# Ultrasound for Cancer

An ultrasound (also known as **ultrasonography, sonography,** or **sonogram**) helps doctors look for tumors in certain areas of the body that don't show up well on x-rays[1]. Doctors often use this procedure to guide a needle during a biopsy[2]. Ultrasounds are usually quick and most don't require special preparation. They're often done as an outpatient procedure.

Ultrasound is commonly used to monitor pregnant women and their unborn babies.

## What does ultrasound show?

An ultrasound machine creates images called **sonograms** by giving off high-frequency sound waves that go through your body. As the sound waves bounce off organs and tissues, they create echoes. The machine turns these echoes into real-time pictures that show organ structure and movement and even blood flow through blood vessels. The pictures can be seen on a computer screen.

Ultrasound is very good at getting pictures of some soft tissue diseases that don't show up well on x-rays. Ultrasound is also a good way to tell fluid-filled cysts from solid tumors because they make very different echo patterns. It's useful in some situations because it can usually be done quickly and doesn't expose people to radiation.

Ultrasound images are not as detailed as those from CT[3] or MRI[4] scans. Ultrasound cannot tell whether a tumor is cancer. Its use is also limited in some parts of the body because the sound waves can't go through air (such as in the lungs) or through bone.

Doctors often use ultrasound to guide a needle to do a biopsy (taking out fluid or small pieces of tissue to be looked at under a microscope). The doctor looks at the ultrasound screen while moving the needle and can see the needle moving toward and into the

tumor.

For some types of ultrasound exams, the *transducer* (the wand that sends out the sound waves and picks up echoes) is pushed against and moved over the skin surface. The sound waves pass through the skin and reach the organs underneath. In other cases, to get the best images, the doctor must use a transducer that's put into a body opening, such as the esophagus (the tube connecting the throat and the stomach), rectum, or vagina.

Special ultrasound machines, known as **Doppler flow machines**, can show how fast and in which direction blood flows through vessels. This is helpful because blood flow in tumors is different from that in normal tissue. Some of these machines make color pictures. Color Doppler has made it easier for doctors to find out if cancer has spread into blood vessels, especially in the liver and pancreas.

## How does ultrasound work?

An ultrasound machine has 3 key parts: a control panel, a display screen, and a transducer, which usually looks a lot like a microphone or a computer mouse. The transducer sends out sound waves and picks up the echoes. The doctor or ultrasound technologist moves the transducer over the part of the body being studied. The computer inside the main part of the machine analyzes the signals and puts an image on the display screen.

The shape and intensity of the echoes depend on how dense the tissue is. For example, most of the sound waves pass right through a fluid-filled cyst and send back very few or faint echoes, which makes them look black on the display screen. But the waves will bounce off a solid tumor, creating a pattern of echoes that the computer will show as a lighter-colored image.

## How do I get ready for an ultrasound?

For most ultrasounds, no preparation is needed, but it depends on what's being studied. Your doctor or nurse will give you instructions about any steps to take before your test. Depending on the organ being studied, you may need to not eat, take a laxative, or use an enema. If you're having an abdominal (belly) ultrasound, you might need to drink a lot of water just before the study to fill your bladder. This will create a better picture because sound waves travel well through fluid.

## What is it like having an ultrasound?

Ultrasound can be done in a doctor's office, clinic, or hospital. Wear comfortable clothes. Depending on the body part to be studied, you might need to change into a hospital gown.

Most often you will lie down on a table. Your position will depend on the body part to be studied. The technologist will put a water-based gel on your skin and move the transducer (a wand-like instrument) over the area to be checked. The gel both lubricates the skin and helps conduct the sound waves. The gel feels cool and slippery. If a probe is used, it will be covered with gel and put into the body opening. This can cause pressure or discomfort.

During the test, the technologist or the doctor moves the transducer as it's firmly pressed to your skin. You may be asked to hold your breath during the scan. The operator may adjust knobs or dials to increase the depth to which the sound waves are sent. You may feel slight pressure from the transducer.

After the test the gel is wiped off your skin. It does not stain your skin or your clothing.

## How long does an ultrasound take?

An ultrasound usually takes 20 to 30 minutes. The length of time depends on the type of exam and how hard it is to find any changes in the organs being studied.

## What are the possible complications of an ultrasound?

Ultrasound is a very safe procedure with a low risk of complications.

## What else should I know about ultrasound?

- Ultrasound does not use radiation.
- Ultrasound usually costs much less than other imaging tests.
- The quality of the results depends to a large extent on the skill of the technologist or doctor operating the transducer.
- Good images are harder to get in people who are obese.
- Newer forms of ultrasound can provide 3-D images.

## 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/testing-biopsy-and-cytology-specimens-for-cancer.html
3. www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html
4. www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html

**References**

American College of Radiology/Radiological Society of North America. RadiologyInfo. *General Ultrasound (Sonography)*. June 23, 2014. Accessed at www.radiologyinfo.org/en/info.cfm?pg=genus on November 16, 2015.

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Last Revised: November 30, 2015

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