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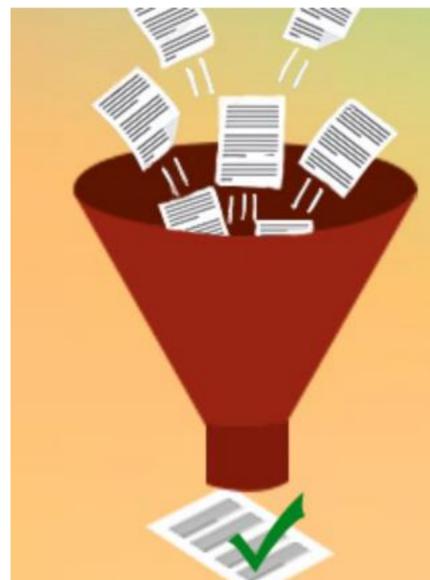
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Introduction

- Ultrasonography constitutes an integral part of modern patient care. It forms part of treatment algorithms for management of cardiac arrest, pulmonary emboli (i.e., detection of deep vein thrombosis), central vascular device insertion and guides hemodynamic assessment in common clinical syndromes such as sepsis and acute respiratory distress syndrome. To achieve the full benefits in patient care that ultrasound brings to emergency and critical care, clinicians need to minimize the contamination risk from the use of ultrasound probes and machines that are shared medical devices (i.e., move from patient-to-patient).

Method

- A literature review of various surveys and research studies in ultrasound probe decontamination showed the risk of cross-contamination through the repeated use of probes as a vector for pathogen transmission in evidence-based research. The survey studies provided further insights into the practicalities, infrastructure requirements and limitations of implementing infection prevention process without dedicated guidelines and medical staff training.

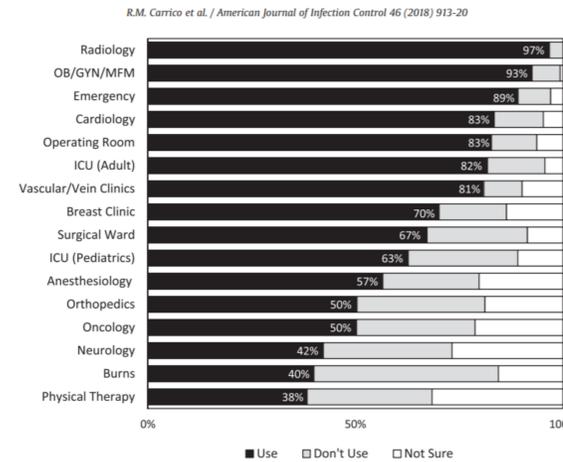


Results

In the early stages before guidelines were established a number of clinical surveys of sonographers and radiologists highlighted inconsistencies and lack of sufficient knowledge or training on proper cleaning/disinfection procedures.

Including clinical workflow challenges of insufficient time between patients to implement stringent infection prevention measures in busy ultrasound units.

- **European Society of Radiology (ESR) online survey** of members assessed the control measures for infection prevention in ultrasound.¹
- **Westerway and Basseal surveyed the Australasian medical ultrasound practice.**²
- **Ruth M. Carrico et. al, survey of 358 health care facilities in the United States.**³
- **Angela Ai et. al, survey showed variations in ultrasound probe reprocessing.**⁴⁻⁵
- Sartoretti and colleagues found that **ultrasound probes used** in three radiology departments had **higher levels of bacterial contamination than public toilets and bus poles.**⁶

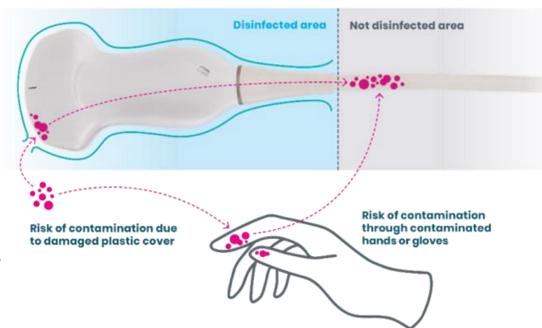


Results

The concerns raised by these surveys that infection may be transmitted patient-to-patient through ultrasound procedures are well supported in numerous published literature.

Poor infection prevention practices can be contributed to medical staff perception that cross contamination risk of infection is negligible, if an ultrasound transducer has been covered with a single-use sheath for the procedure, then low-level disinfection provides sufficient protection against pathogen transmission.

- **A retrospective study (2010-2016) revealed** an increase in infection risk in the 30 days following transvaginal ultrasound.⁷
- **Research studies demonstrated that contaminated gel** can lead to infections through utilising ultrasound guided procedures in central line and arterial line placement.⁸
- **A research study conducted in 5 Emergency Departments and 5 Intensive Care Units showed** that handle and cable section are exposed to cross-infection risk in these clinical environments.⁹
- **With quick turnaround times, performing 10 to 30 blocks per day, including single-shot injections and catheter placements,** it is often not practical to move probes to and from Central Sterilisation Departments for disinfection (which may not be available in clinics).¹¹

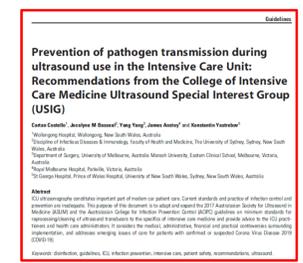


41% Patients are 41% more likely to have positive bacterial cultures 30 days after a transvaginal scan where probes were low level disinfected and

26% **26% (HR=1.26) more likely to be prescribed antibiotics.**

Result

- The rapid expansion in use of Point of Care Ultrasound has brought clinical benefit but may be exposing patients to avoidable infection risk.
- The lack of consistency in HLD practices in Emergency Departments and Intensive Care and poor adherence to HLD protocols further supported the need for dedicated guidelines to adapt and expand the 2017 ASUM/ACIPC Guidelines for Reprocessing Ultrasound Transducers. Focusing on the transducers specific use within POCUS environment and provide advice to Emergency and ICU practitioners and health care administrators.
- In 2020 College of Intensive Care Medicine Ultrasound Special Interest Group (USIG) published a set of recommendations for the prevention of pathogen transmission during ultrasound use in the Intensive Care Unit.
- The recommendations considered the medical, administrative, financial and practical controversies surrounding implementation, and addresses emerging issues of care for patients with confirmed or suspected Corona Virus Disease 2019 (COVID-19).¹¹

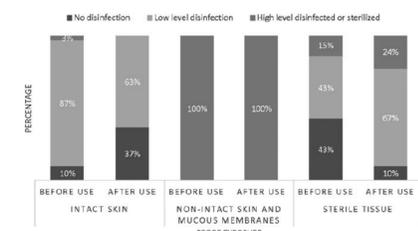


Conclusion

- Ultrasound technology has great promise for improving patient care and patient safety; however, it is important that we also minimize the risk of infection from contaminated probes.
- Procedures involving ultrasound are increasingly common, and the complexity of HLD in certain settings influences the entire work system and may have both intended and unintended consequences that must be anticipated and addressed.⁴
- A national survey of infection preventionists showed the wide range of ultrasound use in the respondents' facilities.³
- To ensure safe practice in ultrasound use there is a need for standardization in staff training and ultrasound probe cleaning/disinfection practices.

Ultrasound-Guided Procedure	Disinfection Before Use				Disinfection After Use			
	No Disinfection, No. (%)	LLD, No. (%)	HLD, No. (%)	Sterilized, No. (%)	No Disinfection, No. (%)	LLD, No. (%)	HLD, No. (%)	Sterilized, No. (%)
Biopsy (n = 6)	4 (67)	0 (0)	2 (33)	0 (0)	0 (0)	2 (33)	4 (67)	0 (0)
Joint injection (n = 5)	4 (80)	1 (20)	0 (0)	0 (0)	2 (40)	3 (60)	0 (0)	0 (0)
Nerve block (n = 3)	0 (0)	3 (100)	0 (0)	0 (0)	0 (0)	3 (100)	0 (0)	0 (0)
Intramuscular injection (n = 3)	0 (0)	3 (100)	0 (0)	0 (0)	0 (0)	3 (100)	0 (0)	0 (0)
Peripheral IV placement (n = 2)	1 (50)	1 (50)	0 (0)	0 (0)	0 (0)	2 (100)	0 (0)	0 (0)
Radiofrequency ablation (n = 1)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)
Prostate brachytherapy (n = 1)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)
Total (n = 21)	9 (43)	9 (43)	2 (10)	1 (5)	2 (10)	14 (67)	4 (19)	1 (5)

Note: LLD, low-level disinfection; HLD, high-level disinfection.



ACIPC POCUS webinar further highlighted the complexities of ultrasound in Intensive care and Emergency environment.

[Watch ACIPC Webinar On Demand - HERE](#)