

CHAPTER 7: WHEN PREGNANCY BECOMES COMPLICATED

Diagnostic Tests

The following tests might be done if earlier screening indicates a potential problem or if a pregnant woman shows symptoms of a specific disease or condition. (For information on screening tests, see page 63 or PCNGuide Chart on Screening Tests). Tests are listed in alphabetical order, not by frequency of use or when they are done during pregnancy.

Diagnostic test	Purpose	Comments
<p>Amniocentesis</p> <p>Using ultrasound for guidance, the doctor passes a needle through your abdomen and uterus into the amniotic sac, withdraws fluid, and sends it to a lab for the appropriate test.</p> <ul style="list-style-type: none"> To identify chromosomal abnormalities, fetal cells are separated from the amniotic fluid and given time (about 2 weeks) to multiply, which provides enough cells to allow analysis. For other tests, the fluid can be checked quickly for the presence of various substances that reveal specific information about your unborn baby. 	<p>In early to midpregnancy (15–20 weeks):</p> <ul style="list-style-type: none"> Provides information on particular birth defects, metabolic disorders, and chromosomal or genetic diseases. May detect Down syndrome, sickle cell anemia, neural tube defects, and many other disorders. Performed to evaluate fetus if results from particular screening tests indicate a problem. Helps you make a decision about continuing or terminating a pregnancy. <p>In late pregnancy (last trimester):</p> <ul style="list-style-type: none"> Provides information on fetal lung maturity when early delivery (32 to 37 weeks or prior) is being considered for the health of you or your baby (see page 274). Reveals severity of Rh disease or other suspected blood disorders and helps determine if treatment of baby will be necessary. May detect biochemical markers to help identify women at highest risk for certain pregnancy complications. 	<ul style="list-style-type: none"> Can be performed when there is an adequate amount of fluid (after 13 weeks gestation), but there are fewer risks if done after 15 weeks. Slightly increases risk of miscarriage—about 0.1 to 0.5 percent higher than for women not having amniocentesis. (Risk of miscarriage is normally about 1 percent at this stage of pregnancy.) Risk of miscarriage depends on the skill and experience of technician performing the test. Carries a slight risk of cramping, intrauterine infection, bleeding, or leaking amniotic fluid. Requires injection of RhoGAM if you're Rh negative. Length of time (2 weeks) required to obtain results for genetic disorders may be stressful. Is expensive, invasive, and used only if medically indicated, such as when screening tests indicate a high risk of a chromosomal abnormality. May cause preterm labor or intrauterine infection or bleeding. Slight risk of injury to fetus, placenta, or cord. Can identify bacteria or other markers of inflammation for women in preterm labor.
<p>Biophysical profile (BPP)</p> <p>This test evaluates fetal biophysical functions and has five components.</p> <p>A non-stress test (NST) checks this function:</p> <ol style="list-style-type: none"> The fetal heart rate's response to the baby's movement <p>An ultrasound scan helps assess these factors:</p> <ol style="list-style-type: none"> Fetal breathing movements Fetal body movements and activity Fetal muscle tone Amount of amniotic fluid <p>Each component is scored with 0, 1, or 2 points, so the highest possible total is 10 points. The two procedures take about 1 hour or less.</p>	<ul style="list-style-type: none"> Estimates fetal well-being in the latter weeks of pregnancy. Used to determine if a high-risk or a post-date pregnancy could safely continue or if labor should be induced. Evaluates amniotic fluid volume (AFV) to identify possible pregnancy problems signaled by too little (oligohydramnios) or too much fluid (polyhydramnios). 	<ul style="list-style-type: none"> Score of 8–10 is considered "normal." Is a fairly good predictor of fetal condition when scores are high (6–10) or low (0–2). Intermediate scores (3–5) are difficult to interpret, and repeat testing is done. Sometimes, only selected components of the biophysical profile are performed (for example, evaluating only the NST and AFV, or using only the four components from the ultrasound). Sometimes the NST and ultrasound are done in two different locations.

Diagnostic test	Purpose	Comments
<p>Chorionic villus sampling (CVS)</p> <p>Using ultrasound for guidance, the doctor passes a slim catheter through the opening of your cervix (transcervical CVS) or a needle through your abdomen and uterus (transabdominal CVS), placing it on the chorionic membrane, which covers the fetus. Tiny pieces of the chorionic villi (the early placenta) are suctioned into a syringe and sent to a laboratory for analysis. The procedure takes about 15–20 minutes.</p> <p>Chorionic villus sampling is usually performed between 10 and 12 weeks gestation, and results are available in about 1 week.</p>	<ul style="list-style-type: none"> • Provides information about chromosomal abnormalities (same as that obtained from amniocentesis, except CVS can not detect neural tube defects, such as spina bifida). • Provides information at an earlier gestational age than amniocentesis, allowing for earlier decision about termination of pregnancy. • Provides a sample large enough to take advantage of molecular genetics technology such as DNA analysis (done if indicated by family history). 	<ul style="list-style-type: none"> • Not as widely used as amniocentesis. • Risk of miscarriage is about 1 percent above those not having CVS test (miscarriage rate may be as high as 4 percent without CVS at this stage of pregnancy). • May cause vaginal bleeding or spotting, amniotic fluid leakage, or infection. • Not available in all medical centers. • Requires injection of RhoGAM if you're Rh negative. • Often requires a full bladder, which may be uncomfortable. • Reasons not to do a transcervical CVS include genital herpes, inflammation of cervix, or cervical myoma (tumor). • Small risk for fetal limb defects if CVS done before 10 weeks gestation.
<p>Contraction stress test (CST)</p> <p>This test shows how the fetal heart rate (FHR) responds to uterine contractions.</p> <p>Contractions are induced until you have three contractions in 10 minutes. Then, while the uterus continues contracting at that rate, an external electronic fetal monitor measures the FHR.</p> <p>Test results are “reassuring” if FHR remains normal during contractions. The test is “non-reassuring” if the FHR indicates fetal distress. It sometimes takes several hours to complete the test.</p>	<ul style="list-style-type: none"> • Used to predict whether the fetus can withstand stress of labor contractions. • Used to decide if high-risk pregnancy can continue, if labor should be induced, or if a cesarean birth is indicated. • Estimates placental function and fetal reserves. 	<ul style="list-style-type: none"> • Not widely used. • Usually not done unless non-stress test (NST) indicates a problem with fetal well-being. • Usually not a cause of preterm labor. • Difficult to interpret results and occasionally produces false results, which could lead to unnecessary intervention. • Considered reliable only during the last weeks of pregnancy. • To make uterus contract, you might be asked to stimulate your nipples or you might receive Pitocin (oxytocin) intravenously. • For more information on FHR monitoring, see page 182.
<p>Fetal blood sampling (also known as Cordocentesis or percutaneous umbilical blood sampling)</p> <p>A doctor, guided by ultrasound, passes a needle through your abdomen and uterus into a blood vessel in the umbilical cord, allowing a sample of fetal blood to be withdrawn for testing.</p> <p>Cordocentesis can be performed after 18 weeks of pregnancy. The procedure takes about 10 minutes and results may be obtained within 3 days.</p>	<ul style="list-style-type: none"> • Allows assessment of fetal blood characteristics to detect chromosomal defects, blood disorders, and conditions such as infection, anemia, and lack of oxygen. • May be used to give a blood transfusion, administer medications, or monitor effectiveness of drug treatment for fetus. • Used when confirmation of a diagnosis is needed more quickly than the results obtained by amniocentesis. 	<ul style="list-style-type: none"> • Requires greater technical skill than amniocentesis on part of doctor and is only available at large prenatal diagnostic centers. • A rarely used, invasive procedure that has a 1–2 percent risk of fetal loss. • Potential complications include infection, bleeding, preterm labor, premature rupture of membranes, blood clot in cord, and transient irregular fetal heart rate. • Use of cordocentesis has declined since other noninvasive tests, such as Doppler velocimetry and analysis of maternal blood for biochemical markers, have been developed to identify high-risk pregnancies.
<p>Doppler arterial blood flow studies (velocimetry)</p> <p>A Doppler ultrasound unit placed on your abdomen obtains information about the rate of blood flow (velocity) in maternal and/or fetal arteries. This information is recorded as velocity waveforms, which show the differences in blood flow during and between heartbeats.</p>	<ul style="list-style-type: none"> • Provides information about circulation of blood between and within the uterus, placenta, and fetus. • Used to measure blood flow in the umbilical arteries (fetal-placental system), fetal blood vessels, and/or your uterine artery (utero-placental system). • Used to predict a fetus at highest risk for complications, such as intrauterine growth retardation (IUGR) from fetal-placental blood flow problems, prematurity from severe preeclampsia, and anemia from Rh incompatibility. 	<ul style="list-style-type: none"> • May be available only in large medical centers. • Is noninvasive. • Ability to predict maternal and fetal disease and/or outcome is being studied. • May be able to predict those mothers and babies who are at highest risk for certain pregnancy complications and help prevent unneeded medical interventions in those at lowest risk.
<p>Glucose tolerance test (GTT)</p> <p>This blood test evaluates your body's ability to handle a large dose of sugar or glucose. After you fast for at least 8 hours, the technician draws blood before you drink a very sugary beverage and then again at 1 hour, 2 hours, and 3 hours afterward.</p>	<ul style="list-style-type: none"> • Used to diagnose gestational diabetes if a screening test (described on page 63) indicates this possibility. 	<ul style="list-style-type: none"> • A special high-carbohydrate meal or snack (with appropriate glucose quantity) could possibly be used if the glucose drink is not well tolerated. • Normally, blood glucose levels remain stable; however, with diabetes, two or more of the readings are elevated. • See page 127 for more on gestational diabetes.

Diagnostic test	Purpose	Comments
<p>Magnetic resonance imaging (MRI)</p> <p>Visual images are obtained with a superconductive magnet that moves over your body above the area that is to be examined. A number of images projected onto a video screen show several layers (multiplanar imaging) of the maternal or fetal organs or structures being evaluated.</p>	<ul style="list-style-type: none"> • Allows a detailed look at an internal organ or structure of your unborn baby to help confirm fetal malformations or other structural abnormalities. • Estimates size and volume of anatomical structures and maturity of fetal organs (for example, lung maturity). • Helps assess maternal internal organs and blood vessels (for example, to help diagnose placental abnormalities, uterine defects, and maternal diseases, such as deep vein thrombosis, appendicitis, or other disorders). 	<ul style="list-style-type: none"> • Used when ultrasound results are unclear and only if medically indicated. • Allows noninvasive evaluation of internal organs, blood vessels, and blood flow without use of dyes or ionizing radiation (x-ray). • Echo-planar imaging (a form of MRI) helps overcome imaging problems due to movement of the fetus. • No harmful effects reported when used in second or third trimesters. Though harm of earlier use has not been determined, MRI isn't used in the first trimester if it can be avoided.
<p>Non-stress test (NST)</p> <p>This noninvasive test indicates how the fetal heart rate (FHR) responds when the baby moves.</p> <p>The FHR is recorded for 10–40 minutes with an external electronic fetal monitor, and you tell the technician or push a button each time you feel your baby move. If there is no spontaneous fetal movement, your baby may be asleep. The examiner may ask you to eat something, push on your abdomen, or sound a loud noise near your abdomen to stimulate your baby to move.</p> <p>An increase in the fetal heart rate (FHR) when the baby moves is normal and a sign of fetal well-being and is called a “reactive test.”</p>	<ul style="list-style-type: none"> • Used to predict fetal well-being. • Used to determine if a high-risk pregnancy can safely continue or if further testing is desirable. • Is used as one of the five components of the biophysical profile (BPP) test (see above). 	<ul style="list-style-type: none"> • Can be done in a caregiver's office, a clinic, or a hospital. • Considered reliable only during the last weeks of pregnancy (after 30 weeks gestation). • Occasionally produces false results. In many cases when NST is nonreactive, further testing shows a healthy fetus.
<p>Ultrasound (sonography, as a diagnostic test)</p> <p>(For a description of ultrasound and more information about ultrasound as a screening test see page 65.)</p> <p>Ultrasound is the first choice of imaging methods for pregnant women for screening and diagnosing pregnancy problems.</p>	<ul style="list-style-type: none"> • Helps estimate gestational age and fetal maturity. • Helps locate fetal organs and structures for inspection, measurement, diagnosis, or treatment. • Helps assess the position, size, and condition of the placenta and cord. • Detects how baby is lying within uterus, showing presentation and position. • Used to measure length of the cervix to determine preterm opening (effacement). • Helps assess amniotic fluid volume (AFV) to detect fetal-placental problems. • Helps evaluate fetal well-being by observing characteristics and movement of the baby and AFV for a biophysical profile. • Used to locate fetus, placenta, cord, and internal structures when performing other procedures, such as breech version, chorionic villus sampling (CVS), amniocentesis, and cordocentesis, to increase safety for mother and baby. 	<ul style="list-style-type: none"> • May be done at imaging center, a hospital, or the doctor's office. • Is noninvasive and gives immediate results. • Can determine whether the pregnancy is uterine or ectopic. • Accuracy varies depending on the quality or level of equipment, skill of person interpreting results, and gestational age of fetus. • Can detect structural abnormalities, such as spina bifida, heart defects, and some chromosomal defects with associated structural components, such as Down syndrome. • Vaginal ultrasound may be better for detecting some problems, such as placenta previa, ectopic pregnancy, and preterm cervical effacement. • Appears safe, but should only be used if medically indicated. • The technician performing the ultrasound usually does not give you information. A physician reports the results either to you or to your regular caregiver. • May detect baby's gender. (Accuracy depends on age of fetus, fetal position, and quality of testing.)

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<p>Vaginal/cervical smear</p> <p>At any time during pregnancy, secretions from your vagina or cervical area can be obtained with a swab or suction bulb and then examined with a microscope or cultured in a laboratory.</p>	<ul style="list-style-type: none"> • Detects organisms that cause infections (bacteria, virus, fungus, or protozoa). • Helps diagnose premature rupture of membranes. • May be used to evaluate the content of amniotic fluid pooled in the vagina after premature rupture of membranes to help predict fetal lung maturity or intra-amniotic fluid infection. • Used to detect fetal fibronectin in cervico-vaginal secretions between 24 to 38 weeks of pregnancy, if indicated, to help identify those at risk for preterm labor. 	<ul style="list-style-type: none"> • See Infections during Pregnancy chart on www.PCNGuide.com for more information. • Amniotic fluid is less acidic (lower pH) than urine, and it has a fernlike appearance under the microscope. Both characteristics may be used to test for the presence of amniotic fluid when diagnosing ruptured membranes. • See pages 129–131 for more about preterm labor.
<p>X-ray</p> <p>Ionizing radiation is used to take a picture of the internal structures of your body.</p>	<ul style="list-style-type: none"> • Helps diagnose maternal problems in pregnancy, such as pneumonia, dental disease, and broken bones. 	<ul style="list-style-type: none"> • Radiation exposure to the abdomen in the first trimester has been associated with an increased risk of childhood malignancies and low birth weight. • X-rays of the abdomen should only be done when the benefits of gathering the diagnostic information from the x-ray outweigh the risks of exposure. • Diagnostic x-rays of other parts of the body (head, chest, limbs) do not cause harm to the baby (you should wear a lead apron shield during x-rays).