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Breast Cancer Early Detection and Diagnosis

Can Breast Cancer Be Found Early?

Breast cancer is sometimes found after symptoms appear, but many women with breast cancer have no symptoms. This is why regular breast cancer screening is so important. Learn more.

- [American Cancer Society Recommendations for the Early Detection of Breast Cancer](#)

Imaging Tests to Find Breast Cancer

Different tests can be used to look for and diagnose breast cancer. If your doctor finds an area of concern on a screening test (a mammogram), or if you have symptoms that could mean breast cancer, you will need more tests to know for sure if it's cancer.

- [Mammograms](#)
- [Breast Ultrasound](#)
- [Breast MRI](#)
- [Newer and Experimental Breast Imaging Tests](#)

Biopsy

A biopsy is done when mammograms, other imaging tests, or a physical exam shows a breast change that may be cancer. A biopsy is the only way to know for sure if it's cancer.

- [Breast Biopsy](#)

Tests to look for breast cancer spread

If your doctor suspects your cancer may have spread to other parts of your body, you may need more tests, such as chest x-rays, CT scans, bone scans, PET scans, or MRI scans.

- [Imaging Tests to Find Out if Breast Cancer Has Spread](#)

Finding breast cancer during pregnancy

Breast cancer during pregnancy is rare. But if you find a lump or notice any unusual changes in your breasts that concern you, tell your doctor or nurse right away.

- [Finding Breast Cancer During Pregnancy](#)

American Cancer Society Recommendations for the Early Detection of Breast Cancer

Finding breast cancer early and getting state-of-the-art cancer treatment are the most important strategies to prevent deaths from breast cancer. Breast cancer that's found early, when it's small and has not spread, is easier to treat successfully. Getting regular screening tests is the most reliable way to find breast cancer early. The American Cancer Society has screening guidelines for women at average risk of breast cancer, and for those at high risk for breast cancer.

What are screening tests?

The goal of screening tests for breast cancer is to find it before it causes symptoms (like a lump that can be felt). **Screening** refers to tests and exams used to find a disease in people who don't have any symptoms. **Early detection** means finding and diagnosing a

disease earlier than if you'd waited for symptoms to start.

Breast cancers found during screening exams are more likely to be smaller and still confined to the breast. The size of a breast cancer and how far it has spread are some of the most important factors in predicting the **prognosis** (outlook) of a woman with this disease.

American Cancer Society screening recommendations for women at average breast cancer risk

The COVID-19 pandemic has resulted in many elective procedures being put on hold, and this has led to a substantial decline in cancer screening. As your regular facility for health care returns to providing cancer screening, it's important that it is done as safely as possible. Learn how you can talk to your doctor and what steps you can take to plan a safe return to regular cancer screening in [Cancer Screening During the COVID-19 Pandemic](#)¹.

These guidelines are for women at **average risk** for breast cancer. For screening purposes, a woman is considered to be at average risk if she doesn't have a personal history of breast cancer, a strong family history of breast cancer, or a genetic mutation known to increase risk of breast cancer (such as in a *BRCA* gene), and has not had chest radiation therapy before the age of 30. (See below for guidelines for women at high risk.)

Women between 40 and 44 have the option to start screening with a mammogram every year.

Women 45 to 54 should get mammograms every year.

Women 55 and older can switch to a mammogram every other year, or they can choose to continue yearly mammograms. Screening should continue as long as a woman is in good health and is expected to live at least 10 more years.

All women should understand what to expect when getting a mammogram for breast cancer screening – what the test can and cannot do.

Clinical breast exams are not recommended for breast cancer screening among average-risk women at any age.

Mammograms

Mammograms are low-dose x-rays of the breast. Regular mammograms can help find breast cancer at an early stage, when treatment is most successful. A mammogram can often find breast changes that could be cancer years before physical symptoms develop. Results from many decades of research clearly show that women who have regular mammograms are more likely to have breast cancer found early, are less likely to need aggressive treatment like surgery to remove the breast (mastectomy) and chemotherapy, and are more likely to be cured.

Mammograms are not perfect. They miss some cancers. And sometimes a woman will need more tests to find out if something found on a mammogram is or is not cancer. There's also a small possibility of being diagnosed with a cancer that never would have caused any problems had it not been found during screening. (This is called *overdiagnosis*.) It's important that women getting mammograms know what to expect and understand the benefits and limitations of screening.

In recent years, a newer type of mammogram called **digital breast tomosynthesis** (commonly known as **three-dimensional [3D] mammography**) has become much more common, although it's not available in all breast imaging centers.

Many studies have found that 3D mammography appears to lower the chance of being **called back** for follow-up testing. It also appears to find more breast cancers, and several studies have shown it can be helpful in women with more dense breasts. A large study is now in progress to better compare outcomes between 3D mammograms and standard (2D) mammograms.

It should be noted that 3D mammograms often cost more than 2D mammograms, and this added cost may not be covered by insurance.

The American Cancer Society breast cancer screening guidelines consider having had either a 2D or 3D mammogram as being in line with current screening recommendations. The ACS also believes that women should be able to choose between 2D and 3D mammography if they or their doctor believes one would be more appropriate, and that out-of-pocket costs should not be a barrier to having either one.

Clinical breast exam and breast self-exam

Research has not shown a clear benefit of regular physical breast exams done by either a health professional (clinical breast exams) or by women themselves (breast self-exams). There is very little evidence that these tests help find breast cancer early when women also get screening mammograms. Most often when breast cancer is detected because of symptoms (such as a lump), a woman discovers the symptom during usual activities such as bathing or dressing. **Women should be familiar with how their**

breasts normally look and feel and should report any changes to a health care provider right away.

(While the American Cancer Society does not recommend regular clinical breast exams or breast self-exams as part of a routine breast cancer screening schedule, this does not mean that these exams should never be done. In some situations, particularly for women at higher than average risk, for example, health care providers may still offer clinical breast exams, along with providing counseling about risk and early detection. And some women might still be more comfortable doing regular self-exams as a way to keep track of how their breasts look and feel. But it's important to understand that there is very little evidence that doing these exams routinely is helpful for women at average risk of breast cancer.)

American Cancer Society screening recommendations for women at high risk

Women who are at **high risk** for breast cancer based on certain factors should get a [breast MRI](#) and a mammogram every year, typically starting at age 30. This includes women who:

- Have a lifetime risk of breast cancer of about 20% to 25% or greater, according to risk assessment tools that are based mainly on family history (see below)
- Have a known [BRCA1 or BRCA2 gene mutation](#)² (based on having had genetic testing)
- Have a first-degree relative (parent, brother, sister, or child) with a *BRCA1* or *BRCA2* gene mutation, and have not had genetic testing themselves
- Had radiation therapy to the chest when they were between the ages of 10 and 30 years
- Have Li-Fraumeni syndrome, Cowden syndrome, or Bannayan-Riley-Ruvalcaba syndrome, or have first-degree relatives with one of these syndromes

The American Cancer Society recommends against MRI screening for women whose lifetime risk of breast cancer is less than 15%.

There's not enough evidence to make a recommendation for or against yearly MRI screening for women who have a higher lifetime risk based on certain factors, such as:

- Having a personal history of breast cancer, [ductal carcinoma in situ \(DCIS\)](#)³, [lobular carcinoma in situ \(LCIS\)](#)⁴, [atypical ductal hyperplasia \(ADH\)](#), or [atypical lobular](#)

[hyperplasia \(ALH\)](#)⁵

- Having “extremely” or “heterogeneously” [dense breasts](#) as seen on a mammogram

If MRI is used, it should be in addition to, not instead of, a screening mammogram. This is because although an MRI is more likely to detect cancer than a mammogram, it may still miss some cancers that a mammogram would detect.

Most women at high risk should begin screening with MRI and mammograms when they are 30 and continue for as long as they are in good health. But a woman at high risk should make the decision to start with her health care providers, taking into account her personal circumstances and preferences.

Tools used to assess breast cancer risk

Several risk assessment tools are available to help health professionals estimate a woman’s breast cancer risk. These tools give approximate, rather than precise, estimates of breast cancer risk based on different combinations of risk factors and different data sets.

Because the different tools use different factors to estimate risk, they might give different risk estimates for the same woman. Two models could easily give different estimates for the same person.

Risk assessment tools that include family history in first-degree relatives (parents, siblings, and children) and second-degree relatives (such as aunts and cousins) on both sides of the family should be used with the ACS guidelines to decide if a woman should have MRI screening. The use of any of the risk assessment tools and its results should be discussed by a woman with her health care provider.

Hyperlinks

1. www.cancer.org/healthy/find-cancer-early/cancer-screening-guidelines/cancer-screening-during-covid-19-pandemic.html
2. www.cancer.org/cancer/breast-cancer/risk-and-prevention/breast-cancer-risk-factors-you-cannot-change.html
3. www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/types-of-breast-cancer/dcis.html
4. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/lobular-carcinoma-in-situ.html
5. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-

[conditions/hyperplasia-of-the-breast-ductal-or-lobular.html](#)

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Oeffinger KC, Fontham ET, Etzioni R, et al. Breast cancer screening for women at average risk: 2015 guideline update From the American Cancer Society. *JAMA*. 2015;314(15):1599-1614.

Saslow D, Boetes C, Burke W, et al. American Cancer Society guidelines for breast screening with MRI as an adjunct to mammography. *CA Cancer J Clin*. 2007 Mar-Apr;57(2):75-89.

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Mammograms

Mammograms are low-dose x-rays that can help find breast cancer. If you've been told you need a mammogram, or you're ready to start breast cancer screening, the topics below can help you know what to expect.

Getting a mammogram

Find out what a mammogram is, why it's done, what doctors look for, and what it's like to get one.

- [Mammogram Basics](#)
- [Tips for Getting a Mammogram](#)
- [What Does the Doctor Look for on a Mammogram?](#)
- [Getting Called Back After a Mammogram](#)

Understanding your results

Doctors use a standard system called the Breast Imaging Reporting and Data System (BI-RADS) to describe what they see on a mammogram. Learn how to understand your results, and what it means if your mammograms show dense breast tissue.

- [Understanding Your Mammogram Report](#)
- [Breast Density and Your Mammogram Report](#)
- [Limitations of Mammograms](#)

Mammograms in special circumstances

If you have had breast cancer in the past, whether or not you need to keep getting mammograms might depend on the type of surgery you had. If you have breast implants, you can and should get mammograms as recommended. But you might need to have extra pictures taken so the doctor can see as much breast tissue as possible.

- [Mammograms After Breast Cancer Surgery](#)
- [Mammograms for Women with Breast Implants](#)

Last Revised: October 3, 2019

Mammogram Basics

A mammogram is a low-dose x-ray that allows doctors called *radiologists* to look for changes in breast tissue.

Why do I need mammograms?

A mammogram can often find or detect breast cancer early, when it's small and even before a lump can be felt. This is when it's easiest to treat.

What are the main uses of mammograms?

Screening mammograms

A **screening mammogram** is used to look for signs of breast cancer in women who don't have any breast symptoms or problems. X-ray pictures of each breast are taken, typically from 2 different angles.

Diagnostic mammograms

Mammograms can also be used to look at a woman's breast if she has breast symptoms or if a change is seen on a screening mammogram. When used in this way, they are called **diagnostic mammograms**. They may include extra views (images) of the breast that aren't part of screening mammograms. Sometimes diagnostic mammograms are used to screen women who were treated for breast cancer in the past.

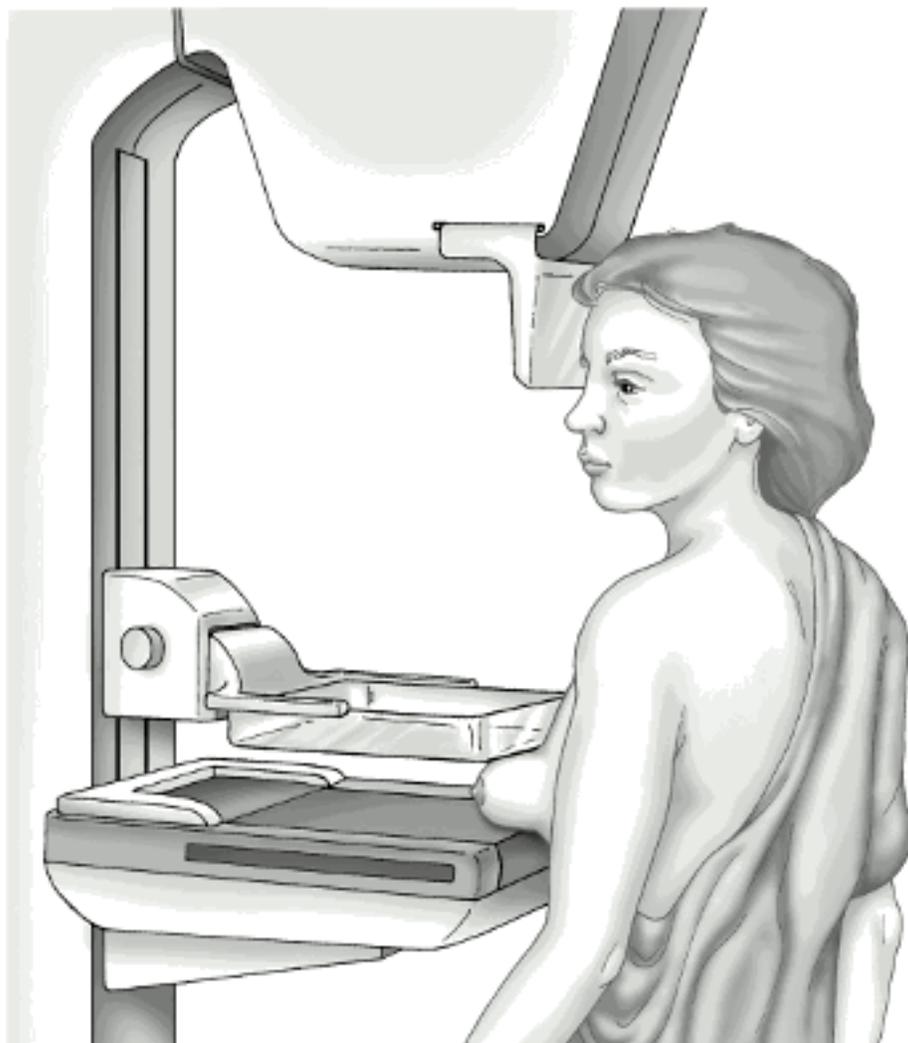
What do mammograms show?

Mammograms can often show abnormal areas in the breast. They can't prove that an abnormal area is cancer, but they can help health care providers decide whether more testing is needed. The 2 main types of breast changes found with a mammogram are **calcifications** and **masses**. Learn more about these and other breast changes in [What Does the Doctor Look for on a Mammogram?](#)

How do mammograms work?

A mammogram uses a machine designed to look only at breast tissue. The machine takes x-rays at lower doses than usual x-rays. Because these x-rays don't go through tissue easily, the machine has 2 plates that compress or flatten the breast to spread the tissue apart. This gives a better picture and allows less radiation to be used.

To learn more about how they are done, see [Mammograms: What to Know Before You Go](#).



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Mammogram

In the past, mammograms were typically printed on large sheets of film. Today, **digital mammograms** are much more common. Digital images are recorded and saved as files in a computer.

Three-dimensional (3D) mammograms

For this newer type of mammogram, also known as *breast tomosynthesis* or *digital breast tomosynthesis (DBT)*, each breast is compressed once, and a machine takes many low-dose x-rays as it moves in an arc over the breast. A computer then puts the images together into a series of thin slices. This allows doctors to see the breast tissues more clearly in three dimensions. (A standard two-dimensional [2D] mammogram can

be taken at the same time, or it can be reconstructed from the 3D mammogram images.)

Many studies have found that 3D mammography appears to lower the chance of being [called back](#) for follow-up testing. It also appears to find more breast cancers, and several studies have shown it can be helpful in women with more dense breasts. A large study is now in progress to better compare outcomes between 3D mammograms and standard (2D) mammograms.

For more on 3D mammograms, see [American Cancer Society Recommendations for the Early Detection of Breast Cancer](#).

Are mammograms safe?

Mammograms expose the breasts to small amounts of radiation. But the benefits of mammography outweigh any possible harm from the [radiation exposure](#)¹. Modern machines use low radiation doses to get breast x-rays that are high in image quality. On average the total dose for a typical mammogram with 2 views of each breast is about 0.4 millisieverts, or mSv. (A mSv is a measure of radiation dose.) The radiation dose from 3D mammograms can range from slightly lower to slightly higher than that from standard mammograms.

To put these doses into perspective, people in the US are normally exposed to an average of about 3 mSv of radiation each year just from their natural surroundings. (This is called *background radiation*.) The dose of radiation used for a screening mammogram of both breasts is about the same amount of radiation a woman would get from her natural surroundings over about 7 weeks.

If there's any chance you might be [pregnant](#), let your health care provider and x-ray technologist know. Although the risk to the fetus is very small, and mammograms are generally thought to be safe during pregnancy, screening mammograms aren't routinely done in pregnant women who aren't at increased risk for breast cancer.

Hyperlinks

1. www.cancer.org/cancer/cancer-causes/radiation-exposure/x-rays-gamma-rays.html

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Helvie MA, Patterson SK. Chapter 11: Imaging Analysis: Mammography. In: Harris JR, Lippman ME, Morrow M, Osborne CK, eds. *Diseases of the Breast*. 5th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2014.

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Tips for Getting a Mammogram

A mammogram is an important step in taking care of yourself and your breasts. Whether you're a mammogram newbie or a veteran, knowing what to expect may help the process go more smoothly.

How to prepare for your mammogram

- If you have a choice, use a facility that specializes in mammograms and does many mammograms a day.
- Try to go to the same facility every time so that your mammograms can easily be compared from year to year.
- If you're going to a facility for the first time, bring a list of the places and dates of mammograms, biopsies, or other breast treatments you've had before.
- If you've had mammograms at another facility, try to get those records to bring with you to the new facility (or have them sent there) so the old pictures can be compared to the new ones.
- Schedule your mammogram when your breasts are not tender or swollen to help reduce discomfort and get good pictures. Try to avoid the week just before your period.
- On the day of the exam, don't wear deodorant or antiperspirant. Some of these contain substances that can show up on the x-ray as white spots. If you're not going home afterward, you might want to take your deodorant with you to put on after your exam.
- You might find it easier to wear a skirt or pants, so that you'll only need to remove your top and bra for the mammogram.
- Discuss any recent changes or problems in your breasts with your health care provider before getting the mammogram.

Don't be afraid of mammograms! Remember that only 2 to 4 screening mammograms in 1,000 lead to a diagnosis of breast cancer.

What to tell your technologist

These tips can help you have a good quality mammogram:

- Always describe any breast changes or problems you're having to the technologist doing the mammogram. Also describe any medical history that could affect your breast cancer risk—such as surgery, hormone use, breast cancer in your family, or if you've had breast cancer before.
- Before getting any type of imaging test, tell the technologist if you're breastfeeding or if you think you might be pregnant.

What to expect when getting a screening mammogram

- You'll have to undress above the waist to get a mammogram. The facility will give you a wrap to wear.
- A technologist will position your breasts for the mammogram. You and the technologist are the only ones in the room during the mammogram.
- To get a high-quality picture, your breast must be flattened. The technologist places your breast on the machine's plate. The plastic upper plate is lowered to compress your breast for a few seconds while the technologist takes a picture. You will then need to change position before the next picture is taken.
- The whole procedure takes about 20 minutes. The actual breast compression only lasts a few seconds each time.
- You might feel some discomfort when your breasts are compressed, and for some women it can be painful. Tell the technologist if it hurts.
- Two views of each breast are taken for a screening mammogram. But for some women, such as those with breast implants or large breasts, more pictures may be needed.

What to expect when getting a diagnostic mammogram

A diagnostic mammogram is often done if a woman has breast symptoms or if a change is seen on a screening mammogram.

- More pictures are taken during a diagnostic mammogram with a focus on the area that looked different on the screening mammogram.
- During a diagnostic mammogram, the images are checked by the radiologist while you're there so that more pictures can be taken if needed to look more closely at any area of concern.
- In some cases, special images known as spot views or magnification views are used to make a small area of concern easier to see.

How will I get my mammogram results?

If you don't hear from your health care provider within 10 days, do not assume that your mammogram was normal. Call your provider or the facility where the mammogram was done.

A full report of the results of your mammogram will be sent to your health care provider. Mammography clinics also must mail women an easy-to-understand summary of their mammogram results within 30 days—or “as quickly as possible” if the results suggest cancer is present. This means you could get the results before your provider calls you. If you want the full written mammogram report as well as the summary, you’ll need to ask for it. We can help you learn more about [how to understand your mammogram report](#).

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What Does the Doctor Look for on a Mammogram?

A radiologist will look at your mammogram. Radiologists are doctors who diagnose diseases and injuries using imaging tests such as x-rays.

When possible, the doctor reading your mammogram will compare it to your old mammograms. This can help show if any findings are new, or if they were already there on previous mammograms. Findings that haven’t changed from older mammograms aren’t likely to be cancer, which might mean you won’t need further tests.

The doctor reading your mammogram will be looking for different types of breast changes, such as small white spots called *calcifications*, larger abnormal areas called *masses*, and other suspicious areas that could be signs of cancer.

Calcifications

Calcifications are tiny calcium deposits within the breast tissue. They look like small white spots on a mammogram. They may or may not be caused by cancer. There are 2 types of calcifications.

Macrocalcifications

Macrocalcifications are larger calcium deposits that are most likely due to changes caused by aging of the breast arteries, old injuries, or inflammation. These deposits are typically related to non-cancerous conditions and don't need to be checked for cancer with a [biopsy](#). Macrocalcifications become more common as women get older (especially after age 50).

Microcalcifications

Microcalcifications are tiny specks of calcium in the breast. When seen on a mammogram, they are more of a concern than macrocalcifications, but they don't always mean that cancer is present. The shape and layout of microcalcifications help the radiologist judge how likely it is that the change is due to cancer.

In most cases, microcalcifications don't need to be checked with a [biopsy](#). But if they have a suspicious look and pattern, a biopsy will be recommended to check for cancer.

Masses

A mass is an area of dense breast tissue with a shape and edges that make it look different than the rest of the breast tissue. With or without calcifications, it's another important change seen on a mammogram. Masses can be many things, including cysts (non-cancerous, fluid-filled sacs) and non-cancerous solid tumors (such as [fibroadenomas](#)¹), but they may also be a sign of cancer.

[Cysts](#)² are fluid-filled sacs. Simple cysts (fluid-filled sacs with thin walls) are not cancer and don't need to be checked with a biopsy. If a mass is not a simple cyst, it's of more concern, so a biopsy might be needed to be sure it isn't cancer.

Solid masses can be more concerning, but most breast masses are not cancer.

A cyst and a solid mass can feel the same. They can also look the same on a mammogram. The doctor must be sure it's a cyst to know it's not cancer. To be sure, a [breast ultrasound](#) is often done because it is a better tool to see fluid-filled sacs. Another option is to use a [thin, hollow needle](#) to remove (aspirate) fluid from the area.

If a mass is not a simple cyst (that is, if it's at least partly solid, or it has other concerning features), more [imaging tests](#) might be needed to decide if it could be cancer. Some masses can be watched over time with regular mammograms or ultrasound to see if they change, but others may need to be checked with a [biopsy](#). The size, shape, and margins (edges) of the mass can help the radiologist decide how likely it is to be cancer.

Breast density

Your mammogram report will also contain an assessment of your [breast density](#). Breast density is based on how fibrous and glandular tissues are distributed in your breast, compared to how much of your breast is made up of fatty tissue.

Dense breasts are not abnormal, but they are linked to a higher risk of breast cancer. Dense breast tissue can also make it harder to find cancers on a mammogram. Still, experts don't agree what other tests, if any, should be done along with mammograms in women with dense breasts who aren't otherwise at higher risk for breast cancer (based on gene mutations, breast cancer in the family, or other factors).

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibroadenomas-of-the-breast.html
2. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibrosis-and-simple-cysts-in-the-breast.html

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Getting Called Back After a Mammogram

Getting called back after a screening mammogram is fairly common, and it doesn't mean you have breast cancer. In fact, fewer than 1 in 10 women called back for more tests are found to have cancer. Often, it just means more x-rays or an [ultrasound](#) needs to be done to get a closer look at an area of concern.

Getting called back is more common after a first mammogram, or when there's no previous mammogram to compare the new mammogram with. It's also more common in women who haven't gone through menopause.

What else could it be?

You could be called back after your mammogram because:

- The pictures weren't clear or didn't show some of your breast tissue and need to be retaken.
- You have [dense breast tissue](#), which can make it hard to see some parts of your breasts.
- The radiologist (doctor who reads the mammogram) sees [calcifications or a mass](#) (which could be a [cyst](#)¹ or solid mass).
- The radiologist sees an area that just looks different from other parts of the breast.

Sometimes when more x-rays are taken of the area or mass, or the area is compressed more, it no longer looks suspicious. In fact, most repeat mammograms do not find cancer.

What will happen at the follow-up appointment?

- You'll likely get another mammogram called a *diagnostic mammogram*. (Your previous mammogram was called a *screening mammogram*.) A diagnostic

mammogram is done just like a screening mammogram, but more pictures are taken so that any areas of concern can be looked at more closely. A radiologist is on hand to advise the technologist (the person who operates the mammogram machine) to be sure they have all the images that are needed.

- You may also get an ultrasound test, which uses sound waves to make pictures of the inside of your breast at the area of concern.
- Some women may need a [breast MRI](#). For this test, you'll lie face down inside a narrow tube for up to an hour while the machine creates more detailed images of the breast tissues. MRI is painless, but it can be uncomfortable for people who don't like small, tight spaces.

You will most likely be given the results of your tests during the visit. You might be told one of the following:

- The suspicious area turned out to be nothing to worry about, and you can return to your normal mammogram schedule.
- The area is probably nothing to worry about, but you should have your next mammogram sooner than normal – usually in about 6 months – to watch it closely and make sure it's not changing over time.
- The changed area could be cancer, so you will need a biopsy to know for sure.

You'll also get a letter with a summary of the findings that will tell you if you need more tests and/or when you should schedule your next mammogram.

What if I need a biopsy?

During a [breast biopsy](#), a small piece of breast tissue is removed and checked for cancer under a microscope. Even if you need a biopsy, it doesn't mean you have cancer. Most biopsy results are not cancer, but a biopsy is the only way to find out.

There are several different types of biopsies, some of which are done using a hollow needle and some that are done through a cut in the skin. The type you have depends on things like how suspicious the tumor looks, how big it is, where it is in the breast, other medical problems you might have, and your personal preferences.

How can I stay calm while waiting?

Waiting for appointments and the results of tests can be frightening. Many women have

strong emotions, such as disbelief, anxiety, fear, anger, or sadness during this time. Here are some things to remember:

- It's normal to have these feelings.
- Most breast changes are not cancer and are not life-threatening.
- Talking with a loved one or a counselor about your feelings may help.
- Talking with other women who have been through a breast biopsy may help.
- The American Cancer Society is available at 1-800-227-2345 around the clock to answer your questions and provide support.

What if it's cancer?

If you do have cancer and you're referred to a breast specialist, use these tips to make your appointment as useful as possible:

- Make a [list of questions](#)² to ask.
- Take a family member or friend with you. They can serve as an extra pair of ears, take notes, help you remember things later, and give you support.
- Ask if you can record the conversations. You might also want to take notes.
- If someone uses a word you don't know, ask them to spell it and explain it.
- Ask the doctors or nurses to explain anything you don't understand.

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibrosis-and-simple-cysts-in-the-breast.html
2. www.cancer.org/treatment/finding-and-paying-for-treatment/choosing-your-treatment-team/questions-to-ask-your-doctor.html

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Understanding Your Mammogram Report

A doctor called a *radiologist* will categorize your mammogram results using a numbered system. You should talk to your doctor about your mammogram's category and what you need to do next.

What is a BI-RADS assessment category?

Doctors use a standard system to describe mammogram findings and results. This system (called the *Breast Imaging Reporting and Data System* or *BI-RADS*) sorts the results into categories numbered 0 through 6.

By sorting the results into these categories, doctors can describe what they find on a mammogram using the same words and terms. This makes communicating about these test results and following up after the tests much easier.

What do the BI-RADS categories mean?

Category	Definition	What it means
0	Incomplete - Additional imaging evaluation and/or comparison to prior mammograms is needed.	This means the radiologist may have seen a possible abnormality, but it was not clear and you will need more tests, such as another mammogram with the spot compression (applying compression to a smaller area when doing the mammogram), magnified views, special mammogram views, or ultrasound . The radiologist may also suggest that the radiologist wants to compare your new mammogram with older ones to see if there have been changes in the area over time.
1	Negative	There's no significant abnormality to report. Your breasts look the same (asymmetrical) with no masses (lumps) , distorted structures , or suspicious calcifications . In this case, negative means nothing bad was found.
2	Benign (non-cancerous) finding	This is also a negative mammogram result (there's no sign of cancer), but the radiologist chooses to describe a finding known to be benign, such as benign calcifications, lymph nodes in the breast, or calcified fibroadenomas ¹ . This finding is recorded in your mammogram report to help with future comparisons. This finding is recorded in your mammogram report to help with comparing to future mammograms.

3	Probably benign finding – Follow-up in a short time frame is suggested	<p>The findings in this category have a very high chance (greater than 98%) of being benign (not cancer). The findings are not expected to change over time. Even if it's not proven to be benign, it's helpful to see if the area in question does change over time.</p> <p>You will likely need follow-up with repeat imaging in 6 months and regular imaging thereafter until the finding is known to be stable (usually at least 2 years). This helps avoid unnecessary biopsies, but if the area does change over time, it allows for early diagnosis.</p>
4	Suspicious abnormality – Biopsy should be considered	<p>Findings do not definitely look like cancer but could be cancer. The radiologist is concerned enough to recommend a biopsy. The findings in this category cover a wide range of suspicion levels. For this reason, this category is often divided into three sub-categories:</p> <p>4A: Finding with a low likelihood of being cancer (more than 2% but no more than 10%)</p> <p>4B: Finding with a moderate likelihood of being cancer (more than 10% but no more than 50%)</p> <p>4C: Finding with a high likelihood of being cancer (more than 50% but less than 95%), but not as high as Category 5</p>
5	Highly suggestive of malignancy – Appropriate action should be taken	<p>The findings look like cancer and have a high chance (at least 95%) of being cancer. Biopsy is very strongly recommended.</p>
6	Known biopsy-proven malignancy – Appropriate action should be taken	<p>This category is only used for findings on a mammogram that have already been shown to be cancer by a previous biopsy. Mammograms may be used in follow-up to see how well the cancer is responding to treatment.</p>

BI-RADS reporting breast density

Your mammogram report will also include an assessment of your breast density, which is a description of how much fibrous and glandular tissue is in your breasts, as compared to fatty tissue. The denser your breasts, the harder it can be to see abnormal areas on mammograms. (Having dense breasts also raises your risk of getting breast cancer.)

BI-RADS classifies breast density into 4 groups, which are described in [Breast Density and Your Mammogram Report](#).

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibroadenomas-of-the-breast.html

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American College of Radiology. ACR BI-RADS ATLAS – Mammography. Reporting System, 2013. Accessed at <https://www.acr.org/-/media/ACR/Files/RADS/BI-RADS/Mammography-Reporting.pdf> on August 21, 2019.

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Breast Density and Your Mammogram Report

Regular mammograms are the best way to find breast cancer early. But if your mammogram report says that you have dense breast tissue, you may be wondering what that means.

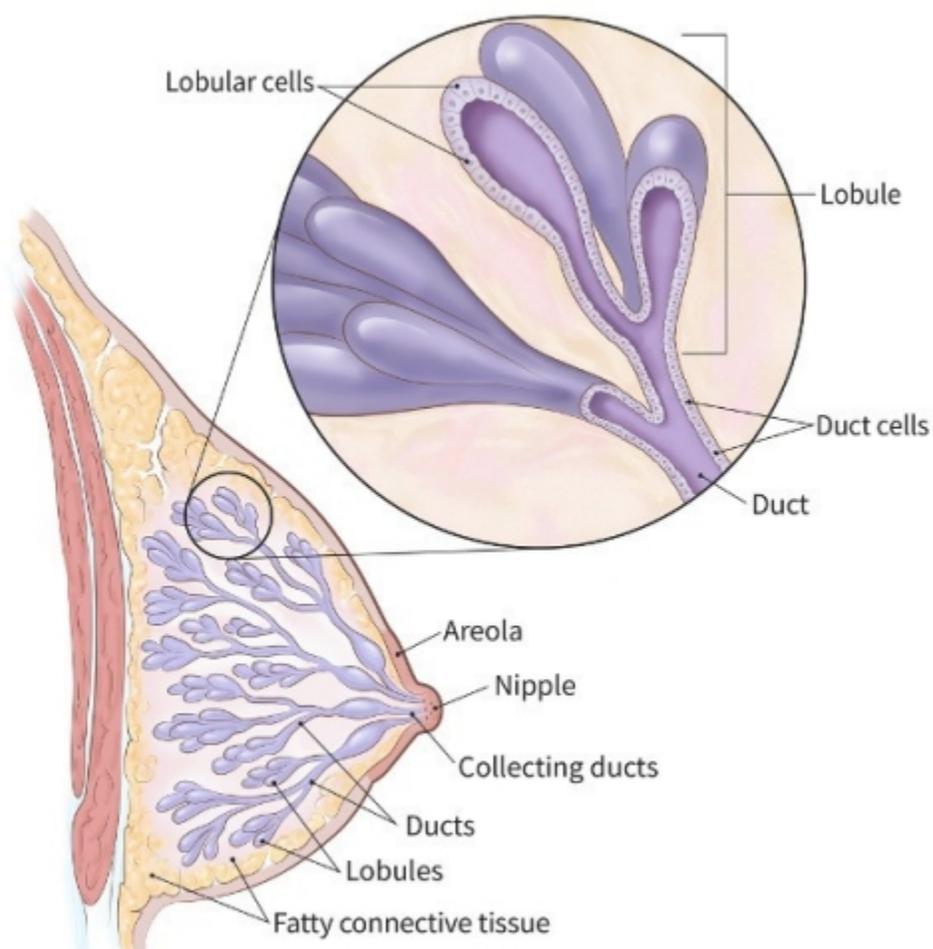
What is dense breast tissue?

Breasts are made up of lobules, ducts, and fatty and fibrous connective tissue.

- **Lobules** produce milk and are often called **glandular tissue**.
- **Ducts** are the tiny tubes that carry milk from the lobules to the nipple.

- **Fibrous tissue** and **fat** give breasts their size and shape and hold the other structures in place.

Your breast tissue may be called dense if you have a lot of fibrous or glandular tissue and not much fat in the breasts. Having dense breast tissue is common. Some women have more dense breast tissue than others. For most women, breasts become less dense with age. But in some women, there's little change.

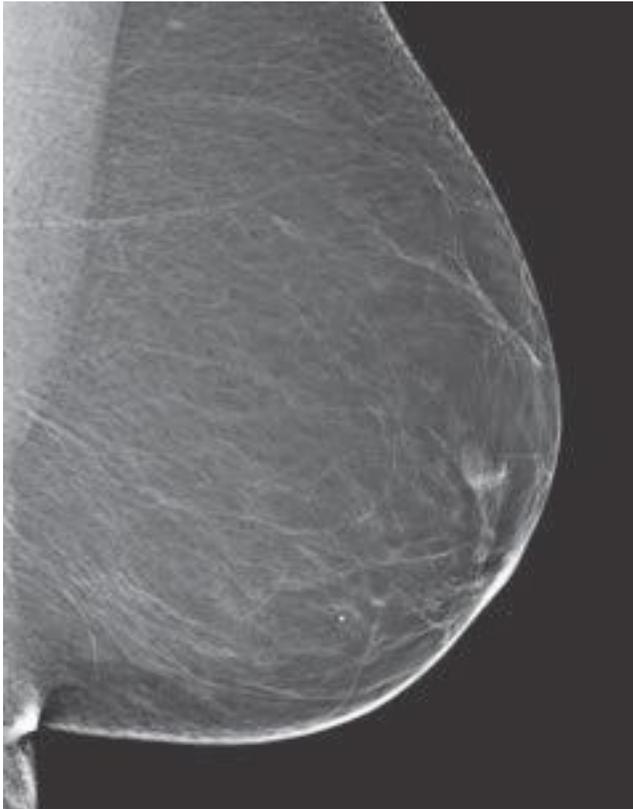


How do I know if I have dense breasts?

Breast density is seen only on mammograms. Breast density isn't based on how your breasts feel, and it's not related to breast size or firmness.

Radiologists are doctors who “read” x-rays like mammograms. They check your mammogram for [abnormal areas](#), and also look at breast density.

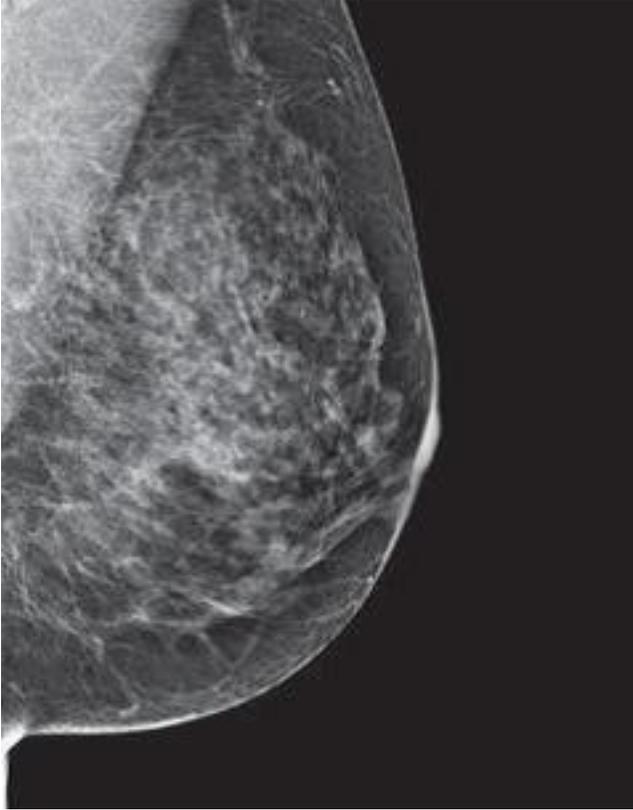
There are 4 categories of breast density. They go from almost all fatty tissue to extremely dense tissue with very little fat. The radiologist decides which of the 4 categories best describes how dense your breasts are:



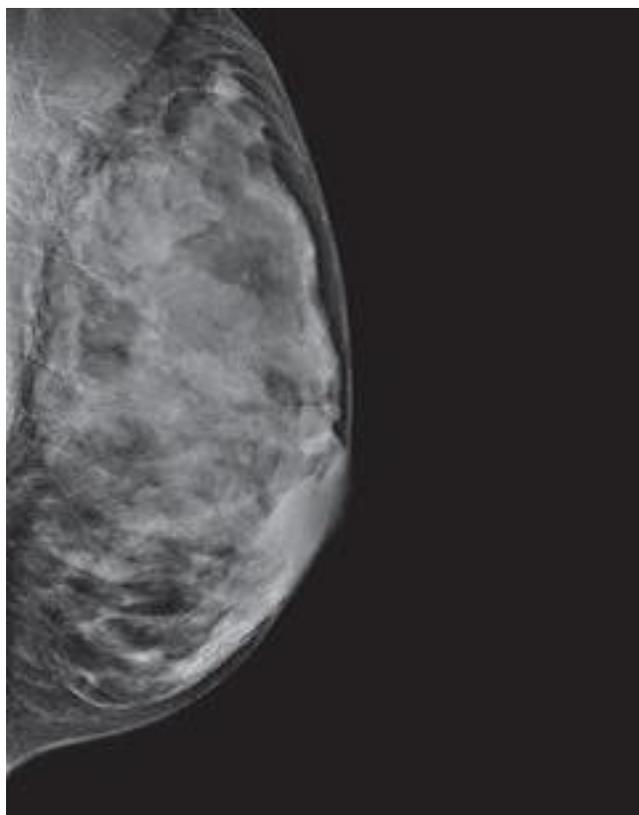
Breasts are almost all fatty tissue.



There are scattered areas of dense glandular and fibrous tissue.



More of the breast is made of dense glandular and fibrous tissue (described as **heterogeneously dense**). This can make it hard to see small tumors in or around the dense tissue.



Breasts are **extremely dense**, which makes it hard to see tumors in the tissue.

[Mammogram reports](#) sent to women often mention breast density. Your health care provider can also tell you if your mammogram shows that you have dense breasts.

In some states, women whose mammograms show heterogeneously dense or extremely dense breasts must be told that they have dense breasts in the summary of the mammogram report that is sent to patients (sometimes called the *lay summary*).

The language used is mandated by each law, and may say something like this:

“Your mammogram shows that your breast tissue is dense. Dense breast tissue is common and is not abnormal. However, dense breast tissue can make it harder to evaluate the results of your mammogram and may also be associated with an increased risk of breast cancer. This information about the results of your mammogram is given to you so you will be informed when you talk with your doctor. Together, you can decide which screening options are right for you. A report of your results was sent to your primary physician.”

Why is breast density important?

Women who have dense breast tissue have a higher risk of breast cancer compared to women with less dense breast tissue. It's unclear at this time why dense breast tissue is linked to breast cancer risk.

Dense breast tissue also makes it harder for radiologists to see cancer. On mammograms, dense breast tissue looks white. Breast masses or tumors also look white, so the dense tissue can hide tumors. But fatty tissue looks almost black. On a black background it's easier to see a tumor that looks white. So, mammograms can be less accurate in women with dense breasts.

If I have dense breasts, do I still need a mammogram?

Yes. Most breast cancers can be seen on a mammogram even in women who have dense breast tissue. So it's still important to get regular mammograms. Mammograms can help save women's lives.

Even if you have a normal mammogram report, you should know how your breasts normally look and feel. Anytime there's a change, you should report it to a health care provider right away.

Should I have any other screening tests if I have dense breast tissue?

At this time, experts do not agree what other tests, if any, should be done in addition to mammograms in women with dense breasts.

Studies have shown that [breast ultrasound](#) and [magnetic resonance imaging \(MRI\)](#) can help find some breast cancers that can't be seen on mammograms. But MRI and ultrasound can both show more findings that are not cancer. This can lead to more tests and unnecessary [biopsies](#). And the cost of ultrasound and MRI may not be covered by insurance.

[Digital breast tomosynthesis \(3D mammography\)](#) can also find some cancers not seen on regular mammograms.

Talk to your health care provider about whether you should have other tests.

What should I do if I have dense breast tissue?

If your mammogram report says that you have dense breast tissue, talk with your provider about what this means for you. Be sure that your doctor or nurse knows your

medical history and if there's anything in your history that increases your risk for breast cancer.

Any woman who's already in a high-risk group (based on gene mutations, a strong family history of breast cancer, or other factors) should have an MRI along with her yearly mammogram.

To learn more about breast cancer risk factors, see [Breast Cancer Risk and Prevention](#)¹. To find out if you're in a higher-risk group for breast cancer, see [American Cancer Society Recommendations for the Early Detection of Breast Cancer](#).

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/risk-and-prevention.html

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Limitations of Mammograms

Mammograms are the best breast cancer screening tests we have at this time. But mammograms have their limits. For example, they aren't 100% accurate in showing if a

woman has breast cancer:

- A **false-negative** mammogram looks normal even though breast cancer is present.
- A **false-positive** mammogram looks abnormal even though there's no cancer in the breast.

False-negative results

A false-negative mammogram looks normal even though breast cancer is present. Overall, screening mammograms do not find about 1 in 5 breast cancers.

- Women with [dense breasts](#) are more likely to get false-negative results.
- False-negative mammograms can give women a false sense of security, thinking that they don't have breast cancer when in fact they do.

False-positive results

A false-positive mammogram looks abnormal even though no cancer is actually present. Abnormal mammograms often require extra testing ([diagnostic mammograms](#), [ultrasound](#), and sometimes [MRI](#) or even a [breast biopsy](#)) to find out if the change is cancer.

- False-positive results are more common in women who are younger, have dense breasts, have had breast biopsies, have breast cancer in the family, or are taking estrogen.
- About half of the women getting annual mammograms over a 10-year period will have a false-positive finding at some point.
- The odds of a false-positive finding are highest for the first mammogram. Women who have past mammograms available for comparison reduce their odds of a false-positive finding by about 50%.
- False-positive mammograms can cause anxiety. They can also lead to [extra tests](#) to be sure cancer isn't there, which cost time and money and maybe even physical discomfort.

Mammograms might not be helpful for all women

The value of a screening mammogram depends on a woman's overall health. Finding breast cancer early may not help her live longer if she has other serious or life-threatening health problems, such as serious heart disease, or severe kidney, liver, or lung disease. The [American Cancer Society breast cancer screening guidelines](#) emphasize that women with serious health problems or short life expectancies should discuss with their doctors whether they should continue having mammograms. Our guidelines also stress that age alone should not be the reason to stop having regular mammograms.

It's important to know that even though mammograms can often find breast cancers that are too small to be felt, treating a small tumor does not always mean it can be cured. A fast-growing or aggressive cancer might have already spread.

Overdiagnosis and overtreatment

Screening mammograms can often find invasive breast cancer and [ductal carcinoma in situ](#)¹ (DCIS, cancer cells in the lining of breast ducts) that need to be treated. But it's possible that some of the invasive cancers and DCIS found on mammograms would never grow or spread. (Finding and treating cancers that would never cause problems is called *overdiagnosis*.) These cancers are not life-threatening, and never would have been found or treated if the woman had not gotten a mammogram. The problem is that doctors can't tell these cancers from those that **will** grow and spread.

Overdiagnosis leads to some women getting treatment that's not really needed (*overtreatment*), because the cancer never would have caused any problems. Doctors can't always tell which cancers will be life-threatening and which won't ever cause problems. Because of this, all cases are treated. This exposes some women to the side effects of cancer treatment, even though it's really not needed.

Still, overdiagnosis is not thought to happen very often. There's a wide range of estimates of the percentage of breast cancers that might be overdiagnosed by mammography, but the most credible estimates range from 1% to 10%.

Radiation exposure

Because mammograms are x-ray tests, they expose the breasts to radiation. The amount of radiation from each mammogram is low, but it can still add up over time. For more on this, see [Mammogram Basics](#).

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/types-of-breast-cancer/dcis.html

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Mammograms After Breast Cancer Surgery

There are many different kinds of [breast cancer surgery](#)¹. The type of surgery you have had will determine whether you need to get mammograms in the future. If you have had [breast-conserving surgery](#)² (BCS), you need to continue to get mammograms. If you have had a [mastectomy](#)³, you most likely won't need a mammogram of that breast.

However, if you had surgery (of any type) on only one breast, you will still need to get mammograms of the unaffected breast. This is very important, because women who have had one breast cancer are at higher risk of developing a new cancer in the other breast.

While the **American Cancer Society does not have specific guidelines for mammograms or other breast imaging in women who have been treated for breast cancer**, there is information available about what these women will probably need to do.

Mammograms after breast-conserving surgery

Most experts recommend that women who have had breast-conserving surgery or BCS (sometimes called a partial mastectomy or lumpectomy) get a mammogram of the treated breast 6 to 12 months after radiation treatment ends. Surgery and radiation both cause changes in the skin and breast tissues that will show up on the mammogram, which might make it harder to read. The mammogram done at this time serves as a new baseline for the affected breast. Future mammograms will be compared with this one, to help the doctor check on healing and look for signs that the cancer has come back (recurred).

You should have follow-up mammograms of the treated breast at least yearly after that, but some doctors may recommend that you have mammograms more often. You will still need to have routine mammograms on the opposite (untreated) breast as well.

Mammograms after mastectomy

Women who have had a mastectomy (including simple mastectomy, modified radical mastectomy, and radical mastectomy) to treat breast cancer should not need further routine screening mammograms on that side, but will still need to have a yearly mammogram on the remaining breast. If both breasts are removed (a double or bilateral mastectomy), additional mammograms should not be needed because there shouldn't be enough tissue left to do a mammogram. Cancer might come back in the skin or chest wall on that side, but it is usually found on a physical exam.

It's possible for women with **reconstructed breasts** to get mammograms, but experts agree that women who have breast reconstruction after a simple, modified radical, or radical mastectomy don't need routine mammograms. Still, if an area of concern is found during a physical exam on a woman who has had breast reconstruction, a diagnostic mammogram may be done. Breast ultrasound or MRI may also be used to look at the area closely.

Women who have had a **subcutaneous mastectomy**, also called **skin-sparing mastectomy**, still need follow-up mammograms. In this surgery, the woman keeps her nipple and the tissue just under the skin. Often, a breast implant is put under the skin. This surgery leaves behind enough breast tissue to require yearly screening mammograms in these women.

If you're not sure what type of mastectomy you had or if you need to get mammograms, be sure to ask your doctor.

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer.html
2. www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer/breast-conserving-surgery-lumpectomy.html
3. www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer/mastectomy.html

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Mammograms for Women with Breast Implants

If you have breast implants, you should still get regular screening mammograms [as](#)

[recommended](#).

It's important to tell the technologist you have implants before your mammogram is started. In fact, it's best to mention this when you make the appointment to have your mammogram done. This way you can find out if the facility has experience doing mammograms in women with breast implants.

You should be aware that it might be hard for the doctor to see certain parts of your breast. The x-rays used in mammograms cannot go through silicone or saline implants well enough to show the breast tissue that is in line with them on the mammogram. This means that part of the breast tissue can be hard to see on a mammogram.

To help the doctor see as much breast tissue as possible, women with implants have 4 extra pictures done (2 on each breast), as well as the 4 standard pictures taken during a screening mammogram. In these extra pictures, called **implant displacement (ID) views**, the implant is pushed back against the chest wall and the breast is pulled forward over it and then compressed. This allows better imaging of the front part of each breast.

Implant displacement views are harder to do and can be uncomfortable if a lot of scar tissue (called *contractures*) has formed around the implants. ID views are easier if the implants were placed underneath (behind) the chest muscles.

Very rarely, the mammogram process can rupture an implant. This is another important reason to make sure the mammography facility knows you have implants.

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Breast Ultrasound

Breast ultrasound uses sound waves to make a computer picture of the inside of the breast. It can show certain breast changes, like fluid-filled cysts, that are harder to identify on mammograms.

When is breast ultrasound used?

Ultrasound is useful for looking at some breast changes, such as lumps (especially those that can be felt but not seen on a mammogram) or changes in women with [dense breast tissue](#). It also can be used to look at a suspicious area that was seen on a mammogram.

Ultrasound is useful because it can often tell the difference between fluid-filled [cysts](#)¹ (which are very unlikely to be cancer) and solid masses (which might need further testing to be sure they're not cancer).

Ultrasound can also be used to help guide a [biopsy](#) needle into an area so that cells can be taken out and tested for cancer. This can also be done in swollen lymph nodes under the arm.

Ultrasound is widely available, easy to have, and does not expose a person to radiation. It also costs less than a lot of other options.

How is it done?

A gel is put on the skin of the breast, and a wand-like instrument called a *transducer* is moved over the skin. The transducer sends out sound waves and picks up the echoes as they bounce off body tissues. The echoes are made into a picture on a computer screen. You might feel some pressure as the transducer is moved across the breast, but it should not be painful.

Automated breast ultrasound (ABUS) is an option that uses a much larger transducer to take hundreds of images that cover nearly the entire breast. When ABUS is done, a second handheld ultrasound is often needed to get more pictures of suspicious areas.

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibrosis-

[and-simple-cysts-in-the-breast.html](#)

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Breast MRI

Breast MRI (magnetic resonance imaging) uses radio waves and strong magnets to make detailed pictures of the inside of the breast.

When is breast MRI used?

To help determine the extent of breast cancer: Breast MRI is sometimes used in women who already have been diagnosed with breast cancer, to help measure the size of the cancer, look for other tumors in the breast, and to check for tumors in the opposite breast. But not every woman who has been diagnosed with breast cancer needs a breast MRI.

To screen for breast cancer: For certain women [at high risk for breast cancer](#), a screening MRI is recommended along with a yearly mammogram. MRI is not recommended as a screening test by itself because it can miss some cancers that a mammogram would find.

Although MRI can find some cancers not seen on a mammogram, it's also more likely to find things that turn out not to be cancer (called a *false positive*). This can result in a woman getting tests and/or [biopsies](#) that end up not being needed. This is why MRI is not recommended as a screening test for women [at average risk of breast cancer](#).

What you need to know about getting a breast MRI

Just as mammograms are done using x-ray machines specially designed for the breasts, breast MRI also requires special equipment. This MRI machine is called an *MRI with dedicated breast coils*. Not all hospitals and imaging centers have dedicated breast MRI equipment. If you are having a breast MRI, it's important to have it at a facility with dedicated equipment, and that can do an MRI-guided breast biopsy (or partners with a facility that can).

MRI uses strong magnets instead of radiation to make very detailed, cross-sectional pictures of the body. An MRI scanner takes pictures from many angles, as if someone were looking at a slice of your body from the front, from the side, or from above your head. MRI creates pictures of soft tissue parts of the body that would sometimes be hard to see using other imaging tests.

Tips for getting ready for the test

Check with your insurance provider before getting an MRI: Breast MRI costs a lot, and it may need to be approved by your insurance company before the scan is done. Most private insurance plans that pay for mammogram screening also pay for MRI as a screening test if a woman can be shown to be at high risk. It might help to go to a center with a high-risk clinic, where the staff has experience getting approval for breast MRIs.

Follow all instructions: You don't usually need a special diet or preparation before an MRI, but follow any instructions you're given.

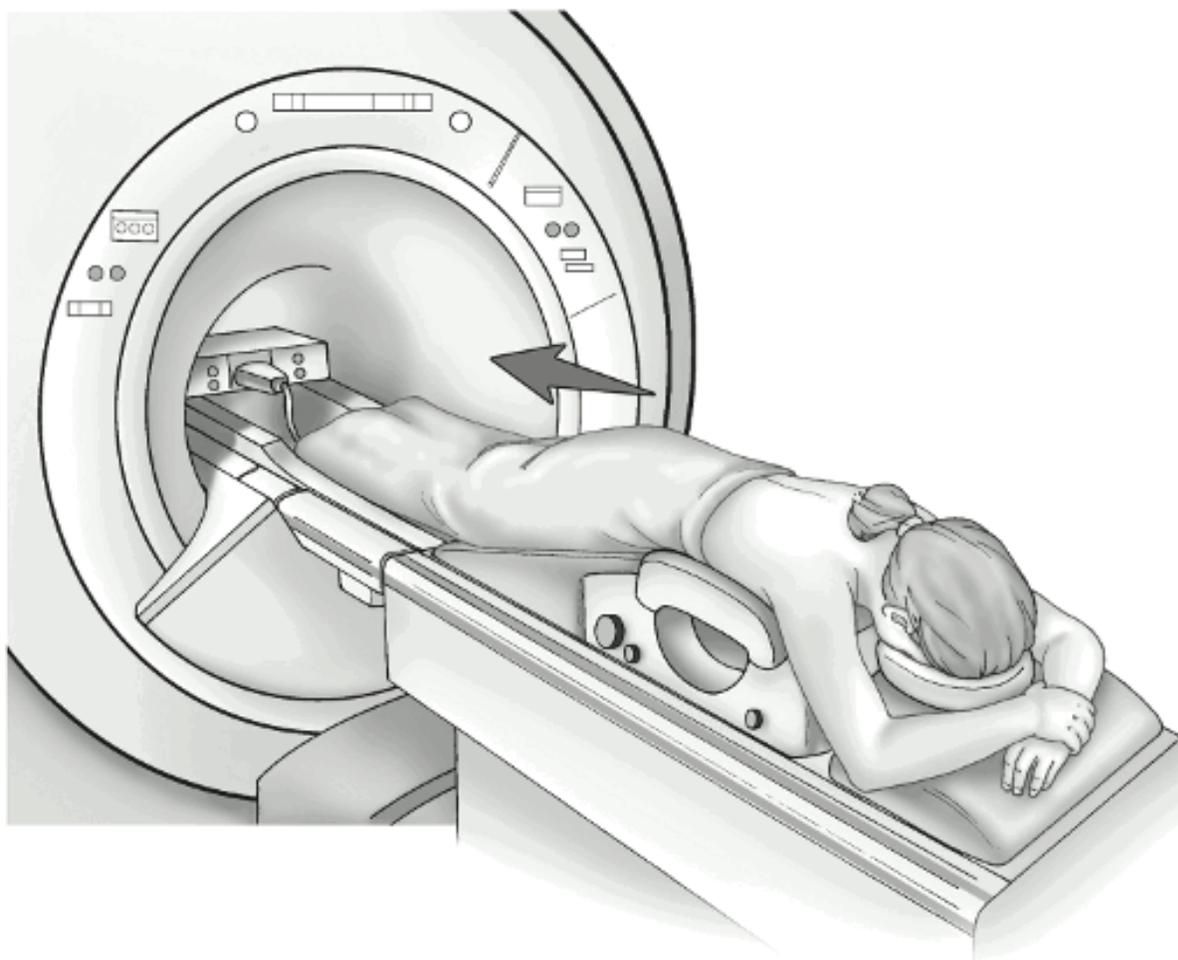
If you have trouble with enclosed spaces: Breast MRI is most often done while you are lying on your belly inside a long, narrow tube. If being in a tight space might be a problem for you (you have claustrophobia), you might need to take medicine to help you relax while in the scanner. Talking with the technologist or a patient counselor or getting a tour of the MRI machine before the test can also help. You'll be in the exam room alone, but you can talk to the MR technologist, who can see and hear what's going on.

Remove metal objects: Before the test, you'll be asked to undress and put on a gown or other clothes without zippers or metal. Be sure to remove any metal objects you can, like hair clips, jewelry, dental work, and body piercings.

If you have metal in your body: Before the scan, the technologist will ask you if you have any metal in your body. Some metallic objects will not cause problems, but others can.

If you have any of these types of medical implants, you should not even enter the MRI scanning area unless you're told it's OK to do so by a radiologist or technologist:

- An implanted defibrillator or pacemaker
- Clips used on a brain aneurysm
- A cochlear (ear) implant
- Metal coils inside blood vessels



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Breast MRI

What's it like to get a breast MRI?

MRI scans are usually done on an outpatient basis in a hospital or clinic. You'll lie face down on a narrow, flat table. Your breasts will hang down into an opening in the table so they can be scanned without being compressed. The technologist may use pillows to make you comfortable and help keep you from moving. The table then slides into a long, narrow tube.

The test is painless, but you have to lie still inside the narrow tube. You may be asked to hold your breath or keep very still during certain parts of the test. The machine may make loud, thumping, clicking, and whirring noises, much like the sound of a washing machine, as the magnet switches on and off. Some facilities give you earplugs or headphones to help block noise out during testing.

The most useful MRI exams for breast imaging use a contrast material called *gadolinium* that's injected into a vein in the arm before or during the exam, which helps to clearly show breast tissue details. (This is not the same as the contrast dye used in CT scans.) Let the technologist know if you have any kind of allergies or have had problems before with any contrast or dye used in imaging tests.

It's important to stay very still while the images are being made.

Each set of images usually takes a few minutes, and the whole test usually takes between 45 and 60 minutes. After the test, you may be asked to wait while the pictures are checked to see if more are needed.

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Newer and Experimental Breast Imaging Tests

The most commonly used breast imaging tests at this time are [mammograms](#), [ultrasound](#), and [breast MRI](#).

Newer types of tests are now being developed for breast imaging. Some of these, such as [breast tomosynthesis \(3D mammography\)](#), are already being used in some centers. Other tests are still being studied, and it will take time to see if they are as good as or better than those used today.

Molecular breast imaging (MBI), also known as **scintimammography** or **breast-specific gamma imaging (BSGI)**, is a type of [nuclear medicine imaging test](#)¹ for the breast. A radioactive chemical is injected into the blood, and a special camera is used to see into the breast. This test is being studied mainly as a way to follow up breast problems (such as a lump or an abnormal mammogram), or to help determine the extent of breast cancer that has already been diagnosed. It's also being studied as a test that can be used along with mammograms to look for cancer in women with [dense breasts](#). One potential drawback is that it exposes the whole body to radiation, so it's unlikely this test would be used for screening every year.

Positron emission mammography (PEM) is a newer imaging test of the breast that is very similar to a [PET scan](#)². A form of sugar attached to a radioactive particle is injected into the blood to detect cancer cells. A PEM scan may be better able to detect small clusters of cancer cells within the breast. Right now it's being studied mainly in women with breast cancer to see if it can help determine the extent of the cancer. As with MBI, it exposes the whole body to radiation, so it's unlikely to be a test that could be used every year for breast cancer screening.

Contrast-enhanced mammography (CEM), also known as **contrast-enhanced spectral mammography (CESM)**, is a newer test in which a contrast dye containing iodine is injected into a vein a few minutes before two sets of mammograms (using

different energy levels) are taken. The contrast can help the x-rays show any abnormal areas in the breasts. This test can be used to get a better look at areas that appear abnormal on a standard mammogram, or to help assess the extent of a tumor in women just diagnosed with breast cancer. Studies are now comparing it to [breast MRI](#) in these settings, as well as possibly for use in screening women with dense breasts. If it proves to be as good as MRI, CEM could become more widely used because it is quicker to do and is less expensive than MRI.

Optical imaging tests pass light into the breast and then measure the light that returns or passes through the tissue. The technique does not use radiation and does not require breast compression. Studies going on now are looking at combining optical imaging with other tests like MRI, ultrasound, or 3D mammography to help look for breast cancer.

Electrical impedance imaging (EIT) scans the breast for electrical conductivity. It's based on the idea that breast cancer cells conduct electricity differently from normal cells. The test passes a very small electrical current through the breast and then detects it on the skin of the breast. This is done using small electrodes that are taped to the skin. EIT does not use radiation or compress the breasts. This test can be used to help classify tumors found on mammograms. But at this time there hasn't been enough clinical testing to use it for breast cancer screening.

Elastography is a test that can be done as part of an [ultrasound](#) exam. It's based on the idea that breast cancers tend to be firmer and stiffer than the surrounding breast tissue. For this test, the breast is compressed slightly, and the ultrasound can show how firm a suspicious area is. This test might prove to be useful in telling if the area is more likely to be cancer or a benign (non-cancerous) tumor.

Hyperlinks

1. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-for-cancer.html
2. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-for-cancer.html

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Breast Biopsy

When other tests show that you might have breast cancer, you will probably need to have a biopsy. Needing a breast biopsy doesn't necessarily mean you have cancer. Most biopsy results are not cancer, but a biopsy is the only way to find out for sure. During a biopsy, a doctor will remove small pieces from the suspicious area so they can

be looked at in the lab to see if they contain cancer cells.

Types of breast biopsies

There are different kinds of breast biopsies. Some are done using a hollow needle, and some use an incision (cut in the skin). Each has pros and cons. The type you have depends on a number of things, like:

- How suspicious the breast change looks
- How big it is
- Where it is in the breast
- If there is more than one
- Any other medical problems you might have
- Your personal preferences

For most suspicious areas in the breast, a needle biopsy (rather than a surgical biopsy) can be done. Ask the doctor which type of biopsy you will have and what you can expect during and after the procedure.

Fine needle aspiration (FNA) biopsy

In an FNA biopsy, a very thin, hollow needle attached to a syringe is used to withdraw (aspirate) a small amount of tissue from a suspicious area. The needle used for an FNA biopsy is thinner than the one used for blood tests.

Core needle biopsy

A core biopsy uses a larger needle to sample breast changes felt by the doctor or seen on an ultrasound, mammogram, or MRI. This is often the preferred type of biopsy if breast cancer is suspected.

Surgical (open) biopsy

In rare cases, surgery is needed to remove all or part of the lump for testing. This is called a surgical or open biopsy. Most often, the surgeon removes the entire mass or abnormal area as well as a surrounding margin of normal breast tissue.

Lymph node biopsy ¹

The doctor may also need to biopsy the lymph nodes under the arm to check them for cancer spread. This might be done at the same time as biopsy of the breast tumor, or when the breast tumor is removed at surgery. This can be done by needle biopsy, or with a sentinel lymph node biopsy and/or an axillary lymph node dissection.

Regardless of which type of biopsy you have, the biopsy samples will be sent to a lab where a specialized doctor called a *pathologist* will look at them. It typically will take at least a few days for you to find out the results.

Questions to Ask Before a Breast Biopsy

It's important to ask questions if there's anything you're not sure about. Get a detailed list of questions to ask your doctor before getting a breast biopsy.

If the doctor doesn't think you need a biopsy, but you still feel there's something wrong with your breast, follow your instincts. Don't be afraid to talk to the doctor about this or go to another doctor for a second opinion. A biopsy is the only sure way to diagnose breast cancer.

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer/lymph-node-surgery-for-breast-cancer.html

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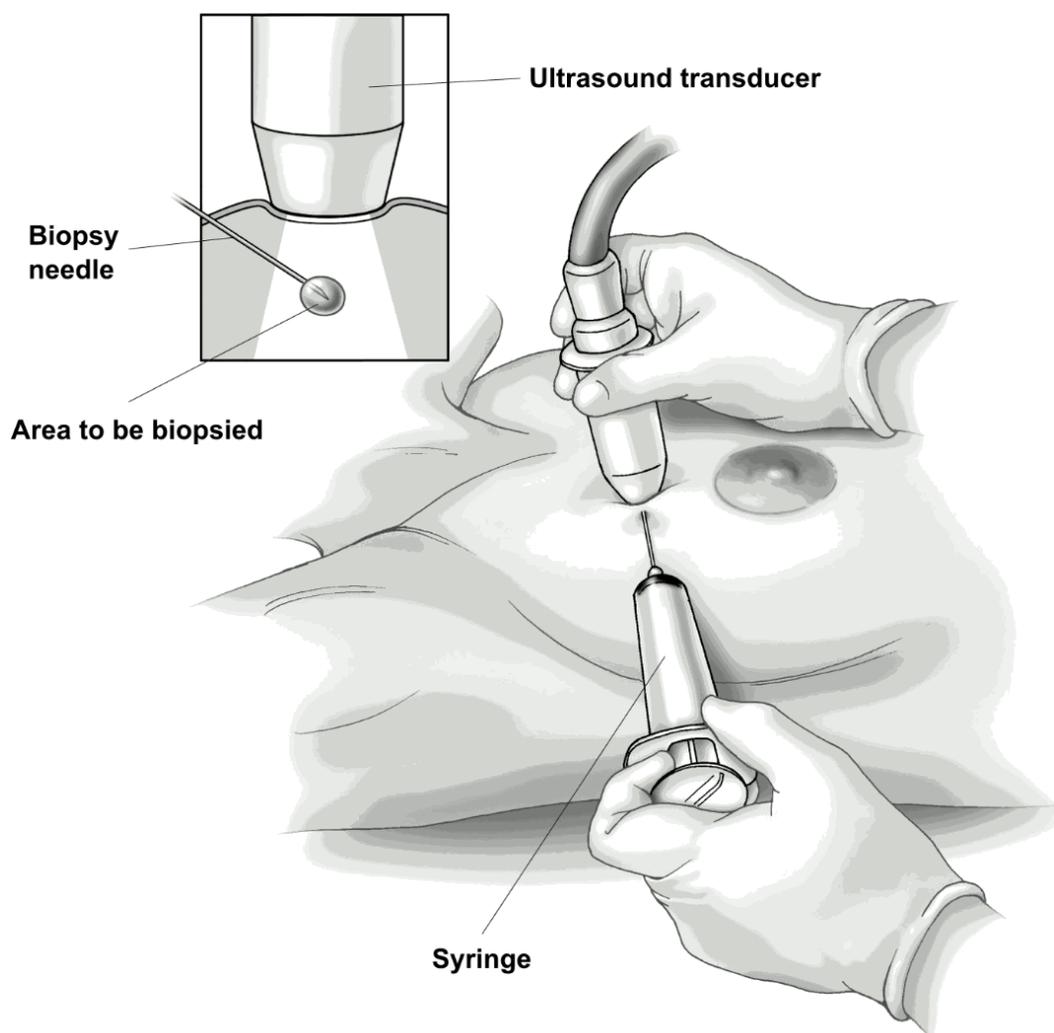
Fine Needle Aspiration (FNA) Biopsy of the Breast

If other tests show you might have breast cancer, your doctor may refer you for a fine needle aspiration (FNA) biopsy. During this procedure, a small amount of breast tissue or fluid is taken from the suspicious area and is checked for cancer cells.

What is an FNA breast biopsy?

In an FNA biopsy, the doctor uses a very thin, hollow needle attached to a syringe to withdraw (aspirate) a small amount of tissue or fluid from a suspicious area. The biopsy sample is then checked to see if there are cancer cells in it.

If the area to be biopsied can be felt, the needle can be guided into it while the doctor is feeling it.



© Sam and Amy Collins

Fine needle aspiration using ultrasound

If the lump can't be felt easily, the doctor might watch the needle on an [ultrasound](#) screen as it moves toward and into the area. This is called an *ultrasound-guided biopsy*.

What should you expect if you have an FNA?

During an FNA

An FNA is an outpatient procedure most often done in the doctor's office. Your doctor

might use a numbing medicine (called a *local anesthetic*), but it's not needed in all cases. This is because the needle used for the biopsy is so thin that getting an anesthetic might hurt more than the biopsy itself.

You'll lie on your back for the FNA, and you will have to be still while it's being done.

If ultrasound is used, you may feel some pressure from the ultrasound wand and as the needle is put in. Once the needle is in the right place, the doctor will use the syringe to pull out a small amount of tissue and/or fluid. This might be repeated a few times. Once the biopsy is done, the area is covered with a sterile dressing or bandage.

Getting each biopsy sample usually takes about 15 seconds. The entire procedure from start to finish generally takes around 20 to 30 minutes if ultrasound is used.

After an FNA

Your doctor or nurse will tell you how to care for the biopsy site and what you can and can't do while it heals. Biopsies can sometimes cause bleeding, bruising, or swelling. This can make it seem like the breast lump is larger after the biopsy. Most often, this is nothing to worry about, and the bleeding, bruising, and swelling go away over time.

What does an FNA show?

A doctor called a *pathologist* will look at the biopsy tissue or fluid to find out if there are cancer cells in it.

- If the fluid is brown, green, or tan, the lump is most likely a [cyst](#)¹, and not cancer.
- Bloody or clear fluid can mean either a cyst that's not cancer or, very rarely, cancer.
- If the lump is solid, the doctor will look at small groups of cells from the biopsy to determine what it is.

The main advantages of FNA are that it is fairly quick, and the skin doesn't have to be cut, so no stitches are needed and there is usually no scar. Also, in some cases it's possible to make the diagnosis the same day.

An FNA biopsy is the easiest type of biopsy to have, but it can sometimes miss a cancer if the needle does not go into the cancer cells, or if it doesn't remove enough cells. Even if an FNA does find cancer, there might not be enough cancer cells to do some of the other lab tests that are needed.

If the results of the FNA biopsy do not give a clear diagnosis, or your doctor still has concerns, you might need to have a second biopsy or a different type of biopsy.

Hyperlinks

1. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibrosis-and-simple-cysts-in-the-breast.html

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Core Needle Biopsy of the Breast

If other tests show you might have breast cancer, your doctor might refer you for a core needle biopsy (CNB). This is often the preferred type of biopsy if breast cancer is suspected, because it removes more breast tissue than a [fine needle aspiration \(FNA\)](#), and it doesn't require [surgery](#).

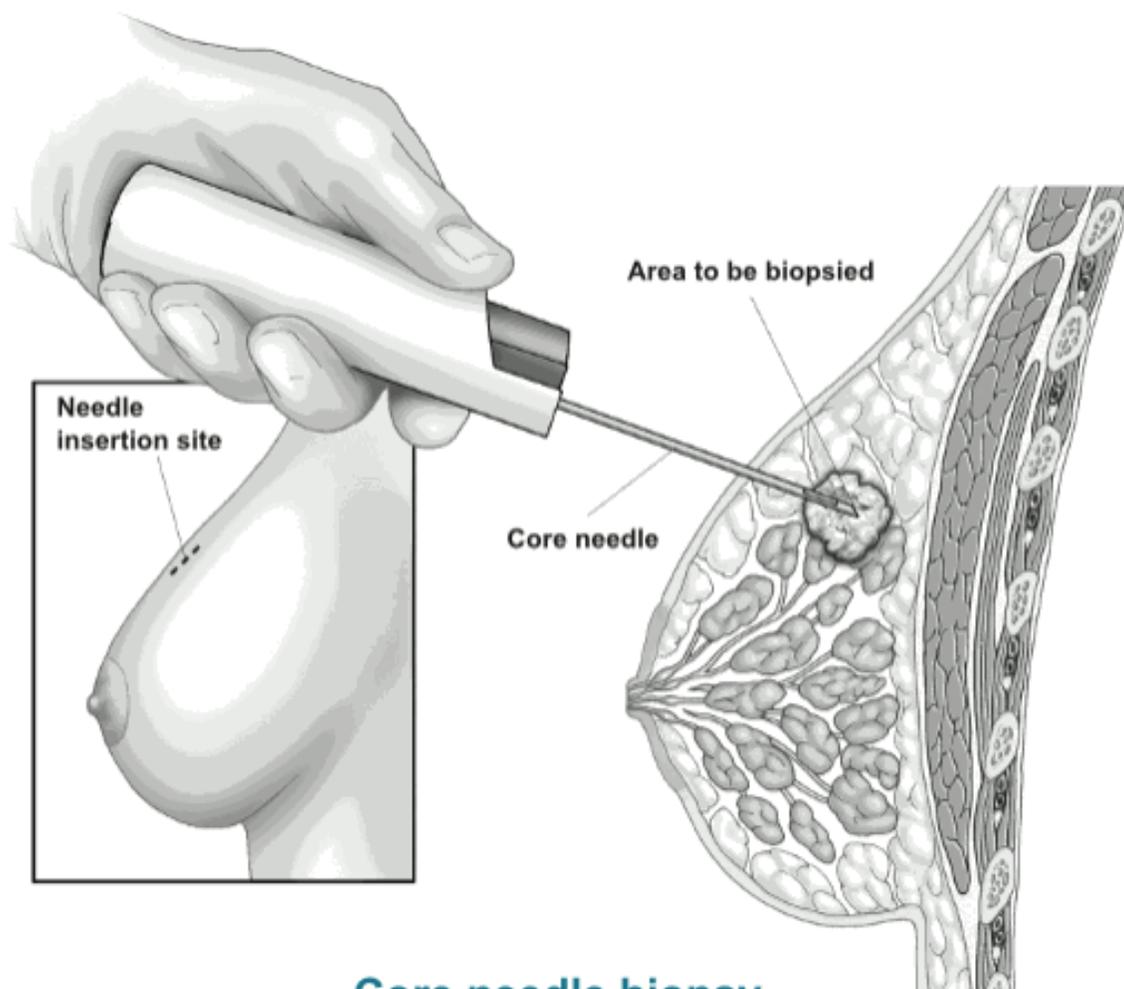
During this procedure, the doctor uses a hollow needle to take out pieces of breast tissue from the area of concern. This can be done with the doctor feeling the area, or while using an imaging test to guide the needle.

What is a core needle biopsy?

For a CNB, the doctor uses a hollow needle to take out pieces of breast tissue from a suspicious area the doctor has felt or has pinpointed on an imaging test. The needle may be attached to a spring-loaded tool that moves the needle in and out of the tissue quickly, or it may be attached to a suction device that helps pull breast tissue into the

needle.

A small cylinder (core) of tissue is taken out in the needle. Several cores are often removed.



Core needle biopsy

The doctor doing the CNB may put the needle in place by feeling the lump. But usually the needle is put into the abnormal area using some type of imaging test to guide the needle into the right place. Some of the imaging tests a doctor may use include:

- [Ultrasound](#)
- [MRI](#)
- [Mammogram](#) (or [breast tomosynthesis](#))

What should you expect if you have a CNB?

During the CNB

A CNB is an outpatient procedure most often done in the doctor's office with local anesthesia (you're awake but part of your breast is numbed). The procedure itself is usually quick, though it may take more time if imaging tests are needed or if one of the special types of CNB described below is used.

You may be sitting up, lying flat or on your side, or lying face down on a special table with openings for your breasts to fit into. You will have to be still while the biopsy is done.

For any type of CNB, a thin needle will be used to put in medicine to numb your skin. Then a small cut (about ¼ inch) will be made in the breast. The biopsy needle is put into the breast tissue through this cut to remove the tissue sample. You might feel pressure as the needle goes in. Again, imaging tests may be used to guide the needle to the right spot.

Typically, a tiny **tissue marker** (also called a **clip**) is put into the area where the biopsy is done. This marker shows up on mammograms or other imaging tests so the exact area can be located for further treatment (if needed) or follow up. You can't feel or see the marker. It can stay in place during MRIs, and it will not set off metal detectors.

Once the tissue is removed, the needle is taken out. No stitches are needed. The area is covered with a sterile dressing. Pressure may be applied for a short time to help limit bleeding.

After the CNB

You might be told to limit strenuous activity for a day or so, but you should be able to go back to your usual activities after that. Your doctor or nurse will give you instructions on this.

A CNB can cause some bleeding, bruising, or swelling. This can make it seem like the breast lump is larger after the biopsy. Most often, this is nothing to worry about, and any bleeding, bruising, or swelling will go away over time. Your doctor or nurse will tell you how to care for the biopsy site and when you might need to contact them if you're having any issues. A CNB usually doesn't leave a scar.

Special types of core needle biopsies

Stereotactic core needle biopsy

For this procedure, a doctor uses mammogram pictures taken from different angles to pinpoint the biopsy site. A computer analyzes the x-rays of the breast and shows exactly where the needle tip needs to go in the abnormal area. This type of CNB is often used to biopsy suspicious [microcalcifications](#) (tiny calcium deposits) or small masses or other abnormal areas that can't be seen clearly on an ultrasound.

Vacuum-assisted core biopsy

For a vacuum-assisted biopsy (VAB), a hollow probe is put through a small cut into the abnormal area of breast tissue. The doctor guides the probe into place using an imaging test. A cylinder (core) of tissue is then suctioned into the probe, and a rotating knife inside the probe cuts the tissue sample from the rest of the breast. Several samples can be taken from the same cut. This method usually removes more tissue than a standard core needle biopsy.

What does a CNB show?

A doctor called *apathologist* will look at the biopsy tissue and/or fluid to find out if there are cancer cells in it. A CNB is likely to clearly show if cancer is present, but it can still miss some cancers.

Ask your doctor when you can expect to get the results of your biopsy. If the results of the CNB do not give a clear diagnosis, or your doctor still has concerns, you might need to have a second biopsy or a different type of biopsy.

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Surgical Breast Biopsy

If other tests show you might have breast cancer, your doctor may refer you for a breast biopsy. Most often this will be a [core needle biopsy \(CNB\)](#) or a [fine needle aspiration \(FNA\) biopsy](#). But in some situations, such as if the results of a needle biopsy aren't clear, you might need a surgical (open) biopsy. During this procedure, a doctor cuts out all or part of the lump so it can be checked for cancer cells.

What is a surgical biopsy?

For this type of biopsy, surgery is used to remove all or part of a lump so it can be checked to see if there are cancer cells in it.

There are 2 types of surgical biopsies:

- An **incisional biopsy** removes only part of the abnormal area.
- An **excisional biopsy** removes the entire tumor or abnormal area. An edge (margin) of normal breast tissue around the tumor may be taken, too, depending on the reason for the biopsy.

Preoperative localization to guide surgical biopsy

If the change in your breast can't be felt and/or is hard to find, a [mammogram](#), [ultrasound](#), or [MRI](#) may be used to place a wire or other localizing device (such as a radioactive or magnetic seed, or a radiofrequency reflector) into the suspicious area to guide the surgeon the right spot. This is called *preoperative localization* (or *stereotactic wire localization* if a wire is used).

For **wire localization**, your breast is numbed, and an imaging test is used to guide a thin, hollow needle into the abnormal area. Once the tip of the needle is in the right spot, a thin wire is put in through the center of the needle. A small hook at the end of the wire keeps it in place, while the other end of the wire remains outside of the breast. The needle is then taken out. You then go to the operating room with the wire in your breast.

The surgeon uses the wire as a guide to the area to be removed. When this method is used, it is done the same day as your surgery.

In **newer methods of localization**, a localizing device is put into the suspicious area before the day of your surgery, so you don't have to have it done the morning of your operation. Radioactive or magnetic seeds (tiny pellets that give off a very small amount of radiation or that create small magnetic fields) or radiofrequency reflectors (small devices that give off a signal that can be picked by a device held over the breast) can be placed completely inside the breast (unlike the wire used for wire localization). Your surgeon can then find the suspicious area by using a handheld detector in the operating room.

What should you expect if you have a surgical biopsy?

During a surgical biopsy

Rarely, a surgical biopsy might be done in the doctor's office. But most often it's done in a hospital's outpatient department. You are typically given local anesthesia with intravenous (IV) sedation. (This means you're awake, but your breast is numbed, and you're given medicine to make you drowsy.) Another option is to have the biopsy done under general anesthesia (where you're given medicine to put you in a deep sleep and not feel pain).

The skin of the breast is cut, and the doctor removes the suspicious area. You often need stitches after a surgical biopsy, and pressure may be applied for a short time to help limit bleeding. The area is then covered with a sterile dressing.

After a surgical biopsy

The biopsy can cause bleeding, bruising, or swelling. This can make it seem like the breast is larger after the biopsy. Most often, this is nothing to worry about, and the bleeding, bruising, and swelling go away over time. Your doctor or nurse will tell you how to care for the biopsy site and when you might need to contact them if you're having any issues.

A surgical biopsy may leave a scar. You might also notice a change in the shape of your breast, depending on how much tissue is removed.

What does a surgical biopsy show?

A doctor called a *pathologist* will look at the biopsy tissue under a microscope to find out if there are cancer cells in it.

Ask your doctor when you can expect to get the results of your biopsy. The next steps will depend on the biopsy results.

If no cancer cells are found in the biopsy, your doctor will talk to you about when you need to have your next mammogram and any other follow-up visits.

If cancer is found, the doctor will talk to you about the kinds of tests needed to learn more about the cancer and how to best treat it. You might need to see other doctors, too.

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Questions to Ask Before a Breast Biopsy

There are different types of breast biopsies. It's important to understand the type of biopsy you'll have and what you can expect during and after the biopsy.

Here are some questions you might want to ask before having a breast biopsy:

- What [type of biopsy](#) do you think I need? Why?
- Will the size of my breast affect the way the biopsy is done?

- Where will you do the biopsy?
- What exactly will you do?
- How much breast tissue will you remove?
- How long will it take?
- Will I be awake or asleep during the biopsy?
- Will the biopsy area be numbed?
- Will I need someone to help me get home afterward?
- If you can't feel the abnormal area in my breast, how will you find it?
- If you are using a guide wire to help find the abnormal area, how will you make sure it's in the right place (with ultrasound or a mammogram)?
- Will I have a hole there? Will it show afterward?
- Will my breast have a different shape or look different afterward?
- Will you put a clip or marker in my breast? If so, what will happen to it?
- Will I have a scar? Where will it be? What will it look like?
- Will I have bruising or changes in the color of my skin? If so, how long will it last?
- Will I be sore? If so, how long will it last?
- Might I have any other types of problems after the biopsy? Are there any I'd need to call your office about?
- When can I take off the bandage?
- When can I take a shower or bath?
- Will I have stitches? Will they dissolve or will I need to come back to the office and have them removed?
- When can I go back to work? How will I feel when I do?
- Will my activities be limited? Can I lift things? Care for my children?
- How soon will I know the biopsy results?
- Should I call you or will you call me with the results?
- Will you or someone else explain the biopsy results to me?

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Imaging Tests to Find Out if Breast Cancer Has Spread

If you have been diagnosed with breast cancer, you might need more tests if your doctor thinks the cancer might have spread based on your symptoms, the results of your physical exam, or the size of your tumor. Not all women with breast cancer need these tests. Your doctor will talk with you about which (if any) of these tests you will need.

Chest x-ray¹: This test may be done to see if the cancer has spread to your lungs.

CT scan² (**computed tomography**): A CT scan uses x-rays taken from different angles, which are combined by a computer to make detailed pictures of the inside of your body. This test is most often used to look at the chest and/or belly (abdomen) to see if breast cancer has spread to other organs. It can also be used to guide a biopsy needle into an area of concern.

MRI³ (**magnetic resonance imaging**): This test makes detailed pictures using radio waves and strong magnets instead of x-rays. This test can be used to look at the breasts or other parts of the body. MRIs can be more uncomfortable than CT scans because they take longer, and you often need to lie in a narrow tube while the test is done.

Ultrasound⁴: For an ultrasound, a wand that gives off sound waves is moved over the skin to take pictures of the inside of the body. A gel is often put on your skin first.

PET scan⁵ (**positron emission tomography**): For this test, a form of radioactive sugar (called FDG) is put into a vein and travels throughout the body. Cancer cells absorb high amounts of this sugar. A special camera then takes pictures that show the areas where the sugar collected throughout the body. A PET scan is often combined with a CT scan (known as a *PET/CT scan*).

Bone scan⁶: This test can help show if the cancer has spread to your bones. It is similar to a PET scan, but it uses a different radioactive substance that settles in areas of change in the bones. It can show all of the bones of your body at the same time and can find small areas of cancer spread not seen on plain x-rays.

Hyperlinks

1. www.cancer.org/treatment/understanding-your-diagnosis/tests/x-rays-and-other-radiographic-tests.html
2. www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html
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Finding Breast Cancer During Pregnancy

Breast cancer during pregnancy is rare. But if you find a lump or notice any changes in your breasts that concern you, tell your doctor or nurse right away. There are a variety of tests a pregnant woman can have if breast cancer is suspected. And there are options for treating breast cancer if you are pregnant.

If you are pregnant and breast cancer is found, it may be called *gestational breast cancer* or *pregnancy-associated breast cancer (PABC)*.

How common is breast cancer during pregnancy?

Breast cancer is found in about 1 in every 3,000 pregnant women. But it is the most

common type of cancer found during pregnancy.

Breast cancers can be harder to find when you're pregnant

Hormone changes during pregnancy cause the breasts to change. They may become larger, lumpy, and/or tender. This can make it harder for you or your doctor to notice a lump caused by cancer until it gets quite large.

Another reason it may be hard to find breast cancers early during pregnancy is that many women put off breast cancer screening with [mammograms](#) until after the pregnancy. And because pregnancy and breastfeeding can make breast tissue denser, it can be harder to see an early cancer on a mammogram.

Because of these challenges, when a pregnant woman develops breast cancer, it's often diagnosed at a later stage than it would be if she were not pregnant. It's also more likely to have spread to lymph nodes.

What to look for

If you find a lump or notice any changes in your breasts that concern you, don't ignore them. Tell your doctor or nurse right away. If your doctor doesn't want to check it out with a mammogram, ask about other kinds of imaging tests such as [ultrasound](#) or [magnetic resonance imaging \(MRI\)](#). You may need to get a [second opinion](#)¹. Any suspicious breast changes should be checked out or even biopsied (see below) before assuming they are a normal response to pregnancy.

Are mammograms and other imaging tests safe during pregnancy?

A main concern with any imaging test during pregnancy is whether it exposes the developing fetus to radiation, which could be harmful, especially during the first trimester.

Mammograms can find most breast cancers that start when a woman is pregnant, and it's generally thought to be safe to have a mammogram during pregnancy. The amount of radiation needed for a mammogram is small, and the radiation is focused on the breasts, so that most of it doesn't reach other parts of the body. For extra protection, a lead shield is placed over the lower part of the belly to help keep radiation from reaching the womb. Still, small amounts of radiation might reach the fetus, and scientists can't be certain about the effects of even a very small dose of radiation on an unborn baby.

Ultrasound exams of the breast do not use radiation and are thought to be safe during pregnancy. This is typically an easy test to have, so it's often the first test done to evaluate a change in the breast (such as a lump).

MRI scans do not use radiation and are thought to be safe during pregnancy. But the contrast material (dye) used in MRI can cross the placenta, the organ that connects the mother to the fetus. This dye has been linked with fetal abnormalities in lab animals. For this reason, many doctors do not recommend MRI with contrast dye during pregnancy. An MRI without contrast can be used if needed.

Other tests, such as **PET scans**, **bone scans**, and **computed tomography (CT) scans** are more likely to expose the fetus to radiation (see below).

Breast biopsy during pregnancy

A new breast lump or abnormal imaging test result may cause concern, but a [biopsy](#) is the only way to find out if a breast change is cancer. During a biopsy, small pieces of breast tissue are taken from the area of concern. Breast biopsies are most often done using a hollow needle. They're usually done as an outpatient procedure, even if you're pregnant. The doctor uses medicine to numb just the area of the breast involved in the biopsy. This causes little risk to the fetus.

If a needle biopsy doesn't give an answer, a [surgical biopsy](#) is typically the next step. This means taking out a larger piece of tissue through a small cut (incision) in the breast. Surgical biopsies are often done under general anesthesia (where you are given medicine to put you into a deep sleep), which carries a small risk to the fetus.

Tests to stage the breast cancer

If breast cancer is found, you might need other tests to find out if cancer cells have spread within the breast or to other parts of the body. This process is called [staging](#)². Different staging tests may be needed, depending on your case.

As noted above, tests like **ultrasound** and **MRI** scans do not use radiation and are thought to be safe during pregnancy. But the contrast material (dye) sometimes used in MRI is typically not recommended during pregnancy. An MRI without contrast can be used if needed.

Chest x-rays are sometimes needed to help make treatment decisions. They use a small amount of radiation. They're thought to be safe to have when you're pregnant, as long as your belly is shielded.

Other tests, such as **PET scans**, **bone scans**, and **computed tomography (CT) scans** are more likely to expose the fetus to radiation. These tests are not often needed, especially if the cancer is thought to be just in the breast. If one of these tests is needed, doctors might be able to make adjustments to limit the amount of radiation exposure to the fetus.

Treatments are available if a pregnant woman has breast cancer. Learn more in [Treating Breast Cancer During Pregnancy](#)³.

Can breast cancer spread to the baby?

There are no reported cases of breast cancer spreading from the mother to the fetus. But in a very few cases, the cancer has reached the placenta (the organ that connects the mother to the fetus). This could affect the amount of nutrition the fetus gets from the mother.

Hyperlinks

1. www.cancer.org/treatment/finding-and-paying-for-treatment/choosing-your-treatment-team/seeking-a-second-opinion.html
2. www.cancer.org/treatment/understanding-your-diagnosis/staging.html
3. www.cancer.org/cancer/breast-cancer/treatment/treating-breast-cancer-during-pregnancy.html

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Written by

The American Cancer Society medical and editorial content team
(www.cancer.org/cancer/acs-medical-content-and-news-staff.html)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.

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