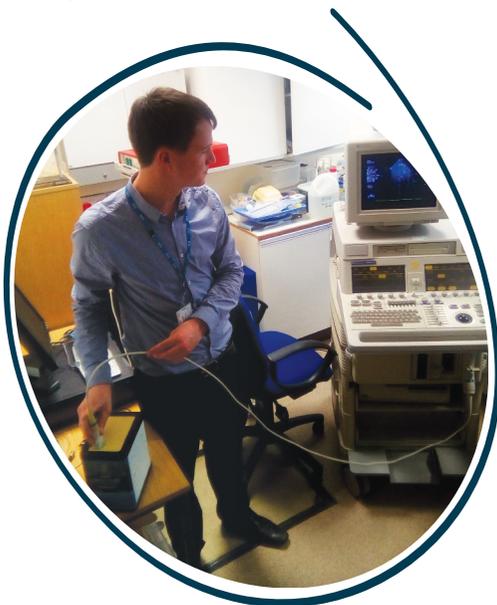


The Scientists

Medical physicists, clinical scientists and technologists provide scientific, safety, quality control and technical expertise on the use of ultrasound. They ensure the best quality images are achieved and provide advice on the purchase of new equipment. Some are at the forefront of research into new diagnostic applications, treatments and techniques for ultrasound. Some medical physicists are clinically trained and carry out scans on patients. Some clinical scientists who specialise in ultrasound play a crucial role in educating other healthcare professionals in its effective use.

Vascular scientists and technologists use ultrasound, along with other non-invasive techniques, to assess the blood flow of patients with arterial and venous diseases such as deep vein thrombosis, varicose veins and stroke. Their role includes interpreting ultrasound results, writing reports, and working alongside nurses, radiologists, consultants and surgeons to determine whether surgical intervention is necessary.



IPEM Institute of Physics and Engineering in Medicine

This series of leaflets highlights the science and the scientists behind some widely used medical techniques. They are produced by the Institute of Physics and Engineering in Medicine. To find out more about Medical Physics or Biomedical Engineering, or to request free leaflets or posters in this series, contact us:

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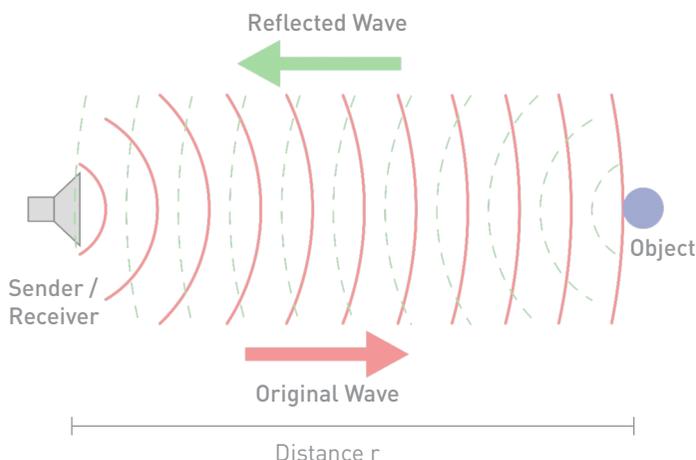
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The techniques described in this leaflet are only available in certain cases and some are not yet widely available. If you need an ultrasound, your doctor will advise on the best treatment for you.

This leaflet was produced with the help of IPEM's Ultrasound & Non-Ionising Radiation Special Interest Group.

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IPEM

The Science & The Scientists

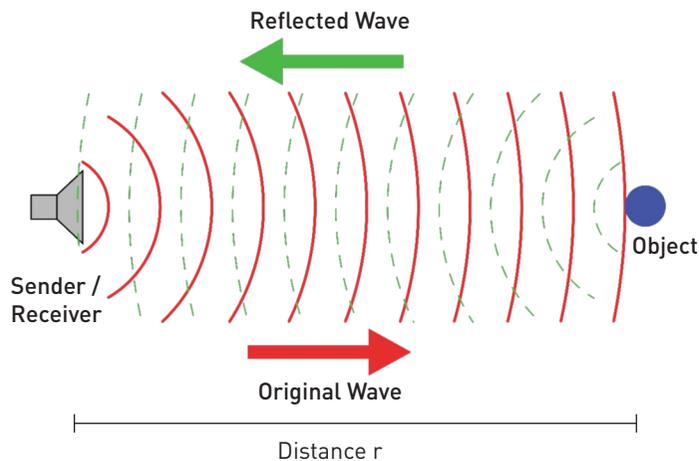
Seeing inside the body with ultrasound

Ultrasound has been described as the 'stethoscope of the future'. It's quick, safe, accessible and is applied across many areas of a hospital to produce images of the inside of the body.



The Science

Ultrasonic images are made by sending pulses of high frequency inaudible sound waves - ultrasound - into tissue using a probe. The sound bounces off the tissue and different tissues reflect varying degrees of sound. These echoes are then turned into an image. This works in a similar way to how radar is used to detect aircraft, but using sound instead of radio waves.



Ultrasound can capture moving images in real time giving an advantage over x-rays in many diagnoses. It is also one of the safest ways to obtain images from inside the body.

Ultrasound waves do not travel very well through air, so a gel is used to exclude the air between the skin and the probe, allowing the waves to transmit directly to the tissues beneath.

Almost every hospital department has its own ultrasound machine. As well as the most commonly known usage for checking the health of foetuses in the womb it is also used for:

- breast screening
- monitoring blood flow to the heart to check it is not under stress
- examining the arteries of diabetics to monitor their condition
- checking for potential muscle and ligament damage in physiotherapy. Specialist ultrasound probes can also provide physiotherapy treatment through heating tissue
- general health screening of abdominal organs as part of the national screening programme for abdominal aortic aneurysm (a check for swelling of the abdominal aorta, the largest blood vessel in the body)
- looking for kidney or bladder stones
- guiding biopsies, anaesthetic and surgical procedures
- neo-natal intensive care monitoring and diagnoses for ill and premature babies.

The images obtained from ultrasound are improving all the time as the scanners themselves improve. Scanning devices are also becoming more sophisticated and virtually pocket-sized.

Foetal Ultrasound

