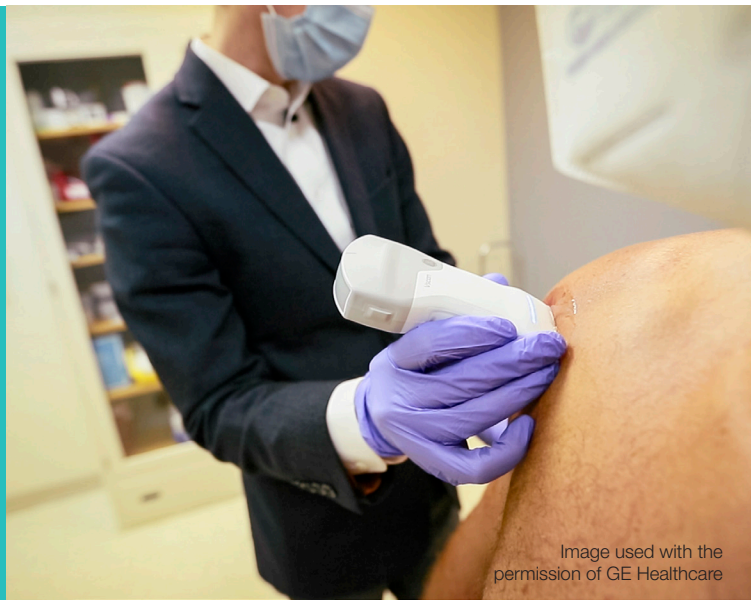
The importance of high-level disinfection (HLD) of wireless ultrasound probes

Critical Summary

- The use of portable ultrasound is growing throughout healthcare, with the utility of handheld ultrasound devices and wireless ultrasound probes increasingly recognised.
- Wireless probes are a versatile and mobile solution for healthcare facilities, able to be transported easily for use at point of care. This portability means that wireless probes may be shared between rooms, departments or operators, and used across a range of procedures.
- Given that wireless probes may contact sterile tissue, the bloodstream or broken skin during use, it is important to ensure they are appropriately disinfected to protect patients from healthcare-associated infections.



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When to use high-level disinfection (HLD)

It is essential to adequately reprocess all ultrasound probes prior to patient use, including wireless probes. The framework governing this reprocessing is the universally accepted Spaulding classification system. The Spaulding classification is used by the Australian Guidelines for the Prevention and Control of Infection, AS/NZS 4187 and the ACIPC-ASUM guidelines to determine the level of disinfection an ultrasound probe requires, based on the patient contact site (see Table 1).[1-3]

Wireless ultrasound can be used in percutaneous procedures involving needle puncture of the skin. There are more than 140 ultrasound-guided percutaneous procedures. While many of these may not involve any contact between the ultrasound probe and the puncture site, some will involve contact with sterile tissue and therefore require the probe to be high-level disinfected at a minimum. The risk of contact can be influenced by variables such as the type of procedure, patient anatomy, technique used and experience of the operator. Clinicians must decide what the risk of contact with sterile tissue is and therefore what level of disinfection is required.

According to the Spaulding classification, HLD should be used when ultrasound probes contact mucous membranes or non-intact skin. Sterilisation is required for probes contacting sterile tissue or the bloodstream, but HLD can be used in conjunction with a sterile sheath if sterilisation is not possible.

Table 1. The Spaulding Classification

Classification	Patient Contact Site	Disinfection Level	Efficacy Spectrum
Critical	Device enters or contacts sterile tissue or bloodstream	Sterilisation or HLD and use with a sterile sheath*	All viable microorganisms destroyed
Semi-critical	Device contacts mucous membranes or non-intact skin	High-Level Disinfection	All viable microorganisms destroyed, except bacterial spores
Non-critical	Device only contacts intact, healthy skin	Low-Level Disinfection (LLD)	Vegetative bacteria destroyed along with some viruses and fungi. Generally not effective against mycobacteria or spores

*Critical ultrasound probes can be high-level disinfected and used with a sterile sheath if sterilisation is not possible.[2,3]

Use of a sheath does not replace the need for HLD

According to the AS/NZS 4187 and the ACIPC-ASUM guidelines, the use of a protective barrier does not change the reprocessing needs of ultrasound probes, and merely acts as another mechanism to reduce infection risk.[2,3]

Use of wireless probes in healthcare

Wireless ultrasound probes are increasingly being used in interventional procedures due to their high portability and lack of a cable. Given the large number of potential applications for wireless probes, it is important to follow guidelines and ensure proper disinfection after each use.

Table 2. The Spaulding Classification of procedures performed using wireless ultrasound probes

Sample use	Potential patient contact sites	Classification	Minimal disinfection and use requirements
Ultrasound scans over intact skin	Healthy, intact skin	Non-critical	LLD
Probes used in percutaneous interventions (e.g. biopsies, joint aspiration, nerve block, thoracentesis)	Probe does not contact sterile tissue or the bloodstream at the puncture/incision site	Non-critical	LLD
	Probe contacts sterile tissue or the bloodstream at the puncture/incision site	Critical^	HLD with use of a sterile sheath*
Ultrasound scans over non-intact skin	Rash, dermatitis, superficial wounds	Semi-critical	HLD
Probes used in surgical procedures	Contact sterile tissue or the bloodstream	Critical^	HLD with use of a sterile sheath*

*Critical ultrasound probes can be high level disinfected and used with a sterile sheath if sterilisation is not possible.[2,3] ^If the probe will not contact sterile tissue, the probe could be non-critical requiring low-level disinfection. However if the probe is used in a sterile field, HLD and a sterile sheath may be required.[2,3]

Benefits of automated HLD

Manual disinfection methods are inherently variable. Using an automated and validated disinfection process means that critical parameters (e.g., contact time, temperature, concentration or dosage) are controlled and all surfaces of the probe head and handle are disinfected. Automated methods also standardise and digitise traceability across the ultrasound infection prevention workflow. HLD of semi-critical and critical ultrasound probes must have full traceability to the patient,[2,3] with this being particularly important for mobile wireless probes used by different operators across different rooms and departments.

Storage of wireless probes

Given the high portability of wireless ultrasound, particular attention should be paid to correct probe storage, particularly following HLD. Australian and New Zealand Standards require that semi-critical ultrasound probes are stored in a manner to prevent environmental contamination in a designated storage area.[2,3] Critical ultrasound probes should be stored in a designated storage area while maintaining sterility.

Conclusion

Wireless ultrasound probes are a versatile solution for healthcare facilities, offering a portable solution that can be used easily at point of care. Given the mobile nature of wireless probes, they may be used across departments and in a variety of procedures. It is therefore important to correctly apply the Spaulding and follow Australian and New Zealand standards on the reprocessing of semi-critical and critical probes to keep patients safe from infection.

Contact us today for your specific needs on wireless ultrasound probe reprocessing, understanding when to HLD or for an educational session at your facility.

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References: **1.** Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019) **2.** AS/NZS 4187:2014 Reprocessing of reusable medical devices in health service organisations. **3.** Australasian College for Infection Prevention and Control (ACIPC), Australasian Society for Ultrasound in Medicine (ASUM). Guidelines for Reprocessing Ultrasound Transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40.

The trophon family includes the trophon EPR and trophon2 devices, which share the same core technology of 'sonically-activated' hydrogen peroxide.

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