Non-stress test \(NST\) and biophysical profile \(BPP\)

What is a non-stress test?

A non-stress test, or NST, is a fetal monitoring test that records the fetal heart rate over time, usually along with uterine activity. It is called "non-stress" because it does not intentionally stress the fetus or trigger contractions. Instead, it observes the fetal heart rate pattern under usual conditions.

The central idea is fetal heart rate reactivity. In many healthy fetuses, movement is accompanied by brief accelerations in heart rate, reflecting adequate oxygenation and normal autonomic nervous system function. The monitor records these accelerations, the baseline heart rate, variability, and any decelerations. Clinicians interpret the tracing in relation to gestational age because earlier fetuses may have less mature reactivity patterns.

During an NST, you usually sit in a reclined chair or lie slightly tilted to one side. Elastic belts hold external sensors on the abdomen: one sensor detects the fetal heartbeat and another may detect contractions. You may be asked to press a button when you feel fetal movement. The test commonly takes about 20 minutes, but it may be extended if the fetus is sleeping or if the tracing needs more time for interpretation.

What is a biophysical profile?

A biophysical profile, or BPP, is a broader assessment of fetal well-being that combines ultrasound observations with fetal heart rate testing. A standard BPP typically evaluates five components: fetal breathing movements, gross body movements, fetal tone, amniotic fluid volume, and the NST.

Each component is generally scored as either 2 points if reassuring criteria are met or 0 points if they are not, for a maximum score of 10. In many clinical frameworks, a score of 8 to 10 is considered reassuring when amniotic fluid is normal. A score of 6 is often considered equivocal and may prompt repeat testing or further assessment. A score of 4 or lower is generally more concerning and requires prompt clinical evaluation. However, interpretation depends on gestational age, amniotic fluid, maternal and fetal conditions, and the reason testing was ordered.

The ultrasound portion can take up to about 30 minutes because the clinician or sonographer may need to wait for fetal behaviors such as breathing movements or limb extension and flexion. If the fetus is in a sleep cycle, some components may take longer to observe. This waiting period can feel stressful, but it is common and does not automatically imply a problem.

Standard BPP versus modified BPP

There are two commonly discussed approaches: the standard BPP and the modified BPP. The standard BPP includes the five-part assessment: NST, fetal breathing, fetal movement, fetal tone, and amniotic fluid volume. It provides a more complete snapshot of acute and somewhat longer-term markers of fetal well-being.

A modified BPP usually combines an NST with an ultrasound measurement of amniotic fluid. This approach is based on the idea that the NST reflects more immediate fetal oxygenation and neurologic responsiveness, while amniotic fluid volume can reflect placental function over a longer period. If either part is abnormal, a full BPP or additional evaluation may be recommended.

Your care team may choose one approach over the other depending on local protocols, the reason for surveillance, gestational age, and prior results.

Neither test is intended to replace clinical judgment or your report of fetal movement patterns.

Why NSTs and BPPs may be recommended

Antenatal fetal surveillance is generally used when the risk of stillbirth or fetal compromise is higher than baseline, or when clinicians need additional information to guide timing and intensity of care. Not everyone needs NSTs or BPPs in an otherwise uncomplicated pregnancy.

Common reasons may include:

Decreased fetal movement or a change in the baby's usual movement pattern
Hypertensive disorders of pregnancy, such as preeclampsia or chronic hypertension
Diabetes in pregnancy, including medication-treated gestational diabetes or preexisting diabetes
Fetal growth restriction or concern that the fetus is smaller than expected
Oligohydramnios or polyhydramnios, meaning too little or too much amniotic fluid
Pregnancy continuing beyond the due date
Multiple pregnancy, especially when complications are present
Certain maternal medical conditions, such as kidney disease, autoimmune disease, or significant cardiac disease

The timing and frequency of testing vary. Some people have a single test after a concern; others have weekly or twice-weekly testing. Decisions should be individualized because testing too early or too often can create false alarms, while under-monitoring may miss important changes.

What the experience feels like

Most people find NSTs and BPPs physically comfortable, though emotionally they can be difficult. You may be asked to eat beforehand or arrive hydrated, depending on your clinic's instructions. You will usually remain awake and can often listen to the heartbeat during an NST. If the fetus is quiet, the team may reposition you, offer cold water or juice if appropriate, or use acoustic stimulation in some settings to encourage fetal activity.

For the ultrasound portion of a BPP, gel is placed on the abdomen and the sonographer observes fetal movements, breathing motions, tone, and amniotic fluid pockets. Fetal breathing movements are practice movements of the diaphragm and chest wall; they are not air breathing, but they are a normal fetal behavior. Fetal tone refers to flexion and extension movements, such as opening and closing a hand or extending and flexing a limb.

It is reasonable to ask what each part of the test is checking, how long results usually take, and whether you should wait at the facility until a clinician reviews the tracing or ultrasound. If you have anxiety during monitoring, tell the staff. A supportive explanation in real time can make the experience much less overwhelming.

Understanding results without overinterpreting them

NST results are often described as reactive or nonreactive, though terminology can vary. A reactive NST generally means the fetal heart rate showed expected accelerations over the observation period. A nonreactive NST means the expected accelerations were not observed during the testing window. This can happen because the fetus is asleep, gestational age is earlier, medications are affecting fetal activity, or there is a clinical concern that needs further evaluation.

BPP results are reported as a numerical score, usually out of 10 for a standard BPP. In general, 8 or 10 is reassuring when amniotic fluid is adequate. A 6 may lead to repeat testing within a specified time frame or additional assessment, depending on gestational age and risk factors. Lower scores, especially with low amniotic fluid, often require prompt clinician review and may influence decisions about observation, further testing, or delivery timing.

Importantly, these tests are screening and surveillance tools. They reduce uncertainty but do not eliminate it. A reassuring test today does not guarantee that a new concern cannot develop later, which is why you should still contact your care team for decreased fetal movement, bleeding, leaking fluid, severe headache, visual changes, or other urgent symptoms.

How NST and BPP fit with other pregnancy tests

NSTs and BPPs are different from screening tests performed earlier in pregnancy. For example, non-invasive prenatal testing \(NIPT\) estimates the chance of certain chromosomal conditions using cell-free DNA in maternal blood, while the anatomy scan evaluates fetal anatomy and growth in the second trimester. NSTs and BPPs, by contrast, focus on current fetal well-being later in pregnancy.

They also differ from routine blood tests, glucose testing, and group B strep screening, which assess maternal health, metabolic status, infection risk, or labor planning. In practice, obstetric care integrates all of these data points: maternal symptoms, blood pressure, laboratory results, ultrasound growth, amniotic fluid, fetal movement, and fetal heart rate patterns.

If you are receiving frequent testing, it can help to keep a written list of dates, results, and follow-up plans. Ask your team what result would be considered reassuring, what would prompt same-day evaluation, and who to call outside office hours.