

Ultrasound in Pregnancy

Ultrasound is a technique that uses sound waves to show a picture of a baby (fetus) in the uterus. Because it uses sound waves instead of radiation, ultrasound is safer than X-rays. Ultrasound provides important information about the health of the fetus and conditions in the uterus. This information can guide a health care provider's plans for a pregnant woman and improve the outcome of pregnancy.

How does ultrasound work?

Ultrasound works by bouncing sound waves off the developing fetus. Echoes from the waves are analyzed by computer to produce a moving or still picture, called a sonogram, on a screen. The technique is also called sonography.

How is ultrasound performed?

Two common forms of ultrasound used in pregnancy are:

- Transabdominal
- Transvaginal

In a transabdominal ultrasound exam, the health care provider or medical technician moves a handheld device, called a transducer, along the pregnant woman's abdomen. The transducer sends sound waves into the woman's uterus and also detects the echoes from those waves, which it then converts into electrical signals. The computer then assembles these signals into a picture. To get a clearer picture, the provider or technician covers the woman's abdomen with a thin layer of gel, which helps improve the transmission of sound waves. The woman also may be asked to have a full bladder during the test. The exam is painless, but many women find having a full bladder uncomfortable.

In transvaginal ultrasound, the provider or technician inserts a probe into the vagina. During the test, the woman lies on her back with her feet in stirrups. This form of ultrasound may be recommended if ultrasound is needed very early in pregnancy because in early pregnancy, the uterus, ovaries and fallopian tubes are closer to the vagina than to the surface of the abdomen. In some cases, the provider may place the probe at the opening of the vagina, called translabial ultrasound. Both of these techniques can be used throughout pregnancy to allow a closer look at the cervix and lower uterus.

What does an ultrasound examination include?

A standard ultrasound exam in the first trimester checks:

- The number and location of the gestational sacs that contain the embryo
- The size and age of the embryo(s)
- Embryonic heart activity
- The condition of the uterus, fallopian tubes and ovaries

A standard ultrasound exam in the second or third trimesters checks:

- Age and size of the fetus
- The number of fetuses
- Location of the placenta
- Fetal heartbeat
- Amount of amniotic fluid
- Basic fetal anatomy, including the brain, spine, kidneys, bladder and all four chambers of the heart

Do all pregnant women have an ultrasound examination?

Today, about 65 percent of pregnant women have an ultrasound examination (1). Many health care providers routinely offer low-risk women one ultrasound exam between 16 and 20 weeks of pregnancy. However, it is uncertain whether low-risk pregnant women benefit from routine ultrasound exams. A major study reported in 1993 found no significant difference between two groups of low-risk women (those who had two routine ultrasound exams and those who had an ultrasound only because there was some medical reason for it) in terms of the rate of preterm delivery, infant birthweight, serious complications in the newborn period or infant death (2).

Some providers recommend a routine ultrasound examination at 16-20 weeks of gestation for all pregnant women performed by a skilled provider to look for fetal birth defects (3). A recent Institute of Medicine report encourages wider use of ultrasound before 20 weeks of pregnancy to more accurately establish gestational age, as a step toward learning more about the causes of preterm birth (4).

What are the medical reasons for an ultrasound exam during pregnancy?

Ultrasounds are performed to identify specific conditions, such as:

- **Suspected ectopic pregnancy:** Ultrasound may be used to diagnose a pregnancy that is located in a fallopian tube or the abdomen instead of in the uterus.
- **Possible miscarriage:** If there is bleeding in early pregnancy, or if the fetal heartbeat or movement seems to have stopped, ultrasound can help determine if the fetus has died and if the woman will miscarry.
- Presence of **more than one baby**.
- **Age of the fetus:** The size of the fetus, measured using ultrasound, helps health care providers estimate the due date. This is most accurate in the first half of pregnancy.
- **Certain birth defects:** Ultrasound can be used to diagnose certain birth defects such as spina bifida. If the targeted (level II) ultrasound detects an abnormality in the development of the fetus, the health care provider may refer a woman to a medical center that specializes in more extensive ultrasound evaluation. A variety of sophisticated examinations can help determine the nature of the problem and what options may be available.
- **Screening for Down syndrome:** Recent studies suggest that a first-trimester ultrasound examination, combined with maternal blood screening, is as accurate as the traditional second-trimester blood test in screening for Down syndrome and certain other chromosomal birth defects (5, 6)). The ultrasound examination looks for a thickening of skin behind the fetal neck, called nuchal translucency, which sometimes occurs in Down syndrome. The American College of Obstetricians now recommends that all pregnant women be offered a screening test for Down syndrome (6).
- **Fetal growth:** If the uterus appears to be growing too quickly or too slowly, ultrasound can help determine whether the fetus has a growth problem or whether uterine size is related to too much or too little amniotic fluid or some other cause. Sometimes the provider recommends repeated ultrasound examinations to monitor fetal growth.
- **Cause of second- or third-trimester bleeding:** Such bleeding often is caused by placental problems, which may require special care and cesarean delivery.
- **Fetal well-being late in pregnancy:** Ultrasound and other tests (such as fetal heart rate monitoring) are used to monitor the health of the fetus during the last trimester of pregnancy (or sometimes sooner) in high-risk pregnancies. One or more ultrasounds may be recommended if the mother has a chronic health condition such as diabetes or high blood pressure or if the baby appears to be growing too slowly. In some cases, the baby may benefit from early delivery.
- **Guiding other tests:** Providers use ultrasound to guide them in performing certain diagnostic tests, including amniocentesis and chorionic villus sampling (CVS).
- **Determining fetal position around time of delivery:** A cesarean delivery may be needed if the baby is in an abnormal position.

Is ultrasound safe?

Ultrasound is considered safe for mother and baby when properly used by medical professionals. Health care providers have used ultrasound for more than 30 years, and they have identified no risks.

Are there any drawbacks to a routine ultrasound exam?

In low-risk women, ultrasound is good at ruling out problems, but not as good at detecting them. Studies suggest that a routine ultrasound exam detects between 16 and 85 percent of all structural birth defects (1). Ultrasound appears most accurate when done by an experienced examiner at a major medical center.

Besides missing some birth defects, a routine ultrasound exam occasionally can suggest that a birth defect is present when none exists. While follow-up exams often show that the baby is healthy, such false alarms can cause intense worry for parents.

Can problems diagnosed by ultrasound be treated?

Information obtained by ultrasound often is used to alter prenatal care to improve a woman's chances of delivering a healthy baby. For example, a life-threatening fetal heart-rhythm disturbance diagnosed by ultrasound may be treated with medication while the baby is still in the uterus. The presence of certain birth defects, abnormalities of the placenta, or breech (foot-first) position may mean that a cesarean delivery could be safer for mother and baby. For babies who are suspected of having problems caused by decreased levels of oxygen, early delivery can be lifesaving.