



### **Diagnostic Tool: MAMMOGRAM**

A mammogram is an imaging test that uses x-rays. Mammograms can be used for screening and diagnosis. During a mammogram, a technician places the breast between two x-ray panels. The panels press the breast to make it flat, which may be uncomfortable for a few seconds. However, this compression is needed to get a clear picture. An x-ray is taken of each breast.

A screening mammogram detects breast changes in women who have no signs or symptoms of breast cancer. Women age 40 and older should have screening mammograms every 1 to 2 years. A diagnostic mammogram is used to check for breast cancer after a lump or other sign or symptom of breast cancer has been found. The size, shape, and edges of a lump sometimes can give doctors information about whether or not it may be cancer. On a mammogram, a benign growth often looks smooth and round with a clear, defined edge. Breast cancer often has a jagged outline and an irregular shape. A calcification is a deposit of calcium in the breast tissue and appears as small white spots on a mammogram. If calcifications are grouped together in a certain way, it may be a sign of cancer.

Getting a high-quality mammogram and having a clinical breast exam (done by a health care provider) on a regular basis on the most effective ways to detect breast cancer early.

### **Diagnostic Tool: MAGNETIC RESONANCE IMAGING (MRI)**

Magnetic resonance imaging (MRI), uses a magnet, radio waves and a computer to make a series of detailed pictures of areas inside the body without the use of radiation. Each MRI produces hundreds of images of the breast from side-to-side, top-to-bottom, and front-to-back. The images are then interpreted by a radiologist.

During an MRI of the breast, the patient lies on their stomach on the scanning table. The breast hangs into a depression or hollow in the table, which contains coils that detect the magnetic signal. The table is moved into a tube-like machine that contains the magnet. The entire imaging session takes about 1 hour.

Breast MRI is not used for routine breast cancer screening, but clinical trials are being performed to determine if MRI is valuable for screening certain women, such as young women at high risk for breast cancer. MRI cannot always accurately distinguish between cancer and benign breast conditions. Like ultrasound, MRI cannot detect microcalcifications.

MRI is used to assess abnormal areas that are seen on a mammogram or are felt after breast surgery or radiation therapy. It can be used after breast cancer is diagnosed to determine the extent of the tumor in the breast. MRI is also sometimes useful in imaging dense breast tissue, which is often found in younger women, and in viewing breast abnormalities that can be felt but are not visible with conventional mammography or ultrasound.



### Diagnostic Tool: BIOPSY

In most cases, doctors need to do a biopsy to diagnose cancer. During a biopsy, fluid or tissue is removed from the breast. The tissue is sent to a lab where a pathologist looks at the cells and checks for cancer or other diseases. Biopsies are usually done on an outpatient basis, meaning patients can go home the same day as. Biopsies are the only way to find out if cells are cancerous.

Doctors can remove tissue from the breast in different ways:

- **Fine Needle Aspiration:** The doctor uses a thin needle to remove fluid from a breast lump.
- **Core Biopsy:** The doctor uses a thick needle through a small cut in the skin to remove a core of breast tissue. This test may cause a bruise but rarely leaves a scar. Sometimes the doctor uses other methods to guide the core needle, including:
  - **Ultrasound-guided needle biopsy.** Doctors use ultrasound to guide the needle during the biopsy. This method is used when lumps are hard to feel on a breast exam or see on a mammogram.
  - **Stereotactic core needle biopsy localization.** A 3-D x-ray guides a biopsy needle to a lump or other change that cannot be felt on a breast exam. The patient lies face down on an exam table with a hole in it. The hole allows the breast to hang below the table, where the x-ray machine and needle are.
- **Surgical Biopsy:** The surgeon removes a sample of tissue. An **incisional** biopsy takes a sample of a lump or abnormal area, while an **excisional** biopsy takes the entire lump or area.

### Diagnostic Tool: ULTRASOUND

Ultrasound, also called sonography, is an imaging technique in which high-frequency sound waves that cannot be heard by humans are bounced off tissues and internal organs. Their echoes produce a picture called a sonogram. Ultrasound imaging of the breast is used to distinguish between solid tumors and fluid-filled cysts. Ultrasound can also be used to evaluate lumps that are hard to see on a mammogram. Sometimes, ultrasound is used as part of other diagnostic procedures, such as one type of core biopsy.

During an ultrasound examination, the clinician spreads a thin coating of lubricating jelly over the area to improve conduction of the sound waves. A hand-held device called a transducer directs the sound waves through the skin toward specific tissues. As the sound waves are reflected back from the tissues within the breast, the patterns formed by the waves create a two-dimensional image of the breast on a computer.

Ultrasound is not used for routine screenings because it does not consistently detect certain early signs of cancer such as microcalcifications (tiny deposits of calcium in the breast that cannot be felt but can be seen on a conventional mammogram).