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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 Scans](#)
- [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 screenings recommendations for women at average breast cancer risk

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 10 more years or longer.

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

Mammograms

Regular [mammograms](#) can help find breast cancer at an early stage, when treatment is most successful. A mammogram can 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. It's important that women getting mammograms know what to expect and understand the benefits and limitations of screening.

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 yourself (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 report any changes to a health care provider right away.**

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 an [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](#)¹ (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 \(DCIS\)](#)², [lobular carcinoma in situ \(LCIS\)](#)³, [atypical ductal hyperplasia \(ADH\)](#), or [atypical lobular hyperplasia \(ALH\)](#)⁴
- 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 may 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/cancer/breast-cancer/risk-and-prevention/breast-cancer-risk-factors-you-cannot-change.html
2. www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/types-of-breast-cancer/dcis.html
3. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/lobular-carcinoma-in-situ.html
4. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-

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

References

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.

Mammogram Basics

A mammogram is an x-ray of the breast that looks for changes that may be signs of breast cancer.

Mammograms: What to Know Before You Go

Whether you're a mammogram newbie or a veteran, knowing what to expect may help the process go more smoothly.

Mammograms for Women with Breast Implants

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.

What Does the Doctor Look for on a Mammogram?

The doctor reading your mammogram will be looking for different types of breast

changes, such as small white spots called calcifications, lumps or tumors called masses, and other suspicious areas that could be signs of cancer.

Getting Called Back After a Mammogram

Getting called back after a screening mammogram is fairly common and doesn't mean you 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.

Limitations of Mammograms

Mammograms are the best breast cancer screening tests we have at this time. But mammography has limitations.

Understanding Your Mammogram Report

Doctors use a standard system to describe mammogram findings and results. This system is called the Breast Imaging Reporting and Data System (BI-RADS).

Breast Density and Your Mammogram Report

The density of your breasts is important. Cancers may be harder to find on mammograms in women with dense breasts. Having dense breasts might also affect your risk of breast cancer.

Having a Mammogram After You've Had Breast Cancer Surgery

Women who have had breast cancer are at higher risk of developing another breast cancer. The American Cancer Society does not have specific recommendations or guidelines for mammograms or other breast imaging tests for women who have been treated for breast cancer, but there is information about what these women will likely need to do.

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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 types 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 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.

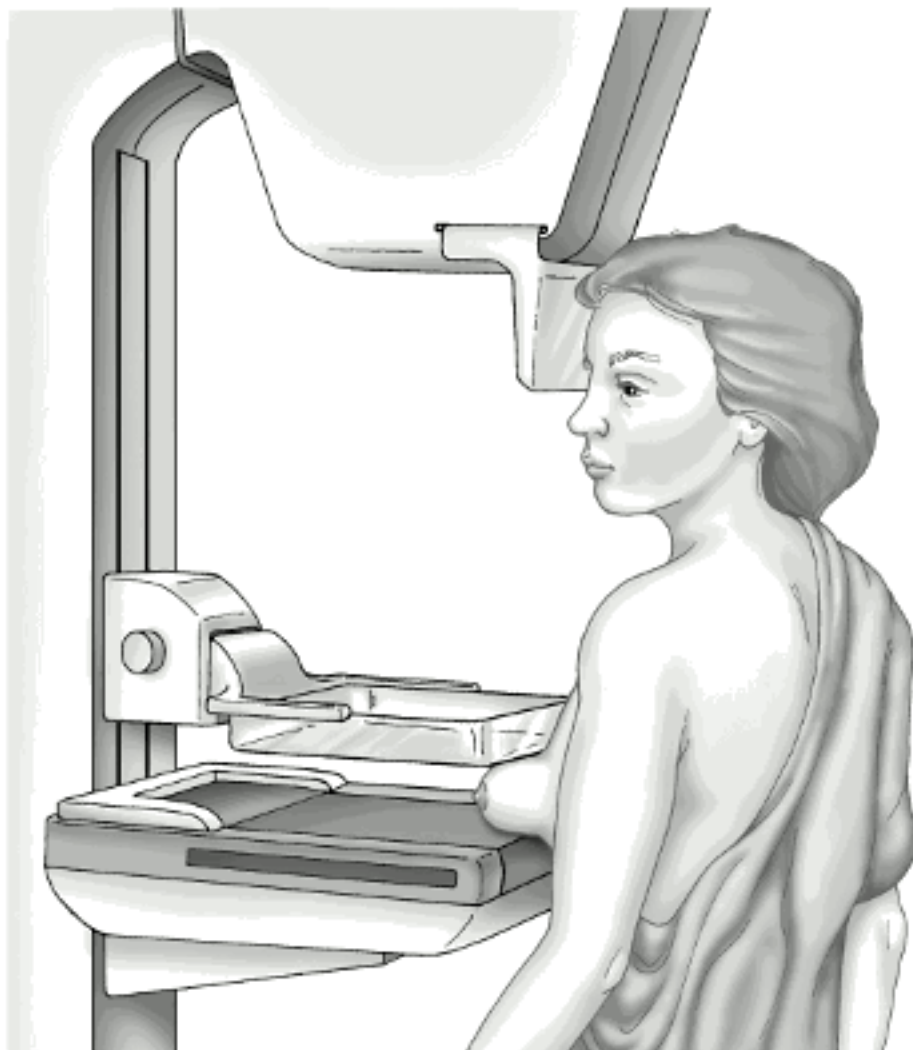
What do mammograms show?

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** (also known as *full-field digital mammography* or FFDM) are much more common. Digital images are recorded and saved as files in a computer.

A newer type of mammogram is known as **breast tomosynthesis** or **3D mammography**. For this, the breast is compressed once, and a machine takes many low-dose x-rays as it moves over the breast. A computer then puts the images together into a 3-dimensional picture. In some cases, this uses more radiation than standard 2-view mammograms, but it may allow doctors to see the breast tissues more clearly. Some studies have suggested it might lower the chance of being **called back** for follow-up testing. It may also be able to find more cancers. But not all health insurance

providers may cover tomosynthesis.

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.)

To put the dose 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 likely very small, screening mammograms aren't routinely done in pregnant women.

Hyperlinks

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

References

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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breast cancer in Europe: A literature review. *J Med Screen*, 2012;19:Suppl 1:42-56.

Rose SL, Tidwell AL, Bujnoch LJ, et al. Implementation of breast tomosynthesis in a routine screening practice: an observational study. *AJR Am J Roentgenol*. 2013;200(6):1401-1408.

Skaane P, Bandos AI, Gullien R, et al. Comparison of digital mammography alone and digital mammography plus tomosynthesis in a population-based screening program. *Radiology*. 2013;267(1):47-56.

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Mammograms: What to Know Before You Go

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.

Tips for getting a mammogram

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.
- The whole procedure takes about 20 minutes. The actual breast compression only lasts a few seconds.
- 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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Rosenberg RD, Hunt WC, Williamson MR, et al. Effects of age, breast density, ethnicity, and estrogen replacement therapy on screening mammographic sensitivity and cancer stage at diagnosis: Review of 183,134 screening mammograms in Albuquerque, New Mexico. *Radiology* 1998;209:511–518.

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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**, lumps or tumors 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.

A mass

A mass is the same as a lump or a tumor. 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 tumors can be more concerning, but most breast tumors are not cancer.

A cyst and a solid tumor 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 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), 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 may 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, as opposed 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 in a breast cancer high-risk group (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 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](#)¹ 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 sees [calcifications or a mass](#)² (a [cyst](#)³ or solid tumor).
- 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 have 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 carefully studied. 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 have 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 can expect to learn the results of your tests during the visit. You are likely to 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 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 to have 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 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, how many tumors there are, 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 including disbelief, anxiety, fear, anger, and 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](#)⁴ 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.

- 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/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html
2. www.cancer.org/treatment/understanding-your-diagnosis/tests/understanding-your-pathology-report/breast-pathology/breast-cancer-pathology.html
3. www.cancer.org/cancer/breast-cancer/non-cancerous-breast-conditions/fibrosis-and-simple-cysts-in-the-breast.html
4. 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 number system of 0 through 6. 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 accurately 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	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 use of spot compression (applying compression to a smaller area when doing the mammogram), magnified views, special mammogram views, or ultrasound . This 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 (they are symmetrical) 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 ensures that others who look at the mammogram will not misinterpret the benign finding as suspicious. This finding is recorded in your mammogram report to help when comparing to future mammograms.
3	Probably benign finding – Follow-up in a short time frame is suggested	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. But since it's not proven to be benign, it's helpful to see if the area in question does change over time. You will likely need follow-up with repeat imaging in 6 months and regularly after that until the finding is known to be stable (usually at least 2 years). This approach helps avoid unnecessary biopsies , but if

		the area does change over time, it still allows for early diagnosis.
4	Suspicious abnormality – Biopsy should be considered	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 can have a wide range of suspicion levels. For this reason, some, but not all, doctors divide this category further: 4A: Finding with a low suspicion of being cancer 4B: Finding with an intermediate suspicion of being cancer 4C: Finding of moderate concern of being cancer, but not as high as Category 5
5	Highly suggestive of malignancy – Appropriate action should be taken	The findings look like cancer and have a high chance (at least 95%) of being cancer. Biopsy is very strongly recommended.
6	Known biopsy-proven malignancy – Appropriate action should be taken	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 this way to see how well the cancer is responding to treatment.

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 opposed to fatty tissue. The denser your breasts, the harder it can be to see abnormal areas on mammograms.

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

References

American College of Radiology. BI-RADS ATLAS – Mammography. Reporting System, 2013. Accessed at www.acr.org/~media/ACR/Documents/PDF/QualitySafety/Resources/BIRADS/01%20Mammography/02%20%20BIRADS%20Mammography%20Reporting.pdf on August 24, 2017.

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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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. **Having dense breasts is very common and is not abnormal.**

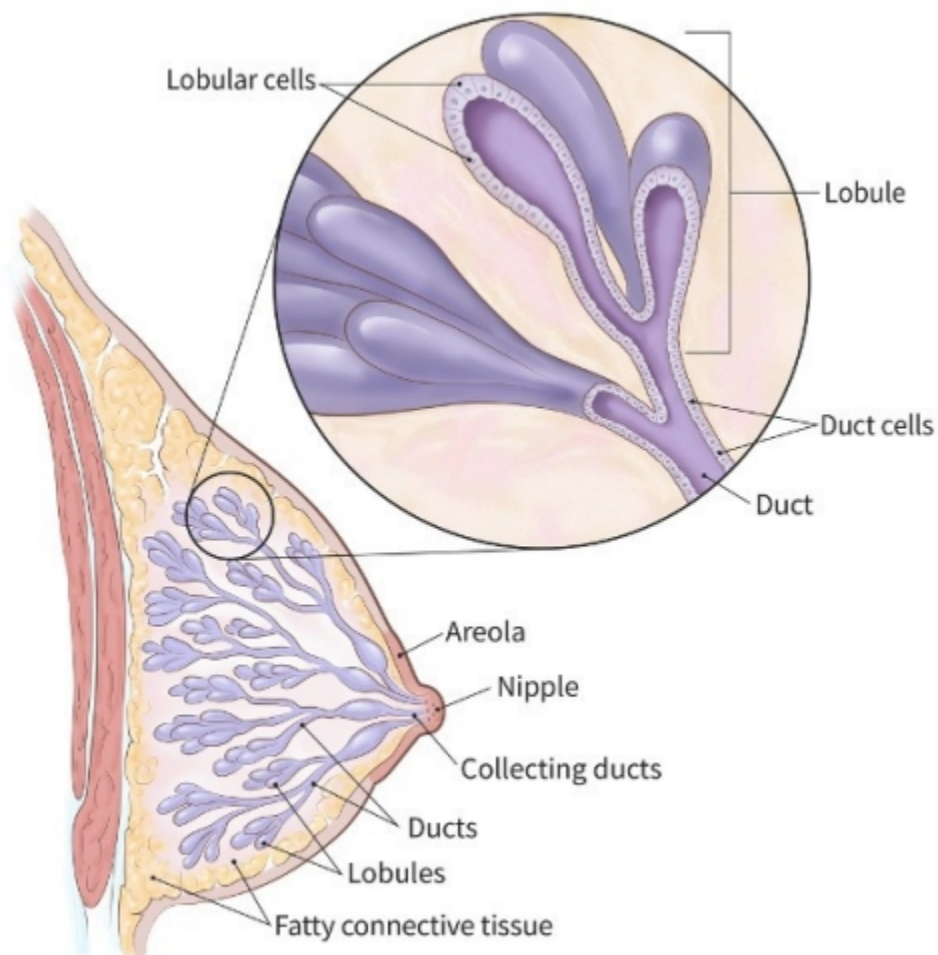
What is dense breast tissue?

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 tissues in place.

Your breasts will be seen as dense if you have a lot of fibrous or glandular tissue and not much fat in the breasts. 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.



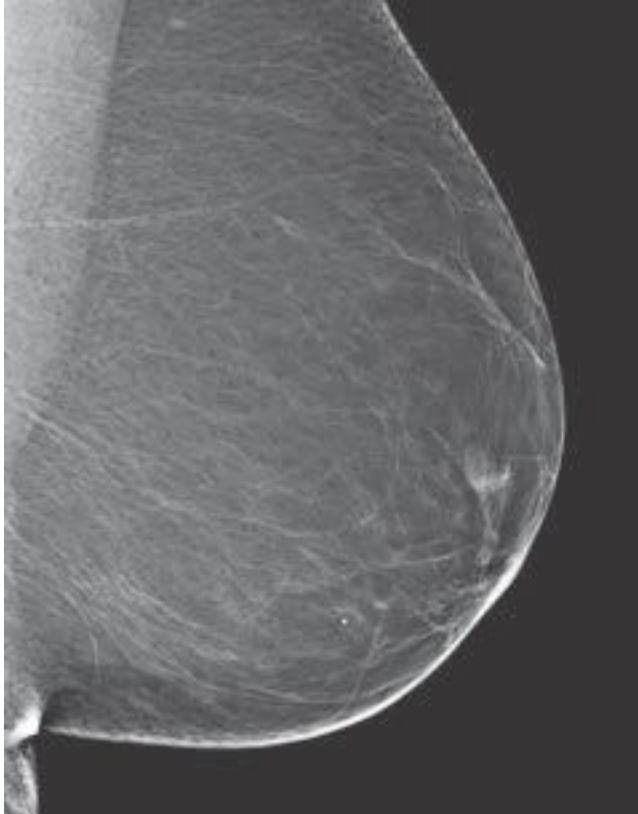
How do I know if I have dense breasts?

Breast density is seen only on mammograms. Some women think that because their breasts are firm, they are dense. But breast density isn't based on how your breasts feel. It's not related to breast size or firmness.

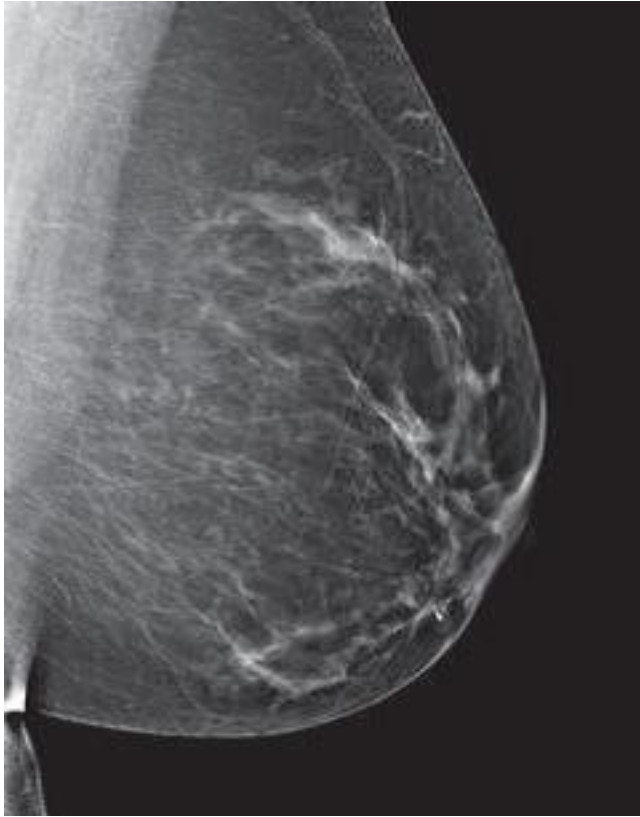
Radiologists are the doctors who "read" x-rays like mammograms. They check your mammogram for [abnormal areas](#), and also look at breast density.

Breast density categories

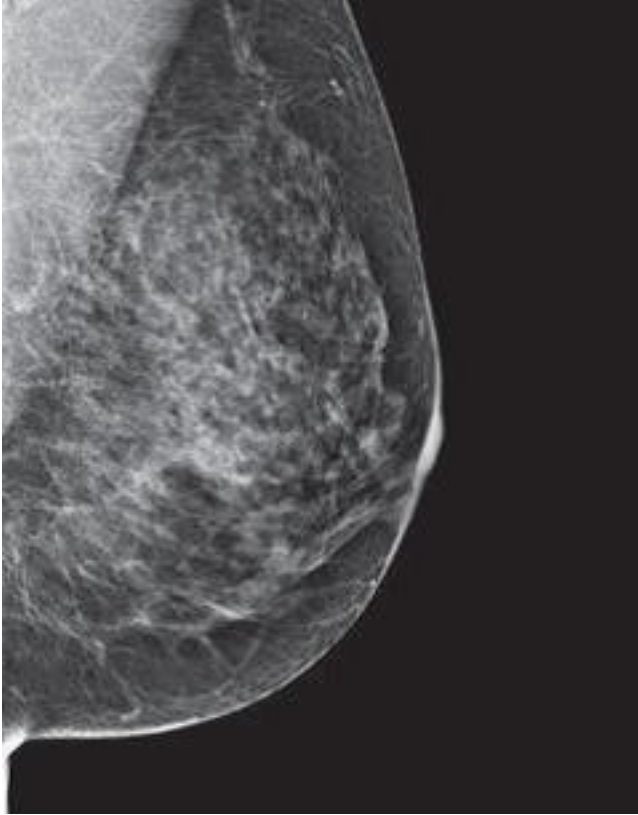
Radiologists use the Breast Imaging Reporting and Data System, or BI-RADS, to classify breast density into 4 categories. They go from almost all fatty tissue to extremely dense tissue with very little fat.



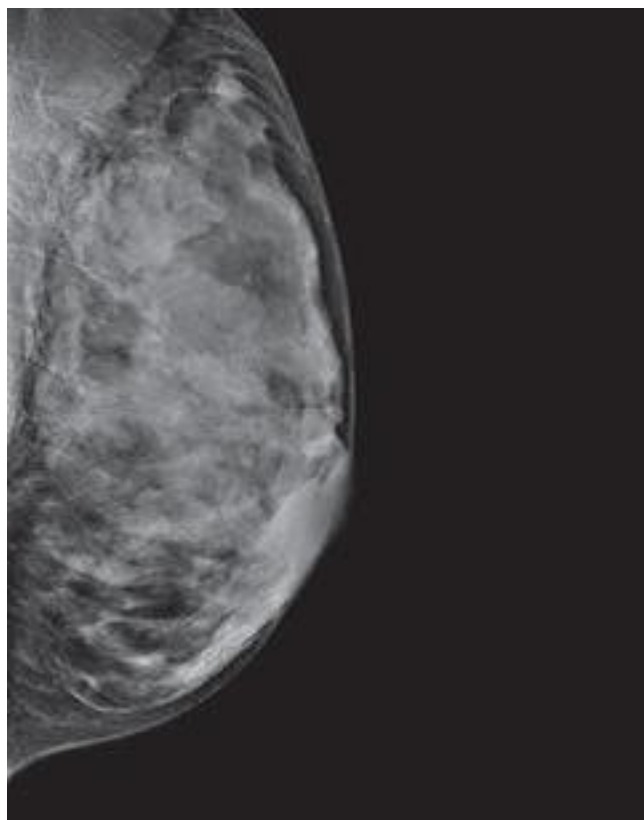
Breasts are almost all fatty tissue.



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.

Some [mammogram reports](#) sent to women 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 seem to have a slightly 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.

We do know that dense breast tissue 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 some tumors. In contrast, 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 mammograms?

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 result (regardless of how dense your breasts are), 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, women with dense breasts should get in addition to mammograms.

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 both show more findings that turn out not to be cancer. This can lead to more tests and unnecessary [biopsies](#). And the cost of ultrasound and MRI may not be covered by insurance.

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 else 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

References

American College of Radiology. BI-RADS ATLAS – Mammography. Reporting System, 2013. Accessed at www.acr.org/~media/ACR/Documents/PDF/QualitySafety/Resources/BIRADS/01%20Mammography/02%20%20BIRADS%20Mammography%20Reporting.pdf on August 24, 2017.

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Last Medical Review: September 1, 2017 Last Revised: October 9, 2017

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](#) have more false-negative results.
- Breasts often become less dense as women age, so false negatives are more common in younger women.
- 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 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.
- 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 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 don't know which women fall into this group when the cancer is found because they can't 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 adverse effects of cancer treatment that's really not needed.

Still, overdiagnosis is not thought to happen that 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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Last Medical Review: September 1, 2017 Last Revised: October 9, 2017

Having a Mammogram After You've Had 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, you may not need a mammogram.

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, making 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](#)³ (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 an 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, an implant is put under the skin. This surgery leaves behind enough breast tissue to require yearly screening mammograms in these women.

Any woman who's not sure what type of mastectomy she has had or whether she needs to get mammograms should ask her 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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National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology. Breast Cancer. Version 2.2017. Accessed at www.nccn.org/professionals/physician_gls/pdf/breast.pdf on August 17, 2017.

Last Medical Review: September 1, 2017 Last Revised: October 9, 2017

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 under them. This means that part of the breast tissue can be hard to see on a mammogram.

To help the doctor can 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. This allows better imaging of the front part of each breast.

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

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

References

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Last Medical Review: September 1, 2017 Last Revised: October 9, 2017

Breast Ultrasound

Breast ultrasound is often used to examine some types of breast changes.

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 change 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?

Breast ultrasound uses sound waves to make a computer picture of the inside of the breast.

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 ultrasound, sometimes called ABUS, is an option that uses a much larger transducer to take hundreds of images that cover nearly the entire breast. When automated ultrasound is used, 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

References

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Breast MRI Scans

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?

Breast [MRI](#)¹ is often 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.

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 something that turns out not to be cancer (called a false positive). False-positive findings have to be checked out to know that cancer isn't present. This can mean more tests and/or [biopsies](#). This is why MRI is not recommended as a screening test for women [at average risk of breast cancer](#), because it would result in unneeded biopsies and other tests for many of these women.

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 screening 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 scan 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 are sometimes hard to see using other imaging tests.

Tips for getting ready for the test

Check with your insurance company 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: If being in an enclosed space is 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. In some cases, you may be able to have the test done with an **open MRI** machine that allows more space around your body.

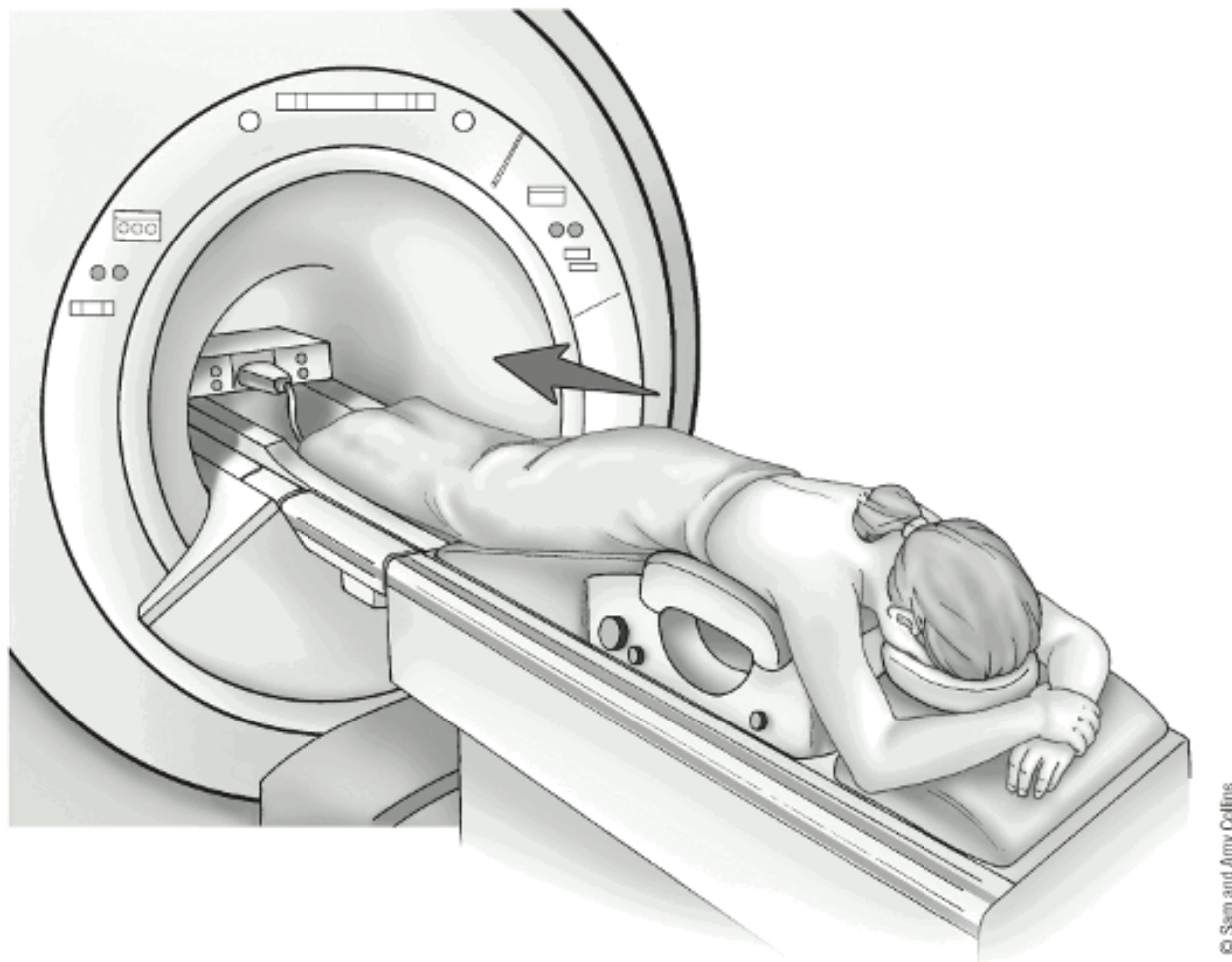
Remove metal objects: Before the test, you'll be asked to undress and put on a gown or other clothes without zippers or metal. Be sure to remove any metal objects you can, like hair clips, jewelry, dental work, and body piercings.

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 (magnetic resonance imaging) 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 cylinder.

The test is painless, but you have to lie still inside the narrow cylinder. 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 with music to help block noise out during testing.

The most useful MRI exams for breast imaging use a contrast material that's injected into a vein in the arm before or during the exam. This helps to clearly show breast tissue details. The contrast material used for an MRI exam is called **gadolinium**. (It's 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, which only takes a few minutes at a time. Tell the technologist if you need to move or take a break.

Breast MRI scans can usually take 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.

Hyperlinks

1. www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html

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Newer and Experimental Breast Imaging

Tests

Newer types of tests are being developed for breast imaging. Some of these are already being used in certain situations, while others are still being studied. It will take time to see if any are as good as or better than those used today.

A newer type of mammogram is known as **breast tomosynthesis** or **3D mammography**. For this test, a machine takes many low-dose x-rays as it moves over the breast. A computer then puts the images together into a 3-dimensional picture. For more on this test, see [Mammogram Basics](#).

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.

Molecular breast imaging (MBI) is a newer [nuclear medicine imaging test](#)¹ for the breast. A radioactive chemical is injected into the blood, and a special camera is used to see it in the breast. This test is being studied mainly as a way to follow up breast problems (such as a lump or an abnormal mammogram). 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. A form of sugar attached to a radioactive particle is injected into the blood to detect cancer cells. The PEM scanner is approved by the Food and Drug Administration (FDA). Working much like a [PET scan](#)², a PEM scan may be better able to detect small clusters of cancer cells within the breast. Right now it's being studied in women with breast cancer or other breast problems to see if it can show which lumps are 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.

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 is approved by the FDA 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 could 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. During a biopsy, a doctor will remove cells from the suspicious area so they can be looked at in the lab to see if cancer cells are present.

Types of breast biopsies

There are different kinds of breast biopsies. Some use a 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
- Other medical problems you might have
- Your personal preferences

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.

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 is done by needle biopsy, or with a sentinel lymph node biopsy and/or an axillary lymph node dissection.

Regardless of what 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 thinks you don't 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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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 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?
- 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?
- 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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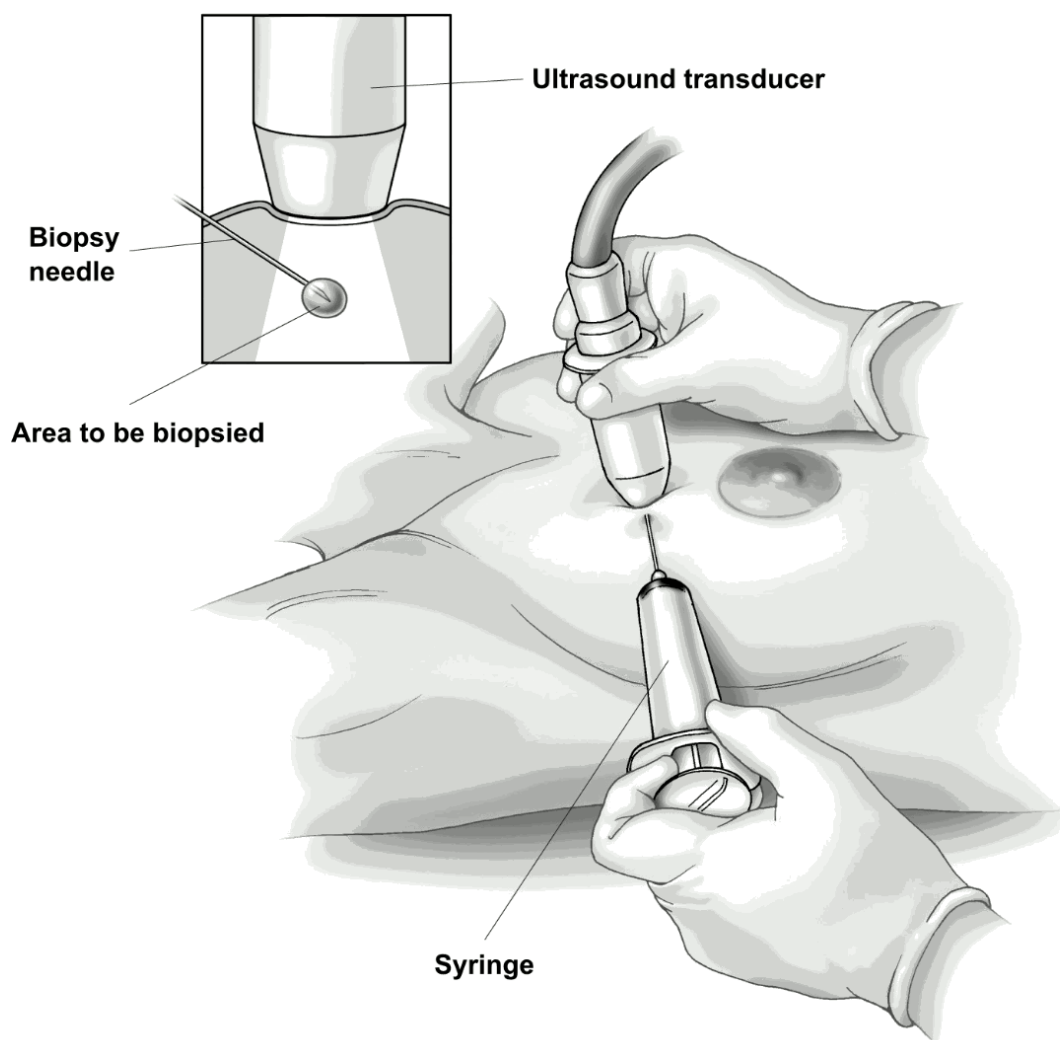
Fine Needle Aspiration Biopsy of the Breast

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 tissue is taken from the suspicious area, and 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.



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 a FNA?

During an FNA

An FNA is an outpatient procedure most often done in the doctor's office. Your doctor may or may not use a numbing medicine (called a local anesthetic). But, 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 and lead to 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 clear, the lump is most likely a [cyst](#)¹, and not cancer.
- Bloody or cloudy fluid can mean either a cyst that's not cancer or, very rarely, cancer.
- If the lump is solid, the doctor will pull out small pieces of tissue.

The main advantages of FNA are that 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. Even if an FNA does find cancer, there may 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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Last Medical Review: September 1, 2017 Last Revised: October 9, 2017

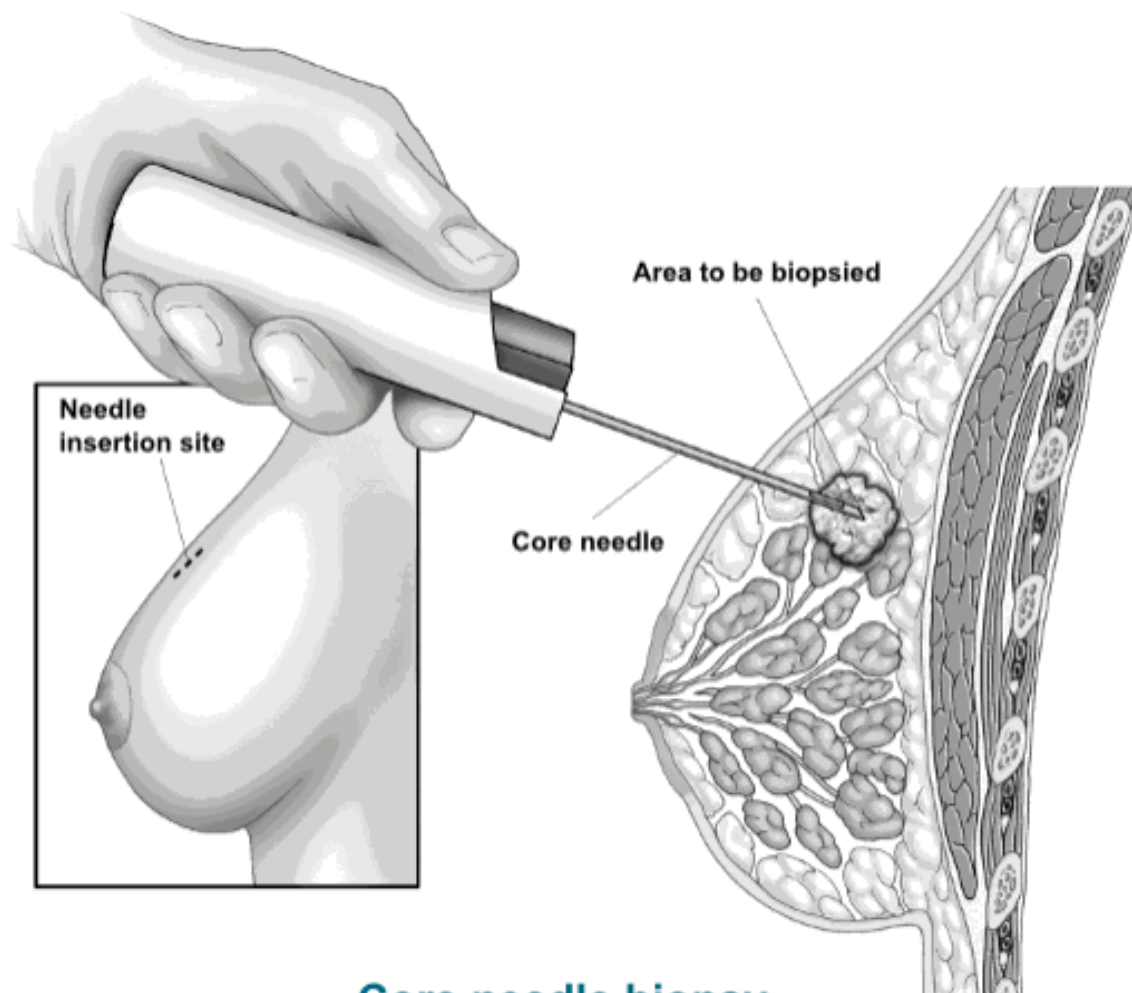
Core Needle Biopsy of the Breast

If other tests show you might have breast cancer, your doctor may refer you for a core needle biopsy (CNB). During this procedure, the doctor uses a wide, 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.

What is a core needle biopsy?

For a CNB, the doctor uses a wide, 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.

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](#)

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 your breast is numbed). The procedure itself is 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 needle or probe 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 marker (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 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 or probe 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 may 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 bruising, but usually it doesn't leave a scar. 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. All biopsies can cause bleeding and can lead to 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.

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 tumors 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 core biopsy done with a regular needle.

What does a CNB show?

A doctor called a **pathologist** 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 [fine needle aspiration \(FNA\) biopsy](#) or a [core needle biopsy \(CNB\)](#). 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 to make a diagnosis.
- An **excisional biopsy** removes the entire tumor or abnormal area. An edge of normal breast tissue around the tumor may be taken, too, depending on the reason for the biopsy.

Wire 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 in the suspicious area to guide the surgeon the right spot. This is called **wire localization** or **stereotactic wire localization**.

After your breast is numbed, an imaging test is used to guide a thin, hollow needle to 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. The needle is then taken out. The surgeon uses the wire as a guide to the area to be removed.

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 drugs are used to put you in a deep sleep and not feel pain).

The skin of the breast is cut to allow the doctor to remove 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

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. All biopsies can cause bleeding and can lead to 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.

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 there are no cancer cells in the tissue, 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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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. Your doctor will talk with you about which (if any) of these tests you will need.

[Chest x-ray](#)¹: This test may be done to see if the cancer has spread to your lungs.

[CT scan](#)² (**computed tomography**): A CT scan uses x-rays taken from different angles, which are combined by a computer to make detailed pictures of the organs. 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.

[MRI](#)³ (**magnetic resonance imaging**): This test makes detailed pictures using radio waves and strong magnets instead of x-rays. This test can be helpful in looking at your brain and spinal cord. 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.

[Ultrasound](#)⁴: 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 scan](#)⁵ (**positron emission tomography**): For this test, a form of radioactive sugar 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 scan](#)⁶: 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
3. www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html
4. www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html
5. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-for-cancer.html
6. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-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.

Mammograms can find most breast cancers that start when a woman is pregnant, and it's 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, 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 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 a small piece of tissue is taken from the area of concern. Breast biopsies are most often done using a 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 piece of tissue through a small cut (incision) in the breast. Surgical biopsies are often done under general anesthesia (where drugs are used to put the patient 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 about [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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