



The Leeds  
Teaching Hospitals  
NHS Trust

# Ultrasound in Pregnancy

Information for patients



Leeds  
Maternity Care

This leaflet for women who are undergoing an ultrasound scan during pregnancy.

## **What is ultrasound?**

Ultrasound is high frequency sound waves that are produced by a probe called a transducer. The transducer contains many crystals which each produce a sound wave usually for say 1/1000th of a second. For the remaining 999 thousandths of a second the crystal listens for the sound returning.

The sound wave passes into the tissue, at each tissue layer some of the sound is reflected back towards the probe and this is recorded by crystals within the probe.

The denser the tissue the sound hits the more of the sound wave which is reflected back. As the probe knows when the sound was generated and when it returns it can build up a picture of the density of the subject it has struck and how far away it is. Because there are many crystals, and therefore many signals this allows a constantly updated image to be created which is why we can see a moving image on the TV screen.

## **Can the picture quality vary between individuals?**

The answer is yes as you will see if you compare your ultrasound pictures with friends.

## What causes this difference?

There are many reasons but the main ones are the distance the sound wave has to travel, what structures the wave has to travel through and the frequency of the transducer.

### Distance

As some of the sound wave is reflected back at each layer it stands to reason that the further the beam has to go the less sound there will be to reflect. As more reflected sound produces better images, the closer the image we wish to see is to the transducers the better the quality of the picture, and therefore the converse is also true and the further away the worse the picture. Unfortunately this means the thicker the abdominal wall, and therefore the more fat a person has, the worse the ultrasound image will be. That is not the only reason. In early pregnancy the uterus may well be retroverted.

This is where the uterus is tilted backwards rather than its more usual position of sitting upright when the top of the uterus will be in contact with the abdominal wall.

If the uterus is tilted backwards then it is often covered by bowel, of which we will hear more later, and in order to see the baby we have to fill the mother's bladder to push the bowel out of the way. The result of a retroverted uterus is a baby which is situated further away from the probe and therefore the images are less clear.

## Scarring

Any operation on the lower abdomen will result in disruption to the neat tissue plains. This means that because of the scarring the sound waves are deflected in a variety of directions and not back to the transducer. As the transducer is not big enough to receive the information it is lost. The net result is a smaller signal being sent back to the transducer and a poorer image.

## Bowel

Ultrasound gel is applied to the abdomen so that air is not present between the probe and the skin. This is because high frequency ultrasound waves do not readily pass through a gas in this case air. Unfortunately bowel also contains gas and if this lies on top of the uterus we obtain very poor views. Often filling the mother's bladder will push the bowel out of the way or this may be achieved by the person performing the scan pushing harder on the probe to squeeze the bowel out of the way.

## Transvaginal ultrasound

Sometimes problems like a tilted uterus can be overcome by using a transvaginal probe. Here an ultrasound probe covered in a probe cover (like a condom) is inserted into the vagina. Because the tip of the probe is close to the cervix a higher frequency can be used which usually gives better images. This is only of use in early pregnancy when the uterus is within the pelvis, in late pregnancy for looking at the edge of the placenta or the cervix and occasionally to look at the baby's head if it is low in the uterus.

## Frequency

The higher the frequency of the sound wave used the clearer the image. Unfortunately higher frequencies travel the shortest distances and therefore are only of use when the area to be looked at is close to the probe. Lower frequencies travel further but do not produce as clear an image.

The net result of all of the above is that the quality of the ultrasound picture will be poorer in women with thicker abdominal walls. This may result in the ultrasound department missing an anomaly which might have been seen in a thinner subject.

As a general rule as the fetus grows between 16 and 22 weeks it becomes easier to see the anatomy. If your BMI is increased (above 30) we may well opt to delay your mid trimester scan until 21-22 weeks to allow us the best opportunity of seeing your baby.

## Does being over weight increase my risk?

Unfortunately there is evidence that as the maternal BMI increases so do both the maternal and fetal risks. With a BMI above 30 there is an increased risk of a fetal anomaly and for the reasons outlined above an increased chance that we might miss it. Specific fetal anomalies which are associated with an increased BMI include spina bifida and heart defects. As we are aware that taking folic acid can reduce the risk of spina bifida it is now recommended that women with a BMI above 30 should take a larger dose (5mg rather than 400 micrograms) of folic acid before and for the first 12 weeks of the pregnancy.

## Does ultrasound identify all anomalies?

The answer to this question is no. Even common anomalies can be missed at times. This can occur for a variety of reasons which include: that it was too small to see, the baby was in an awkward position, it was not present at the time of scanning or it is not possible to spot it on ultrasound at this time. Overall we would expect to pick up over 95% of spina bifida or gastroschisis. We do much less well with heart defects where we miss more than 50% and will never pick up conditions such as cerebral palsy.

## What happens if the views are poor?

We will always do our best to try and obtain the best possible views. That might mean altering your position, or filling your bladder. We might ask you to go for a walk and return when hopefully your baby will have moved position. If all fails we may ask you to return on another occasion. If the images are poor because of the maternal size rescanning may not improve the situation and in that case we have to accept that there is a higher chance that we might miss an anomaly. However, it must be remembered that the vast majority of babies are normal.

## Questions / Notes

Dotted lines for writing.



**What did you think of your care?**

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**Your views matter**



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