

Ultrasound scans can be used in conjunction with other clinical information during pregnancy for the following reasons:

- as a guide during other prenatal tests, such as amniocentesis and chorionic villi sampling, in order to minimise the chance of damage to the foetus or placenta
- to check the position and presentation of the baby
- the foetus seems small or large for its dates
- a multiple pregnancy is suspected
- when the mother is bleeding from the uterus at any stage during pregnancy
- to check the fluid levels around the baby
- to check the position of the placenta when placenta previa is suspected (the placenta is lying across the entrance to the uterus)
- to confirm whether the foetus is alive or dead

### Concerns about ultrasound

According to a 2008 review of eight trials, the use of ultrasound in normal pregnancies offers no improvement to the health of either the mother or the baby, and may result in increased intervention. (7) This confirms other reviews which found that although routine scans conducted before 24 weeks in women with low risk pregnancies resulted in earlier detection of multiple pregnancies and reduced rates of induction for overdue pregnancies, there was no clear evidence of significant benefits. (8)

Studies have not proved any harm from the use of ultrasound, but neither have they been able to prove its absolute safety. It is still not clear whether there are any long-term effects of the ultrasound in use today. The intensity level or acoustic output of modern ultrasound machines is now considerably higher than it was 15 years ago, and laboratory studies show that ultrasound at high intensities does create immediate effects at the time of exposure. (9)

Ultrasound causes heating, known as the thermal effect, and also creates nonthermal or mechanical effects. The nonthermal effects include audible sounds, the movement of cells in liquid, electrical changes in cell membranes, shrinking and expansion of bubbles in liquid (cavitation), and pressure changes. (9)

The risk of heating increases the longer the foetus is exposed to ultrasound. A temperature elevation of 4 degrees centigrade, maintained for 5 minutes or more, is considered to be potentially hazardous to a foetus. Some Doppler ultrasound equipment can produce temperature rises in excess of 4 degrees centigrade in bone, with an associated risk of high temperatures being produced in adjacent soft tissues. (10) It is therefore recommended that ultrasound scanning during pregnancy is only used when there is a medical indication and that the number of scans is limited to the minimum necessary for diagnostic purposes.

Some studies have linked ultrasound to increased movement of the foetus during the scan. It has been suggested that the foetus moves because it actually hears sound caused by the pressure of the ultrasound beam. At present there is no evidence that hearing sounds during an ultrasound scan causes any damage to the foetus.

### Ethical issues about ultrasound



When an ultrasound scan reveals an abnormality in the foetus, the mother may be faced with the difficult decision about whether or not to have an abortion. Some abnormalities such as cleft palate and many heart defects are correctable by surgery soon after birth. Women report they often feel they are expected to have an abortion if untreatable abnormalities are discovered.

There are also other consequences of routine ultrasound scans that are both costly and have the potential to alarm women unnecessarily. These include the fact that the NT and the 18-20 week anomaly scans may need to be repeated due to findings of minor deviations from normal which are later determined not to be significant.

Many defects cannot be accurately identified by an early ultrasound scan so women may be referred for an amniocentesis at 15 – 18 weeks, a procedure that carries a 0.5 to 1% risk of miscarriage of what may be a healthy foetus.

By the time the results of the amniocentesis are returned, the pregnancy cannot be terminated by vacuum aspiration or curettage, but involves inducing labour and expelling the foetus.

Before consenting to ultrasound screening women need to consider what they would do if an abnormality is detected.

### Women's reactions to ultrasound



Women's reaction to ultrasound scans vary. Some women value the reassurance that their baby is normal and find it reduces their anxiety and provides them with a photo or video of their baby. However, many women don't know that an ultrasound scan that detects no foetal abnormalities is not a guarantee of a healthy baby.

Other women find having a scan makes them anxious particularly when the results are unclear and they are asked to return for repeat scans. Women who are told something is wrong face difficult decisions, especially since the diagnosis can never be 100% accurate. No study has looked at the long term outcomes of increased anxiety during pregnancy on mothers and babies.

### Code of Consumers' Rights



Ultrasound screening is a health service so the Code of Health and Disability Services Consumers' Rights applies to all those providers performing ultrasound scans. Ask for a copy of the Code or contact the Office of the Health and Disability Commissioner on 0800 11 22 33; email: [hdc@hdc.org.nz](mailto:hdc@hdc.org.nz) or visit the HDC website at [www.hdc.org.nz](http://www.hdc.org.nz)

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# ultrasound scans during pregnancy

## A DECISION MAKING GUIDE

WOMEN'S HEALTH ACTION TRUST



INFORMATION FOR PARENTS

**Choosing to participate in any screening, including ultrasound, is your decision. This pamphlet is designed to help you with this by giving you important information about ultrasound screening so you can decide whether it is useful for you and your baby.**

## What is ultrasound?



Ultrasound is a way of seeing the growing foetus/baby and hearing its heartbeat while it is inside a pregnant woman. It works by sending out very high frequency sound waves which are directed at the foetus using a hand-held device called a transducer that is passed over the woman's abdomen. The reflected sound or echoes from the transducer are recorded to create a picture of the baby.

Other names for an ultrasound scan include sonogram and ultrasonography.

There are two types of ultrasound used during pregnancy and labour:

**1. Real-time imaging** is ultrasound that uses high frequency sound waves of between 3.5 to 7 megahertz to produce a picture of the foetus which is depicted on a monitor screen. This is done either with a transducer or with a probe that is inserted into the vagina. The transvaginal probe usually provides better images of the foetus because it is closer to the uterus and uses higher frequency sound waves of between 5 to 7.5 megahertz.

3D and 4D ultrasound scans use real-time imaging to accumulate a volume of echoes that are stored digitally and shaded to produce a more life-like picture of the foetus. Some parts of the baby's anatomy can be seen more clearly with 3D ultrasound scans.

**2. Doppler ultrasound** uses either pulsed or continuous ultrasound to measure the velocity of blood flow. Doppler ultrasound is used to listen to the foetal heartbeat, examine the foetal heart for defects, estimate placental blood flow and examine blood flow in various foetal blood vessels.

A **doptone (or sonicaid)** is a hand-held device that enables the doctor or midwife to listen to the foetal heartbeats.



At antenatal visits and during labour, **continuous electronic foetal heart monitoring** may be used. This is another form of doppler ultrasound which produces a printout of the foetal heartbeats over a period of time.

An alternative to using the ultrasonic doptone to listen to the foetal heart is the ear trumpet, also known as the manual pinard stethoscope.

## When is ultrasound screening carried out?



There is no hard and fast rule as to when and how many scans a woman may have during her pregnancy. Routine scanning has become the norm in early pregnancy despite a lack of evidence that it results in improvements in outcomes for the baby. (1)

Most pregnant women are offered a scan at around 12 weeks of pregnancy (Nuchal Translucency scan), and again between 18 – 20 weeks, although scans for specific purposes can be performed both earlier and later in the pregnancy.

## What is ultrasound scanning used for?



### 1. First trimester scans

Ultrasound scans performed during the first trimester (first three months) are used to confirm pregnancy, check the age and size of the foetus, count the number of foetuses, and predict the due date of the baby (or babies). A scan done during the first twelve weeks of pregnancy may be able to detect **some** major foetal abnormalities. It is not possible to accurately inspect the foetus for **all** possible abnormalities. Detection rates can vary considerably as they depend on the skill and expertise of the operator as well as the quality of the scanning equipment.

**First Trimester Combined Screening (FTCS)** involves having a maternal serum screening test (a blood test) taken between 9 weeks and 13 weeks 6 days of pregnancy followed by a nuchal translucency (NT) scan between 11 weeks and 13 weeks 6 days of pregnancy (see below). FTCS is now being offered to all women as it improves the detection rate of Down syndrome and reduces the need for other more invasive diagnostic procedures such as amniocentesis. (2) Both NT scans and maternal serum tests are screening tests, not diagnostic tests, and will result in both false positive and false negative results. Some women with normal babies will be assessed as being at high risk of having a baby with a congenital abnormality. Others who are assessed as being at low risk will have a baby that does have Down syndrome.

Further information on First Trimester Combined Screening can be accessed at:  
<http://www.nsu.govt.nz/current-nsu-programmes/antenatal-screening.asp>

**Nuchal Translucency (NT) scans** are performed between 11 weeks and 13 weeks 6 days of pregnancy to assess the risk of the baby having Down syndrome or some other chromosomal abnormality. Studies have shown that an increase in the thickness of the fold of skin at the back of the foetal neck is associated with Down syndrome and other chromosomal abnormalities. (3)

Recent studies have indicated that 'soft markers' such as the absence of the foetal nasal bone and tricuspid regurgitation (leakage of blood back through the heart valve) may also be associated with Down syndrome. (4) However, this work is still experimental and the apparent absence of the nasal bone varies by ethnicity. Further research is needed before this can be safely included in the risk assessment.

More recently an increase in nuchal thickness has also been associated with major cardiac defects in babies who are chromosomally normal, as well as with other genetic abnormalities.

**Having an NT scan without a blood test is not recommended due to the high rate of false positive results. An NT scan without a blood test is not part of publicly-funded maternity care.**

Amniocentesis may be recommended in order to provide more information when an abnormality is suspected. This procedure is performed by an obstetrician and involves inserting a needle through the abdominal wall of the mother and withdrawing a small quantity of the amniotic fluid that surrounds the foetus. It is usually performed between fifteen and eighteen weeks of pregnancy. There is a risk of 0.5 – 2% of miscarriage following the procedure and many women report cramping, mild bleeding or spotting in the days afterwards. Women may have to wait for two to three weeks for the results. If an abnormality is found or suspected they may face follow-up procedures and/or the difficult decision of whether to terminate the pregnancy.

### 2. Second trimester scans

Ultrasound scans are most commonly performed between 18 – 20 weeks to confirm the number of babies and the due date, to check the fluid levels around the baby, to look for foetal malformations, and to locate the placenta. It is still not possible to detect all foetal defects at this stage. Only half of all major abnormalities are able to be detected by an ultrasound scan. Even when the scan indicates that the baby is normal there is still a possibility that the baby will have a problem. (5)

A placenta which is lying low down in the uterus at 18 – 20 weeks is not considered to need further investigation unless there are other symptoms such as vaginal bleeding.

Overall detection rates for congenital abnormalities vary considerably. Differences in detection rates may be due to the quality of the scanning machine, the expertise of the person performing the scan, the duration of the scan, the position of the foetus and maternal size. One publication lists the chances of identifying certain conditions as: spina bifida 90%, abdominal wall defects 90%, hydrocephalus 60%, diaphragmatic hernia 60%, and major heart defects only 25%. (5)

### 3. Third trimester scans

Sometimes a scan is done during the third trimester (typically at around 34 weeks) to evaluate the size of the baby, assess the baby's growth, position and surrounding fluid levels, and verify the position of the placenta. However, studies have shown that scans performed during the third trimester are not able to provide an accurate prediction of the baby's weight or size. (6) A 2008 Cochrane review on routine ultrasound screening in late pregnancy concluded that based on existing evidence, routine late pregnancy ultrasound in low risk populations does not benefit either the mother or baby. (7)

## LEGISLATION AND TRAINING

- There is no legislation covering the use of obstetric ultrasound. There is also no auditing and monitoring of ultrasound scanning during pregnancy. Monitoring the safety of machines is the responsibility of the owners of the equipment.
- Not everyone who performs scans has had specific training in the technique. Sonographers – who do most scans – must hold either a Diploma of Medical Ultrasonography (DMU) or a Bachelor of Health Science (Medical Imaging) and be registered with the Medical Radiation Technologists Board (MRT).
- Others who perform scans are radiologists who must complete a 5-year training programme. Other doctors, eg obstetricians, may not hold a specific radiology qualification nor have had any extensive training in performing scans.
- Many practitioners performing ultrasound scans have been trained to perform NT measurements and are accredited by the Fetal Medicine Foundation in London. Accreditation to perform publicly-funded NT scans became compulsory in 2007.

## Social uses of ultrasound scans



Ultrasound scans are increasingly being performed for non-medical reasons that have little or no influence on the management or outcomes of pregnancy and birth. These include reassuring parents that their baby seems to be developing normally, helping parents bond with their unborn baby, revealing the sex of the baby (ultrasound is not always accurate for this purpose), and encouraging mothers to give up smoking.

The development of 3D and 4D ultrasound scans has encouraged the use of scanning for social purposes.

### 3D ultrasound scans

A 3D scan shows the baby in three dimensions. It is best done at 26-32 weeks of pregnancy when the amniotic fluid volume is greater and the baby is not too big.

### 4D ultrasound scans

A 4D scan is a 3D scan with the added dimension of time. This means the baby can be seen to be moving. As it may take time to get good views of the baby it can prolong the time the baby is exposed to ultrasound.

## Medical uses of ultrasound scans



### Benefits of ultrasound

In pregnancies where there is a medical reason for ultrasound scanning, the information gained can lead to decisions that will improve the chance of giving birth to a healthy baby.