

Important points

- Ultrasound is the use of high frequency sound waves to make an image. When used in pregnancy, an ultrasound gives a picture of the developing baby in the uterus (womb)
- Ultrasound is often considered part of the routine care for all pregnant women
- It can either give an indication that the baby is at an increased risk of a problem (a **screening** test), or it can detect a definite problem in the baby's physical development for example, in the heart or the kidneys (a **diagnostic** test)
- The best time for using ultrasound to date the pregnancy and to determine the number of babies in the uterus is between 8 and 12 weeks
- Ultrasound is also used during the nuchal translucency screening test which is done between 11.5 and 13.5 weeks of pregnancy (see Genetics Fact Sheet 17B)
- An ultrasound scan to check the baby's physical development is best done between 18 and 20 weeks
- Ultrasound does not harm the baby
- In a small number of cases an ultrasound scan done early in the pregnancy may show that the baby either has or is at risk of having, a problem
 - A more specialised ultrasound scan to determine if the baby actually has a problem may be indicated
 - Alternatively, depending on how advanced the pregnancy is, the doctor may also suggest having one of the diagnostic tests (See Genetics Fact Sheet 17C)

Every woman hopes for a healthy baby. In some cases the baby may have a serious physical or intellectual problem.

There are a number of different prenatal (meaning before birth) tests and procedures available to assess the development of the baby. Each has advantages, disadvantages and limitations.

The importance of counselling in association with prenatal testing

Counselling before any prenatal test is done, whether it is a screening test or a diagnostic test, is strongly recommended. It provides an opportunity to discuss:

- How and when the tests are done
- The advantages and disadvantages of each test
- Any risks to the baby that may result from each test
- Any further testing which may be offered and what this further testing may mean for the woman and the baby

Counselling before a test is done will help the woman decide which test, if any, is best for the woman and the baby.

This Fact Sheet discusses ultrasound. Other related Genetics Fact Sheets are:

- Genetics Fact Sheet 17 – An overview
- Genetics Fact Sheet 17B – First and second trimester screening
- Genetics Fact Sheet 17C – CVS and Amniocentesis

Ultrasound

Ultrasound is the use of high frequency sound waves to make an image. When used in pregnancy, an ultrasound gives a picture of the developing baby in the uterus (womb). Ultrasound is often considered part of the routine care for all pregnant women.

Why is an ultrasound done?

The most common reasons for having an ultrasound in pregnancy are to:

- Check or confirm how many weeks pregnant the woman is
- View the position of the placenta
- See if there is more than one baby in the uterus
- Check the baby's growth and physical development
- Check the pregnancy when there has been a complication such as bleeding
- Check the baby's progress when a scan which was done earlier in pregnancy has raised concern
- Check progress when the baby is at increased risk of a condition (eg because of a family history) that can be diagnosed by ultrasound
- Determine if the baby is at an increased risk for having a chromosome problem (see Genetics Fact Sheet 17B)
- Get a clear picture of the baby when diagnostic tests are being done (see Genetics Fact Sheet 17C)
- Check the development of the baby's spine if the baby is considered to have a high risk of a neural tube defect (see Genetics Fact Sheet 59) following the maternal serum test

When will the ultrasound be done?

An ultrasound scan can be done at any time during the pregnancy. Most people have at least one scan.

- The best time for using ultrasound to date the pregnancy and to determine the number of babies in the uterus is between 8 and 12 weeks
- Ultrasound is also used during the nuchal translucency screening test which is done between 11.5 and 13.5 weeks of pregnancy (see Genetics Fact Sheet 17B)

- An ultrasound scan to check the baby’s physical development is best done between 18 and 20 weeks
 - The sonographer or doctor may spend some time getting the best possible view of the baby. The equipment used to do this type of detailed scan is very specialised
 - If the woman chooses to have this test, it is important that an experienced, well-trained operator with up-to-date equipment performs the scan for the woman. High quality ultrasound is available from Fetal Medicine Units in public hospitals and from a number of private practitioners

What happens during an ultrasound?

During the ultrasound, sound waves are passed either through the mother’s abdomen or less commonly through the vagina. The doctor will discuss the procedure that is best for the woman.

Abdominal ultrasound

The doctor or sonographer rubs a jelly-like substance on the mother’s abdomen before pressing an instrument like a microphone (*transducer*) against her skin. The sound waves pass from the transducer into the uterus and through the fluid surrounding the baby (*amniotic fluid*). The sound waves bounce harmlessly off the baby, creating echoes.

A computer changes these echoes into a picture on a television screen so that the outline of the baby, the limbs, head, internal organs and skeleton can be seen. The baby is unable to hear the sound and the power of the sound itself is very low.

For abdominal ultrasound to be most successful, a full bladder is needed. This is especially important when the woman is in the early stages of pregnancy. The uterus and the ovaries are often hidden behind the bowel, making it difficult to clearly see inside the uterus. When the bladder is full, the bowel is pushed out of the way. This means that the woman should have several glasses of non-fizzy fluid one hour before the test.

Vaginal ultrasound

Under sterile conditions, a special probe containing the “transducer” may be placed in the vagina. The sound waves pass into the uterus and create the same echoes as described above.

For vaginal ultrasound it is best if the bladder is empty.

What does the ultrasound picture look like?

Depending on the stage of pregnancy, the ultrasound scan may provide a picture of only a small part of the uterus at any one time. The woman may see on the screen only the baby’s head or the arms and legs. The doctor or sonographer will look at all the parts of the baby during the scan.

- *Figure 17A.1* is a photograph of an ultrasound of a baby taken at 11.5 weeks of pregnancy
- The photograph in *Figure 17A.2* was taken at 19 weeks of pregnancy

How reliable is an ultrasound?

Ultrasound is used as both a screening and a diagnostic test. It can either give an indication that the baby is at an increased risk of a problem (a screening test), or it can detect a definite problem in the baby’s physical development for example, in the heart or the kidneys (a diagnostic test).

Sometimes it is not easy to get a good picture of the baby in the uterus. The baby may be lying in such a way that all the organs of the body cannot be seen clearly. The accuracy of the ultrasound will also depend on the skill of the operator and the quality of the machine used.

When will the result of the scan be available?

In some cases the woman will be given information about the baby’s scan straight away. If however, there is a suspicion that the baby has a problem, a sonographer may not be able to discuss the findings with the woman. A further review of the result may be sent to the doctor, who will then inform the woman of her result.

It is a good idea to ask the sonographer before the scan how the result will be given.



Figure 17A.1: Ultrasound scan of a baby taken at 12 weeks of pregnancy



Figure 17A.2: Ultrasound scan of a baby taken at 18 weeks of pregnancy

Does the ultrasound harm the mother or the baby?

No evidence has been found of ultrasound causing harm to the mother or developing baby.

- In most Western countries, about 80% of pregnant women have at least one ultrasound during the pregnancy

What if the baby has a problem?

In a small number of cases an ultrasound scan done early in the pregnancy may show that the baby either has or is at risk of having, a problem.

- A more specialised ultrasound scan to determine if the baby actually has a problem may be indicated
- Alternatively, depending on how advanced the pregnancy is, the doctor may also suggest having one of the diagnostic tests (See Genetics Fact Sheet 17C)

Discussing the situation with the doctor or a genetic counsellor can help the parents if they wish to have further diagnostic testing,

and which test would be best for the woman (see Genetics Fact Sheet 3).

Professional genetic counselling will provide an opportunity to discuss:

- What the result means for the parents and the family
- The options available at this time
- Whether the parents wish to have further testing if available
- The advantages and disadvantages of any further testing that is offered
- What course of action the woman will take
- The attitudes to people with disabilities and to termination of pregnancy in a safe and understanding environment

Support will be offered to the woman and the partner at this time, no matter what they decide to do.

Other Genetics Fact Sheets referred to in this Fact Sheet: 3, 17, 17B, 17C, 59

Information in this Fact Sheet is sourced from:

- Barlow-Stewart K, Emery J, Metcalfe S. (2007). Testing and pregnancy. In: *Genetics in Family Medicine: the Australian Handbook for General Practitioners*. Biotechnology Australia, Commonwealth Department of Industry, Tourism and Resources
- Gardener, RJ and Sutherland GR. (2004). *Chromosome abnormalities and genetic counselling*, New York: Oxford University Press
- Hook EB. (1981). Rates of chromosomal abnormalities. *Obs Gyn* 58 282-285
- Morris JK, Mutton DE and Alberman E. (2002). Revised estimates of maternal age specific live birth prevalence of Down's syndrome. *Journal of Medical Screening*. 9, 2-6
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists [online]. Available from: www.ranzcog.edu.au. [Accessed June 2007]

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