

Scope: This fact sheet provides guidance on the safe use of ultrasound technology. The information in this fact sheet is designed to assist you to conduct and then document your risk assessment within UQ Safe.

What is medical ultrasound?

Medical ultrasound is categorised into two distinct types: **diagnostic** and **therapeutic**.

Diagnostic ultrasound is a non-invasive imaging technique used to visualise structures inside the body. It involves the use of ultrasound probes, also known as transducers, which generate sound waves at frequencies above the human hearing range ($> 20\text{KHz}$). However, most modern transducers operate at much higher frequencies, typically in the megahertz (MHz) range.



Therapeutic ultrasound also uses sound waves above the range of human hearing but is not used for imaging. Instead, its purpose is to interact with tissues in the body either modifying or destroying them.

How does it work?

An ultrasound transducer emits sound waves and detects the echoes reflected back. Most transducers use piezoelectric materials that produce sound when an electric field is applied and generate an electric field when sound waves hit them.

During a scan, the transducer sends sound waves into the body. These waves reflect off tissue boundaries (e.g., between fluid and soft tissue or bone), and the returning echoes are converted into electrical signals. The scanner uses these signals to create two-dimensional images based on the time it takes for the echoes to return.



An ultrasound transducer

A gel is applied to the skin during the exam to prevent air pockets, ensuring the sound waves pass through effectively.

Are there risks?

Diagnostic ultrasound is generally considered safe as it does not involve ionizing radiation like X-rays. Studies have shown that it is a safe technique with no harmful side effects. However, under certain settings and conditions, ultrasound can produce biological effects in the body. For this reason, ultrasound devices must operate within safe limits. Many professional societies advise against non-medical use (e.g., for keepsake videos) and recommend using ultrasound only when there is a legitimate medical need.

Peer Reviewed References

These references have been reviewed by staff of the HSWD and are recommended to assist you further with your risk management:

- [National Institute of Biomedical Imaging and Bioengineering](#)
- [Non-ionising Radiation Protection in Australia, Australian Radiation Protection and Nuclear Safety Agency](#)

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