

# Physics Principles of Doppler Ultrasound

*Patient Information Series – What you should know, what you should ask.*

## What is the Doppler effect?

The Doppler effect in physics is defined as the increase (or decrease) in the frequency of sound as the source and observer move towards (or away from) each other.

## Who discovered the Doppler effect?

Christian Johann Doppler, an Austrian mathematician and physicist discovered the Doppler effect in 1842.

## What is a Doppler flow study?

Doppler flow is a type of ultrasound. It uses sound waves to measure the flow of blood through a blood vessel. The results are shown on a computer screen in lines called waveforms. It's sometimes called Doppler velocimetry. It checks blood flow in:

- The mother's uterine arteries that deliver blood to the placenta
- The umbilical arteries
- The baby's brain and heart
- Other organs in the baby's body

## How long does a Doppler ultrasound scan take?

You can have a Doppler scan at the same time as a normal ultrasound scan, as it uses the same equipment. The Doppler scan will take just a few minutes during your regular ultrasound scan.

## Are Doppler scans safe?

The Doppler flow study is a non-invasive test. The test doesn't harm the baby or you. As with all ultrasound scans, Doppler scans are safe in expert hands. Sonographers, doctors, and midwives are fully trained in how to safely carry out a Doppler scan to get a clear picture of your baby's health and wellbeing. They're only used when they really need to be.

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## **Why might I need a Doppler scan?**

The following are the most frequent indications to perform a Doppler study:

- Investigate your risk of developing pre-eclampsia.
- If your baby is measuring small for dates or isn't growing at a healthy rate.
- If you're carrying twins or more and there are signs of twin-to-twin transfusion syndrome (TTTS) or other special conditions affecting multiples.
- If you've previously had a small baby or suffered the loss of your baby in late pregnancy or at birth.
- If you have an existing medical condition, such as diabetes or high blood pressure.
- If your baby is affected by rhesus disease (blood group incompatibility) or other conditions that could cause anemia in your baby.
- To investigate a cardiac abnormality.

## **How do I get ready for a Doppler flow study?**

You don't need to do any special preparation before the test.

## **What happens during a Doppler flow study?**

You will lie in a comfortable position on an exam table. A healthcare provider with special training does this test using a special ultrasound machine. A gel is put on your belly which helps to send sound waves from your belly to the computer. The provider puts a device called an ultrasound transducer on your belly. It takes several minutes to check the flow in each blood vessel being tested.

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