Mammography

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Mammography is useful in discovering tumors too small to be felt. The procedure involves taking an X-ray of the breast with a very low radiation dose. It has been shown that there is little risk from the exposure for women over 35 who have annual mammograms. However, for younger women who are at high risk for breast cancer due to their BRCA status, exposure to X-rays may lead to an increase in risk.1

Patients should verify that their clinic is FDA certified and specializes in mammography or processes a large number of mammograms. Visit the FDA to verify that your local facility is accredited. Most health plans, Medicare, and Medicaid cover part or all of the costs of mammography. The American Cancer Society has information about low cost mammograms available in most areas.2.

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Mammography Screening Guidelines

Recommendations for screening mammograms have been revised throughout the years to reflect new data that have been collected on the pros and cons of screening mammograms. Mammograms can save lives, but they can also lead to false positive diagnoses and unecessary and potentially harmful treatments, such as surgery, radiation, and chemotherapy. The following chart contains 4 key groups' recommendations for screening mammograms. Differences between the groups' recommendations may be due to differences in the methods by which each group balances the pros and cons of screening mammograms.

	When to start getting mammograms	**Frequency of testing for average risk individuals**	**When to stop getting mammograms**

US Preventative Services Task Force [3]	Age 50	Biennially (once every other year)	Age 74
American Cancer Society [4]	Age 45	Once every year until age 55, then once every other year	Not defined. Continue with mammography screenings as long as individual is in good overall health and has a life expectancy of at least 10 more years
American College of Radiology [5]	Average risk individuals: age 40 High risk individuals: by age 30, but not before age 25	Annually	Not defined. Continue with mammography screenings as long as individual is in good health
American Congress of Obstetricians and Gynecologists [6]	Age 40	Annually	Not defined.

What to Expect

The patient will first be requested to undress above the waist, and put on a provided wrap. A technician will then help position the breast for the mammogram. If the sex of the technician is of concern, inquiries should be made prior to the visit. A normal screening mammogram involves taking two views of each breast, and the whole procedure lasts about 20 minutes. The process involves the brief, a few seconds long, compression of the breasts. This is done to obtain the best possible image of all breast tissue. The compression may be uncomfortable, but if there is pain the technician and physician should be notified. To lessen discomfort and pain, it is suggested that patients avoid scheduling mammograms for the week before or during menstruation when breasts may be more sensitive. Also, it is suggested not to wear deodorant, powder, or cream under the arms so as not to interfere with the quality of the mammogram.[2] The image below is a labeled representation of a mammography machine.

Results of a Mammography

The radiologist who reads the mammograms has a difficult job because the normal appearance of the breasts is different for each woman. For this reason, it is valuable to have previous mammograms available for comparison. Therefore, if mammographies are scheduled at different locations, the patient should make sure that the new facility has access to any previous mammograms. Mammography does not directly detect cancer. Instead, it is used to detect possible abnormalities, which can then be checked by a biopsy to determine if the changes are cancerous or benign. Depending on the radiologists' interpretation of an abnormality, the patient may be asked back for more diagnostic mammograms, for a follow up mammogram in 3-6 months, ultrasound, and/or biopsy. A common finding on mammogram is a cyst (a benign collection of fluid in the breast). The way to determine if a detected abnormality is a cyst is through an ultrasound examination or by needle aspiration.[2]

On the mammogram, there are two principal signs of cancer: calcifications and/or the presence of a mass. Calcifications (deposits iof calcium compounds in the breast) show up as white spots on a mammogram and occur in two forms, microcalcifications and macrocalcifications. Macrocalcifications tend to be large and coarse looking and are associated with aging. They are common in women over 50, and are present in a small percentage of younger women. Macrocalcifications are not typically associated with cancer. Microcalcifications are smaller and

are considered a sign of possible malignancy, even without a visible mass. The radiologist must interpret the characteristics of the mass to determine the possibility of cancer, and will order diagnostic tests and possibly a biopsy.2

The image on the left shows the mammogram of a normal breast, while the image on the right shows a mammogram with an abnormality detected (denoted by the red arrows). Click on the images to visit their source, the Breast Center of St. Louis University.

Requests for additional testing does not necessarily mean there is anything to fear. The clincians may call a patient back just because something looks a little suspicious and they would like to make a more thorough examination. In the event that a biopsy is indicated the likelihood of cancer is still small. Only 8-10% of those called back will need a biopsy, and approximately 20% of those will be diaganosed as having some form of cancer.2

Women with denser breasts show a decreased mammographic sensitivity, meaning it is harder to interpret the x-rays films and to see all of the breast tissue clearly. Ultrasound has been considered as an alternative to or supplementary to mammography for women with dense breasts because it can more effectively screen all of the breast tissue.7 However, ultrasound is not effective in detecting microcalcifications, which are an early sign of possible breast cancer.2

Digital Mammography

Digital mammography is a relatively new way of capturing the mammographic images. Instead of using X-ray film to capture the image, computerized sensors collect the image.

Digital mammography is becoming more popular because the images are stored on a computer and may be read by a radiologist directly on a computer screen. Mammograms can be shared with other physcians more easily via computer than by hand. Importantly, radiologists can enhance the images to get a better view of particular areas.2

Below is a comparison of images from a regular mammogram (on the left) and an enhanced digital mammogram (on the right). The digital mammogram allowed for the discovery of an otherwise undetectable abnormality. Currently there is debate in the field as to whether the increased detection of cancer by digital imaging justifies its increased cost to the patient. A fear is that increased cost could prevent some women from having mammography screening.

Images courtesy of Memorial Sloan-Kettering Cancer Center

A study published in 2012 showed that digital mammography was better than film mammmography at detecting 'high grade' ductal carcinoma in situ (DCIS). This is the type of pre-cancerous change that is most likely to advance to invasive cancer.8

Mammography After Mastectomy

Treatment for breast tumors may not involve a complete mastectomy. A Breast Conserving Treatment (BCT) such as a lumpectomy (the removal of the tumor and a margin of normal tissue surrounding it) may be utilized in conjunction with radiation and/or chemotherapy. In this case, it is suggested that the patient have a mammogram of the affected breast six months after completion of treatment because radiation and chemotherapy can alter the normal view of breasts on mammograms. The radiologist can then use this image as a baseline to compare with any future images. Opinions differ on the optimum frequency of mammography after treatment. The decision is one to be made by the physician and patient.2

If a total, modified radical, or radical mastectomy has been performed, mammograms are unnecessary for that breast. Also, if reconstruction was performed afterwards with implants or muscle tissue, regular mammograms are not usually taken. The unaffected breast should still be screened according to normal standards. Patients who have undergone a subcutaneous mastectomy (one in which the nipple and tissue just under the skin are retained)

require regular screening of the affected breast.2

Mammography After Breast Augmentation

Women with breast implants require regular breast cancer screening. Implants may interfere with mammography and can prevent the imaging of some breast tissue. As a result, four more x-ray films, called implant displacement views, must be taken. In these views, the implant is pushed toward the chest wall. The type of implants that cause the least interference with mammography are those placed behind the chest muscle. Mammograms do not cause implants to rupture and they usually cannot detect a rupture. MRI may be used to detect ruptures in breast implants.2

Frequently Asked Questions About Mammography

What exactly is a mammogram?

A mammogram is a tool used to screen for breast cancer. Each breast is compressed between two plates as small amounts of radiation take an internal picture (X-ray) of the breast. A radiologist then looks at these pictures and can find signs of potential cancer.

Do mammograms hurt?

The procedure may hurt your breasts, but the technician needs to squeeze the breast to get an accurate picture. The pain should not be unbearable only a little uncomfortable. Your breasts may be sore after the procedure, but the pain will subside shortly. It may help to take a pain relief medication before getting a mammogram. It is also good to schedule your mammogram after your period because the breasts are generally less sensitive.

How accurate are mammograms?

Mammograms are generally very accurate they can detect 80-90% of breast cancers in women without symptoms and when combined with a clinical breast exam and diligent self breast examination, the chances of a cancer going undetected are very low.

Where do I get a mammogram?

There are many places to get mammograms, breast clinics, radiology departments, some doctor's offices, and there are often mobile mammogram vans that offer the procedure. The MQSA is the Mammography Quality Standards Act, a Federal law that helps to ensure the safety and reliability of mammograms across the country. You should visit a facility accredited by the FDA. You can visit the FDA to verify that your local facility is accredited.

How much does a mammogram usually cost?

Mammograms usually cost between $50 and $150 and in many cases insurance companies will pay most or all of the cost. **There are also many low-cost or free programs around the country.** Visit Susan G. Komen for the Cure or call 1-800- I'M-AWARE ® (1-800-462-9237) to find a low-cost or free mammogram facility near you.

What if the mammogram indicates that something may be wrong?

More comprehensive tests will be done. Possibly an ultrasound, a biopsy, MRI, or a more intensive diagnostic mammography will be done to determine more comprehensive results.

What should I wear the day of the exam?

It is not a good idea to wear deodorant, perfume, lotion, or any other cosmetic product the day of the mammogram. These products can distort the mammogram giving a false negative or false positive. Also, you will be asked to undress from the waist up, so it's best not to wear a dress.

Do I need a referral to get a mammogram at a mammography facility?

In general no. There are many facilities that allow self referral; call ahead to make sure your facility accepts them. You can receive all the information about the mammography you need using a self referral

Should I still get a mammogram if I am pregnant?

Because the effects of radiation on the fetus are not known, in general doctors do not suggest a mammography for pregnant woman. If there is any need for concern other imaging tests will be done, such as an ultrasound. Women who are pregnant should be diligent about doing breast exams themselves

Will a mammogram affect breast feeding?

A mammogram will not have any effect on breast feeding, but the results may not be as accurate. So, women breast feeding should be diligent in doing their self breast exams.

Can I get a mammogram if I have had breast implants?

Yes you can get a mammogram with breast implants, but you need to tell the technicians beforehand. Some facilities may not have a technician able to perform the mammogram correctly, so ask ahead of time.

What is a false negative mammogram result?

A false negative is when a mammogram is read as 'negative' (i.e. no cancer) but the person being tested does have cancer.

What is a false positive mammogram result?

A false positive is when a mammogram is mistakenly interpreted as detecting cancer when the person being tested does NOT have cancer.

How often should I get a mammogram?

There is not a fully agreed upon schedule. The Centers for Disease Control and Prevention recommends that women over 50 years old should get a mammogram every other year. Women with significant risk factors or concerns should talk to their physician about the correct schedule for them. View a table to mammogram recommendations from different health organizations (located on the CDC website).

What is a 'BSE'?

BSE stands for Breast Self-Exam. Initially, BSE were thought to be a good screening tool for breast cancer, but it was later shown that BSE led to additional women having to undergo a biopsy but was not shown not improve cancer survival.9

Can a mammogram CAUSE cancer?

No women have been shown to have developed breast cancer as a result of mammography. The American Cancer Society reports that a woman receiving treatment for breast cancer would receive several thousand rads, whereas a woman getting a mammogram every year from age 40 to 90 would receive only around 10 rads. The breast is being exposed to radiation which can cause cancer, but the chances of getting cancer from mammograms do not out weight the benefit of early detection.

Can I get an ultrasound instead of a mammogram?

An ultrasound is usually only used when the results of a mammogram show more accurate testing is needed or if there are significant symptoms present. If there are no lumps or other symptoms a mammogram is enough to stay ahead of breast cancer.

What is the smallest size tumor that a mammogram can detect?

A mammogram can detect tumors at very early stages, when they are around the size of a pencil eraser. At this point the tumors are still very small and usually readily treated. *Importantly, mammograms are able to identify cancers that are not detectable via breast self exam (BSE).*

Why do I need to get a mammogram if I do self breast exams?

A mammogram can detect cancerous tissue on the microscopic level, whereas you cannot feel a microscopic lump doing a BSE. For example, the average size of a lump found by BSE is about the size of a quarter (~2.5 cm) and the average size lump found by first mammogram is about the size of a dime (~1.5 cm). This is a significant difference in size.

How old is too old to get a mammogram?

The chances of getting breast cancer increase with age. That said, the benefits of getting a mammogram may not

be the same for all ages of women. It is not yet completely clear whether screening of elderly women (aged 75 or older) with no known risk factors is beneficial. The decision should be made with the patient's physician after taking into account other health conditions. View a table to mammogram recommendations from different health organizations (located on the CDC website).

Do men get mammograms?

Men DO get breast cancer. Men can get mammograms and definitely should if they have risk factors associated with male breast cancer or have any physical symptoms (lumps, pain, discharge, etc.).

If I am physically disabled, can I still get a mammogram?

Women with disabilities don't get mammograms as often as women without disabilities. This should not be the case. Women with disabilities should call the mammogram facility before hand to determine if they are capable of accommodating disabled women. If the center is not capable, call other certified mammography centers until you find one. Remember, your disability should NOT prevent you from getting a mammogram!

Know the Flow: Mammography

Know the Flow is an educational game for you to test your knowledge. To play:

- Drag the appropriate choices from the column on the right and place them in order in the boxes on the left. Note that you will only use five of the six choices to complete the game.
- When done, click on 'Check' to see how many you got correct.
- For incorrect answers, click on 'Description' to review information about the processes.
- To try again, choose 'Reset' and start over.

Know the Flow: Mammography
Processes in order

- 1
- 2
- 3
- 4
- 5

Processes

- Learn more
  Make an appointment to get a mammogram
- Learn more
  Undress from waist up; give family’s medical history
- Learn more
  The technologist explains the mammography
- Learn more
  Breast is placed on the plate, pictures are taken from 2 angles
- Learn more
  The x-rays are examined by a radiologist
- Learn more
  An ultrasound is taken of the breast

Check answers Reset

You did it!
The process is in the correct order!
Play again
This game does not currently fit on this width of screen.
Please visit us on a larger screen to play this game.

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