do not express increased levels of HER2. Chemotherapy is used to treat HER- cancer. It might include another systemic therapy. Systemic therapy options for HER2- can be found in **Guide 4.**

Triple-negative breast cancer

In triple-negative breast cancer (TNBC), the tumor tested negative for HER2, estrogen receptors, and progesterone receptors. It is written as ER- and/or PR- with HER2-. This cancer is treated with chemotherapy and other systemic therapies found in **Guide 4.**

Guide 4
Systemic therapy options: HER2- cancer

Preferred	• Doxorubicin and cyclophosphamide (AC) with paclitaxel • Docetaxel and cyclophosphamide (TC) • Adjuvant only: Olaparib, if germline *BRCA1* or *BRCA2* mutations Triple-negative breast cancer (TNBC): • Preoperative pembrolizumab with carboplatin and paclitaxel, followed by preoperative pembrolizumab and cyclophosphamide with doxorubicin or epirubicin, followed by adjuvant pembrolizumab • If residual disease after preoperative therapy with taxane-, alkylator-, and anthracycline-based chemotherapy, then capecitabine
Other recommended	• Doxorubicin and cyclophosphamide (AC) with docetaxel • Epirubicin and cyclophosphamide (EC) • Docetaxel, doxorubicin, and cyclophosphamide (TAC) TNBC: • Options listed above • Paclitaxel with carboplatin or docetaxel with carboplatin
Used in some cases	• Doxorubicin and cyclophosphamide (AC) • Cyclophosphamide, methotrexate, and fluorouracil (CMF) • Doxorubicin and cyclophosphamide (AC) with paclitaxel TNBC: • Options listed above • Docetaxel, carboplatin, and pembrolizumab (preoperative only) • Doxorubicin and cyclophosphamide (AC) with carboplatin and docetaxel • Capecitabine (maintenance therapy after adjuvant chemotherapy)
Notes	Other taxanes (ie, docetaxel, paclitaxel, albumin-bound paclitaxel) might be substituted in some cases

HER2+

Inflammatory breast cancers often produce greater than normal amounts of HER2. If the tumor is HER2-positive (HER2+), then it is treated with HER2-targeted therapy found in **Guide 5.**

Triple-positive breast cancer

In triple-positive breast cancer, tumor cells have estrogen receptors (ER+), progesterone receptors (PR+), and a larger than normal number of HER2 receptors on their surface. It is treated with HER2-targeted therapy and endocrine therapy. A CDK4/6 inhibitor may be added. **See Guide 5.**

Guide 5
HER2-targeted therapy options: HER2+ cancer

Preferred	• Paclitaxel and trastuzumab • Docetaxel, carboplatin, and trastuzumab (TCH) • Docetaxel, carboplatin, trastuzumab, and pertuzumab (TCHP) If no residual disease after preoperative therapy or no preoperative therapy: • Complete up to 1 year of HER2-targeted therapy with trastuzumab. Pertuzumab might be added. If residual disease after preoperative therapy: • Ado-trastuzumab emtansine alone. If ado-trastuzumab emtansine discontinued for toxicity, then trastuzumab with or without pertuzumab to complete one year of therapy.
Other recommended	• Doxorubicin with cyclophosphamide (AC) followed by docetaxel with trastuzumab • Doxorubicin with cyclophosphamide (AC) followed by docetaxel with trastuzumab and pertuzumab
Used in some cases	• Docetaxel, cyclophosphamide, and trastuzumab • Doxorubicin and cyclophosphamide (AC) followed by docetaxel and trastuzumab, followed by paclitaxel with trastuzumab • Doxorubicin and cyclophosphamide (AC) followed by docetaxel, trastuzumab, and pertuzumab, followed by paclitaxel, trastuzumab, and pertuzumab • Neratinib (adjuvant only) • Paclitaxel with trastuzumab and pertuzumab • Ado-trastuzumab emtansine (TDM-1) (adjuvant only)
Notes	Other taxanes (ie, docetaxel, paclitaxel, albumin-bound paclitaxel) might be substituted in some cases

Treatment response

The next treatment is based on how the tumor responded to preoperative systemic therapy. It is called preoperative (before surgery) treatment because the goal is surgery, when possible. Systemic therapy given after surgery is called adjuvant therapy. Adjuvant systemic therapy may be given after surgery to reduce the chance of cancer recurrence.

A physical exam and imaging tests should be done to assess how the cancer responded to preoperative systemic therapy. Treatment will be based on if the tumor can be removed with surgery or if the tumor did not shrink enough to be removed with surgery.

Surgery is an option

If surgery is possible, then a total mastectomy with level I and II axillary lymph node dissection is the recommended option. Because IBC usually involves a large portion of the breast, lumpectomy is not typically an option. You may choose a delayed breast reconstruction as part of the mastectomy. Radiation therapy (RT) is part of this treatment.

After the mastectomy you will finish chemotherapy if you didn't complete the course before surgery and have radiation therapy. Tumors that are estrogen receptor-positive (ER+), progesterone receptor-positive (PR+), or both (ER+/PR+) are treated with endocrine therapy.

If the tumor is HER2+, then you will complete up to one year of HER2-targeted therapy. This may be given with RT and endocrine therapy.

- For a list of systemic therapies that target HER2+, **see Guide 5.**
- For a list of endocrine therapy options, **see Guide 6.**

Surgery is not an option

Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. If the cancer is not responding to systemic therapy, then radiation may be considered to try to make the cancer resectable (able to be removed with surgery). The goal of treatment is to reduce the amount of cancer. Talk with your care team about your goals of treatment and your treatment preferences. Your wishes are always important.

- For a list of systemic therapies for HER2- cancer, **see Guide 4.**
- For a list of systemic therapies that target HER2+ cancer, **see Guide 5.**

Guide 6
Endocrine therapy options: ER+ cancer

Premenopause at diagnosis	Option 1 • Tamoxifen alone or with ovarian suppression or ablation for 5 years →	• After 5 years, if in postmenopause, then an aromatase inhibitor for 5 years or consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen) • After 5 years, if still in premenopause, then consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen) or stop endocrine therapy
	Option 2 (preferred for those with IBC) • Aromatase inhibitor for 5 years with ovarian suppression or ablation, then consider aromatase inhibitor for an additional 3 to 5 years for a total of 7.5 to 10 years	
Menopause at diagnosis	Option 1 • Aromatase inhibitor for 5 years, then consider aromatase inhibitor for 3 to 5 more years (for a total of 7.5 to 10 years). Preferred for those with IBC • Aromatase inhibitor for 2 to 3 years, then tamoxifen to complete 5 years total of endocrine therapy • Tamoxifen for 2 to 3 years, then an aromatase inhibitor to complete 5 years of endocrine therapy • Tamoxifen for 2 to 3 years, then up to 5 years of an aromatase inhibitor	
	Option 2 • Tamoxifen for 4.5 to 6 years, then an aromatase inhibitor for 5 years or consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen)	
	Option 3 • For those who can't have aromatase inhibitors or who don't want aromatase inhibitors, take tamoxifen for 5 years or consider tamoxifen for up to 10 years	

Follow-up care

After treatment, you will receive follow-up care. During this time, your health will be monitored for side effects of treatment (late effects) and the possible return of cancer (recurrence). It is important to keep any follow-up care and imaging test appointments. Seek routine medical care, including regular doctor visits for preventive care and cancer screening. Find out who will coordinate with specialists for your follow-up care.

Tell your care team about any symptoms such as headaches, menstrual spotting between periods or new onset of spotting after menopause (if prior tamoxifen use), shortness of breath while walking, or bone pain. Side effects can be managed. Continue to take all medicine such as endocrine therapy exactly as prescribed and do not miss or skip doses.

Follow-up care can be found in **Guide 7.**

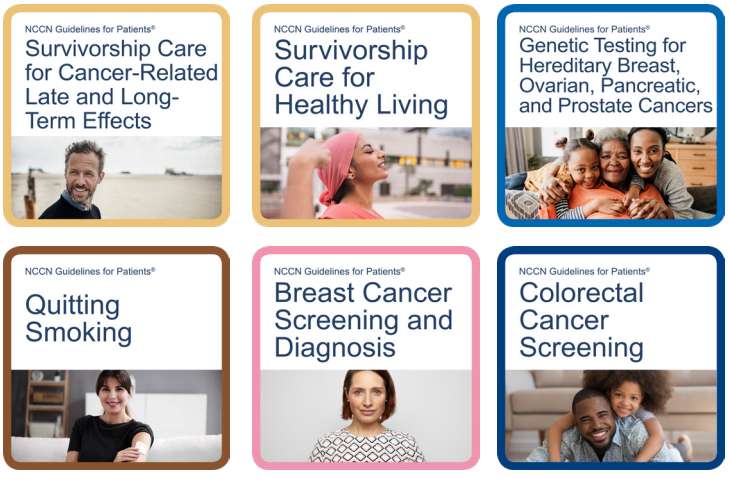
Guide 7 Follow-up care
Medical history and physical exam 1 to 4 times per year as needed for 5 years, then every year
Screen for distress, anxiety, depression, and changes in family history
Genetic testing and referral to genetic counseling, as needed
Monitor for lymphedema and refer for lymphedema management, as needed
Mammogram every 12 months (not needed for the side that underwent a mastectomy or on reconstructed breast)
Discuss any issues or questions related to fertility, birth control, or sexual health
Heart tests, as needed
Information on risk of future health issues (comorbidities)
If signs and symptoms of metastases, then blood and imaging tests
If taking endocrine therapy, continue to take endocrine therapy. Do not miss or skip doses
Annual gynecology exam (depending on age)
Bone density tests for those on an aromatase inhibitor or who later have ovarian issues
Maintain an ideal body weight (BMI of 20 to 25), be active, eat a mostly plant-based diet, exercise, limit alcohol, and quit smoking/vaping nicotine

Key points

- Treatment for inflammatory breast cancer (IBC) starts with preoperative systemic therapy. Preoperative therapy is treatment given before surgery. It is based on hormone receptor (HR) and HER2 expression status of the tumor cells.
- Treatment after surgery is called adjuvant treatment. It often includes systemic therapy and radiation therapy (RT). It is given to kill any remaining cancer cells and to help prevent the return of cancer.
- Adjuvant treatment is based on the stage, histology, and hormone receptor (HR) status. Histology is the study of the anatomy (structure) of cells, tissues, and organs under a microscope.
- Inflammatory breast cancers often produce greater than normal amounts of HER2. If the tumor is HER2+, then HER2-targeted therapy is given.
- In hormone receptor HR-positive (HR+) cancer, tumor cells test positive for estrogen receptors (ER+), progesterone receptors (PR+), or both (ER+/PR+). Endocrine therapy is used to treat HR+ cancer.
- If chemotherapy is given, it is given before radiation therapy and endocrine therapy.
- It is important to keep follow-up visits and imaging test appointments. Seek good routine medical care, including preventive care and cancer screenings. Continue to take all medicines as prescribed.

Follow-up care resources

More information on supportive care is available at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



Questions to ask

- What treatments do you recommend and why?
- Does the order of treatments matter?
- Which option is proven to work best for my type of cancer, age, overall health, and other factors?
- Are there resources to help me pay for treatment or other care I may need?
- Am I a candidate for a clinical trial?

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
The breast after surgery

The look of your breast after surgery will depend on the type of surgery, the amount of tissue removed, and other factors such as your body type, age, and size and shape of the area before surgery. You might consider speaking with a plastic surgeon before surgery. This chapter offers more information on flat closure and breast reconstruction.

The recovery time for each procedure differs. This can affect your ability to return to work or participate in activities. You might consider speaking with a plastic surgeon before surgery to discuss your options and what to expect. A plastic surgeon performs breast reconstruction.

Flat closure

In a total mastectomy with a flat closure, the entire breast, including nipple, extra skin, fat, and other tissue in the breast area, is removed. The remaining skin is tightened and sewn together. No breast mound is created, and no implant is added. The scar will be slightly raised and differ in color than the surrounding skin. A flat closure is not completely flat or smooth. The result varies from person to person. Ask to look at pictures from flat closures so you know what to expect.

You might decide to have a flat closure procedure later or after having breast implants removed. Talk to your care team to learn more.

Breast reconstruction

Breast reconstruction is surgery to rebuild the shape and look of the breast after a mastectomy. In many cases, breast reconstruction involves a staged approach. It might require more than one procedure.

You may have a choice as to when breast reconstruction is done. Immediate reconstruction is finished within hours after removing the breast. Delayed reconstruction can occur months or years after the cancer surgery. Reconstruction can also be done in stages, with part of the reconstruction done at the time of the original cancer surgery and finished with another surgery later. A plastic surgeon performs breast reconstruction.

Breasts can be reconstructed with implants and flaps. All methods are generally safe, but as with any surgery, there are risks. Ask your treatment team for a complete list of side effects.

Implants

Breast implants are small bags filled with salt water, silicone gel, or both. They are placed under the breast skin or muscle to look like a new breast following a mastectomy. A balloon-like device, called an expander, may be used first to stretch out tissue. It will be placed under your skin or muscle and enlarged every few weeks for 2 to 3 months. When your skin is stretched to the proper size, you will have surgery to place the final implant.

Implants have a small risk of leaking or causing other issues. You may feel pain from the implant or expander. Scar tissue or tissue death can occur.

Flaps

Breasts can be remade using skin from other parts of your body, known as flaps. These flaps are taken from the abdomen, buttocks, thigh, or from under the shoulder blade. Some flaps are completely removed and then sewn in place. Other flaps stay attached to your body but are slid over and sewn into place.

There are several risks associated with flaps, including death of fat in the flap, which can cause lumps. A hernia may result from muscle weakness. Problems are more likely to occur among those who have diabetes or who smoke.

Implants and flaps

Some breasts are reconstructed with both implants and flaps. This method may give the reconstructed breast more volume to match the other breast. For any reconstruction, you may need surgery on your remaining breast to match the size and shape of both breasts.

Nipple replacement

Like your breast, a nipple can be remade. To rebuild a nipple, a plastic surgeon can use surrounding tissues. Also, nipples can be remade with tissue from the thigh or the other nipple. Tissue can be darkened with a tattoo to look more like a nipple. It is important to know that while you can remake something to look like a nipple, it will not have the sensation of your real nipple. Also, a tattoo can be done to look like a nipple without having to take tissue from another part of the body.

What to consider

Some things to consider when deciding to have flat closure or reconstruction after mastectomy:

- **Your desire** – You may have a strong feeling towards flat closure or one form of reconstruction after being given the options. Breast reconstruction should be a shared decision between you and your care team. Make your wishes known.
- **Health issues** – You may have health issues such as diabetes or a blood disorder that might affect or delay healing or make longer procedures unsafe.
- **Tobacco use** – Smoking delays wound healing and can cause mastectomy flap death (necrosis), nipple-areola complex (NAC) necrosis in a nipple-sparing mastectomy, infection, and failure of implant-based reconstruction. In free flap reconstruction, smoking increases the risk of complications. You are encouraged to stop smoking prior to reconstruction.
- **Breast size and shape** – There are limits to the available sizes of breast implants. Very large breasts or breasts that lack tone or droop (called ptosis) might be difficult to match. Breast reduction surgery might be an option.
- **Body mass index (BMI)** – Those with an elevated BMI have an increased risk of infections and complications with breast reconstruction.

Key points

- Flat closure is done after a mastectomy. The skin is tightened and sewn together without the addition of a breast implant.
- Breast reconstruction is surgery to rebuild the shape and look of the breast.
- Breasts that are fully removed in a mastectomy can be remade with breast implants, flaps, or both.
- Removed nipples can be remade with body tissue and/or tattooing.

Questions to ask

- What will my breast look like after surgery?
- How long will it take for me to recover from surgery and what should I expect?
- What options are available if I do not like the look of my breast after surgery?
- What treatment will I have before, during, or after surgery?
- How much pain will I be in and what will be done to manage my pain?

If you smoke or vape, seek help to quit

Smoking or vaping nicotine greatly increases your chances of having side effects during and after surgery. Smoking and vaping can limit how well cancer treatment works and prevent wound healing. They also increase your chances of developing other cancers. Cannabis use might also affect the amount of anesthesia used during surgery.

Nicotine is the chemical in tobacco that makes you want to keep smoking and vaping. Nicotine withdrawal is challenging for most people who smoke or vape. The stress of having cancer may make it even harder to quit. If you smoke or vape, ask your care team about counseling and medicines to help you quit.

More information can be found in the *NCCN Guidelines for Patients: Quitting Smoking* at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.

For online support, try these websites:

- SmokeFree.gov
- CDC.gov/tobacco

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Other resources

Want to learn more? Here's how you can get additional help.

What else to know

This book can help improve your cancer care. It plainly explains expert recommendations and suggests questions to ask your care team. But, it's not the only resource that you have.

You're welcome to receive as much information and help as you need. Many people are interested in learning more about:

- The details of treatment
- Being a part of a care team
- Getting financial help
- Finding an oncologist who is an expert in inflammatory breast cancer (IBC)
- Coping with side effects

What else to do

Your health care center can help you with next steps. They often have on-site resources to help meet your needs and find answers to your questions. Health care centers can also inform you of resources in your community.

In addition to help from your providers, the resources listed in the next section provide support for many people like yourself. Look through the list and visit the provided websites to learn more about these organizations.

Where to get help

Bone Marrow & Cancer Foundation
bonemarrow.org

Breast Cancer Alliance
Breastcanceralliance.org

Breastcancer.org
Breastcancer.org

CanCare, Inc.
Cancare.org

Cancer*Care*
Cancercare.org

Cancer Hope Network
cancerhopenetwork.org

Cancer Survivor Care
Cancersurvivorcare.org

DiepC Foundation
diepcfoundation.org

FORCE: Facing Our Risk of Cancer Empowered
facingourrisk.org

GPAC Global Patient Advocacy Coalition
GPACunited.org

HIS Breast Cancer Awareness
Hisbreastcancer.org

Imerman Angels
Imermanangels.org

Inflammatory Breast Cancer Research Foundation
ibcresearch.org

Lobular Breast Cancer Alliance
lobularbreastcancer.org

MedlinePlus
medlineplus.gov

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

National Coalition for Cancer Survivorship
canceradvocacy.org

Sharsheret
sharsheret.org

Triage Cancer
triagecancer.org

Unite for HER
uniteforher.org

Young Survival Coalition (YSC)
Youngsurvival.org

Questions to ask about resources and support

- Who can I talk to about help with housing, food, and other basic needs?
- What help is available for transportation, childcare, and home care?
- What other services are available to me and my caregivers?
- How can I connect with others and build a support system?
- Who can I talk to if I don't feel safe at home, at work, or in my neighborhood?

"When I was diagnosed with inflammatory breast cancer (IBC) the doctor told me to stay away from the internet, but I wanted to learn all I could. You need to learn so you can advocate for yourself. Not everyone has experience treating this disease. Just be sure to go to reputable sources for information."

Words to know

adjuvant therapy
Treatment that is given to lower the chances of the cancer returning.

anti-estrogen
A drug that stops estrogen from attaching to cells.

areola
A darker, round area of skin on the breast around the nipple.

aromatase inhibitor (AI)
A drug that lowers the level of estrogen in the body.

axillary lymph node (ALN)
A small disease-fighting structure that is near the armpit (axilla).

axillary lymph node dissection (ALND)
An operation that removes the disease-fighting structures (lymph nodes) near the armpit.

bilateral diagnostic mammogram
Pictures of the insides of both breasts that are made from a set of x-rays.

bilateral oophorectomy
An operation that removes both ovaries.

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

bone mineral density
A test that measures the strength of bones.

bone scan
A test that makes pictures of bones to assess for health problems.

breast implant
A small bag filled with salt water, gel, or both that is used to remake breasts.

breast reconstruction
An operation that creates new breasts.

cancer stage
A rating of the outlook of a cancer based on its growth and spread.

carcinoma
A cancer of cells that line the inner or outer surfaces of the body.

chest wall
The layer of muscle, bone, and fat that protects the vital organs.

clinical breast exam (CBE)
Touching of a breast by a health expert to feel for diseases.

clinical stage (c)
The rating of the extent of cancer before treatment is started.

clinical trial
A type of research that assesses health tests or treatments.

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

core needle biopsy (CNB)
A procedure that removes tissue samples with a hollow needle. Also called core biopsy.

deoxyribonucleic acid (DNA)
A chain of chemicals in cells that contains coded instructions for making and controlling cells.

diagnostic bilateral mammogram
Pictures of the insides of both breasts that are made from a set of x-rays.

duct
A tube-shaped structure through which milk travels to the nipple.

endocrine therapy
A cancer treatment that stops the making or action of estrogen. Also called hormone therapy.

estrogen
A hormone that plays a role in breast development.

estrogen receptor (ER)
A protein inside cells that binds to estrogen.

estrogen receptor-negative (ER-)
A type of breast cancer that doesn't use estrogen to grow.

estrogen receptor-positive (ER+)
A type of breast cancer that uses estrogen to grow.

fertility specialist
An expert who helps people have babies.

fine-needle aspiration (FNA)
A procedure that removes tissue samples with a very thin needle.

flat closure
Procedure done after a mastectomy in which the skin is tightened and sewn together without the addition of a breast implant.

gene
Coded instructions in cells for making new cells and controlling how cells behave.

genetic counseling
Expert guidance on the chance for a disease that is passed down in families.

hereditary breast cancer
Breast cancer likely caused by abnormal genes passed down from biological parent to child.

histology
The structure of cells, tissue, and organs as viewed under a microscope.

hormone
A chemical in the body that triggers a response from cells or organs.

hormone receptor-negative cancer (HR-)
Cancer cells that don't use hormones to grow.

hormone receptor-positive cancer (HR+)
Cancer cells that use hormones to grow.

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

immunohistochemistry (IHC)
A lab test of cancer cells to find specific cell traits involved in abnormal cell growth.

inflammatory breast cancer (IBC)
A type of breast cancer in which the breast looks red and swollen and feels warm to the touch.

infraclavicular
The area right below the collarbone.

in situ hybridization (ISH)
A lab test of the number of a gene.

internal mammary
The area along the breastbone.

invasive breast cancer
The growth of breast cancer into the breast's supporting tissue (stroma).

linear accelerator (linac)
A machine that delivers radiotherapy treatments.

lobule
A gland in the breast that makes breast milk.

luteinizing hormone-releasing hormone (LHRH)
A hormone in the brain that helps control the making of estrogen by the ovaries.

lymph
A clear fluid containing white blood cells.

lymphatic system
Germ-fighting network of tissues and organs that includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels. Part of the immune system.

lymphedema
Swelling in the body caused by a buildup of fluid called lymph.

lymph node
A small, bean-shaped disease-fighting structure.

magnetic resonance imaging (MRI)
A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

mammogram
A picture of the insides of the breast that is made using x-rays.

mastectomy
An operation that removes the whole breast.

medical oncologist
A doctor who is an expert in cancer drugs.

menopause
12 months after the last menstrual period.

modified radical mastectomy
An operation that removes the whole breast and lymph nodes under the arm (axilla).

mutation
An abnormal change.

neoadjuvant treatment
A treatment that is given before the main treatment to reduce the cancer. Also called preoperative treatment if given before an operation.

nipple-areola complex (NAC)
The ring of darker breast skin is called the areola. The raised tip within the areola is called the nipple.

pathologic stage (p)
A rating of the extent of cancer given after examining tissue removed during surgery.

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

positron emission tomography (PET)
A test that uses radioactive material to see the shape and function of body parts.

postmenopause
The state of having no more menstrual periods.

premenopause
The state of having menstrual periods.

progesterone (PR)
A hormone involved in sexual development, periods, and pregnancy.

prognosis
The likely course and outcome of a disease based on tests.

radiation therapy (RT)
A treatment that uses high-energy rays. Also called radiotherapy.

radical mastectomy
An operation that removes the whole breast, lymph nodes under the arm (axilla), and chest wall muscles under the breast.

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

selective estrogen receptor degrader (SERD)
A drug that blocks and destroys estrogen receptors.

selective estrogen receptor modulator (SERM)
A drug that blocks the effect of estrogen inside of cells.

sentinel lymph node (SLN)
The first lymph node to which cancer cells spread after leaving a tumor.

sentinel lymph node biopsy (SLNB)
An operation to remove the disease-fighting structures (lymph nodes) to which cancer first spreads. Also called sentinel lymph node dissection.

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

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

supraclavicular
The area right above the collarbone.

systemic therapy
Drug treatment that works throughout the body.

total mastectomy
An operation that removes the entire breast with a flat closure. Also called simple mastectomy.

triple-negative breast cancer (TNBC)
A breast cancer that does not use hormones or the HER2 protein to grow.

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

NCCN Contributors

This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer Version 3.2025. It was adapted, reviewed, and published with help from the following people:

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For disclosures, visit NCCN.org/disclosures.

NCCN Cancer Centers

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

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

City of Hope National Medical Center
Duarte, California
800.826.4673 • cityofhope.org

Dana-Farber/Brigham and Women's Cancer Center |
Mass General Cancer Center
Boston, Massachusetts
877.442.3324 • 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

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

Fred Hutchinson Cancer Center
Seattle, Washington
206.667.5000 • fredhutch.org

Huntsman Cancer Institute at the University of Utah
Salt Lake City, Utah
800.824.2073 • healthcare.utah.edu/huntsmancancerinstitute

Indiana University Melvin and Bren Simon
Comprehensive Cancer Center
Indianapolis, Indiana
888.600.4822 • www.cancer.iu.edu

Johns Hopkins Kimmel Cancer Center
Baltimore, Maryland
410.955.8964
www.hopkinskimmelcancercenter.org

Mayo Clinic Comprehensive 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

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

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

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

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

The UChicago Medicine Comprehensive Cancer Center
Chicago, Illinois
773.702.1000 • uchicagomedicine.org/cancer

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

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 • uclahealth.org/cancer

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

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

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Notes

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2025

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