

Good infection prevention practice: using ultrasound gel - Full Clinical Guideline

Reference no.:

1. Introduction

Ultrasound gel has been associated with outbreaks of infection in various settings worldwide and risk of contamination of non-sterile ultrasound gel has been highlighted. Such outbreaks have typically included serious clinical infections (NatPSA/2021/010/UKHSA): The safe use of ultrasound gel to reduce infection risk November 2021.

Standard ultrasound gel is not produced as a sterile product, although sterile versions are available. Examinations using ultrasound gel and ultrasound-guided invasive procedures are conducted routinely in various clinical settings and situations. Patients range from those who are 'fit and well' to vulnerable individuals, such as those with severe immunosuppression and those who are critically ill.

This guidance should be considered in the wider context of standard IPC precautions. Patient safety is paramount, but the environmental impact associated with adhering to this guidance needs to be considered. Local risk assessments could be used to augment these recommendations.

This document provides guidance on the safe use of ultrasound gel to reduce risk of transmission of infection arising from these products and is aligned with the government guidance (Good infection prevention practice: using ultrasound gel, November 2021). The guideline includes additional guidance on scenarios when sterile gel is recommended and what types of gel containers should be used.

The target audience for this guideline includes:

- Clinicians and practitioners using ultrasound gel in their practice in healthcare settings. Any user such as:
 - Sonographers
 - Radiologists
 - Intensivists
 - Midwives
 - Vascular access specialists
 - Emergency department and medical clinicians
 - Physiotherapists
 - Nurses
 - Health care assistants

2. Aim and Purpose

To reduce risk to patients associated with the use of non-sterile ultrasound gel in healthcare settings.

3. Definitions, Keywords

Ultrasound, ultrasound gel

4. When to use sterile and non-sterile gel

Type of gel to be used

Sterile ultrasound gel in single-use containers should be used in the following scenarios:

- Invasive procedures, that is any ultrasound-guided procedure that involves passing a device through skin into sterile tissue, such as intravenous line insertion or fine needle aspirate
- If an invasive procedure is likely to be undertaken in the following 24 hours – this includes ‘viewing or initial assessment’ of a site by ultrasound prior to undertaking an aseptic invasive procedure
- In labour where there is a high likelihood of a C-section or invasive instrumentation during delivery being used
- Where there is contact with or near to non-intact skin (any alteration in skin integrity such as a rash or surgical wound, including umbilicus in neonates)
- Where the ultrasound examination is near to an indwelling invasive device, such as an intravenous line or suprapubic catheter
- Where there is contact with a mucous membrane (e.g. transrectal, transvaginal or ophthalmic procedures) – note: sterile gel to be used inside and outside of probe covers
- For examinations on severely immunocompromised individuals (such as conditions explained in appendix 1....., this may be guided by a clinical risk assessment)
- In an intensive-care setting, high dependency or equivalent unit/s, including neonatal intensive care units

Non-sterile gel ultrasound gel in single use and multi-patient use containers may be used:

- During examinations in areas involving intact skin:

- In examinations that do not involve invasive procedures
- More than 24 hours prior to a probable invasive procedure at or near the same site

Safe Use of Ultrasound Gel

General principles

For both sterile and non-sterile gel:

- Ensure healthcare workers carry out hand hygiene before and after use of ultrasound gel
- Gel should be stored according to manufacturer's instructions in an area that is dry and away from potential sources of contamination
- Dispose of container if it appears soiled, is damaged or is out of date

For sterile ultrasound gel:

- Ensure that only unopened sachets and containers that are labelled as 'sterile' are used
- Do not reuse the container or sachet once opened, either with other patients or stored and reused with the same patient, as sterile gels are single use only

For non-sterile Ultrasound gel:

- Gel **should not** be decanted from a larger container into other bottles
- Use single-use sachets or pre-filled, multi-patient disposable bottles* - pre-filled disposable bottles must not be re-filled
- **Once a bottle has been opened, it MUST be labelled with the date it was opened and the disposal date (one month from opening). The bottle must be disposed of when it's either empty, one month from opening or on the expiry date, whichever comes first.**
- Clean the whole bottle, including the tip, with a disinfectant wipe between uses
- Tip/nozzle of the bottle should not come into contact with anything – if it does, clean immediately with a disinfectant wipe
- After the procedure remove all residual gel from the patient's skin and advise patients to wash area when feasible
- If an invasive procedure is subsequently undertaken within 24hours of the use of non-sterile gel at or near to the site, then ensure all residual gel is removed, and the

skin is thoroughly cleaned using antiseptic skin preparation in line with local policy for the procedure (note: sterile ultrasound gel should normally be used in advance of invasive procedures as detailed in the Type of gel to be used section above)

* to avoid wastage, single use non-sterile ultrasound gel sachets may be preferable in areas where gel is used infrequently

Warming of gel

The warming of gel is not recommended unless there is a clinical benefit that outweighs applying gel at room temperature. Where warming of gel is performed:

- Use dry heat warmers instead of warm water
- Gel bottles should be kept upright in warmers and not inverted
- Warmers should be cleaned regularly according to the manufacturer's instructions, where these exist, or clean according to local guidance

5. Monitoring Arrangements

Monitoring Requirement :	<ul style="list-style-type: none"> • Audit programmes to identify any non-compliance with IPC policies
Monitoring Method:	<ul style="list-style-type: none"> • Appropriate use of ultrasound gel is monitored as part of the infection prevention and control audit programme • Non-compliance with IPC policies will be reported using the Trust Incident reporting process
Report Prepared by:	<ul style="list-style-type: none"> • A report on annual IPC audits will be prepared by Head of IPC or deputy • The reports on compliance with infection prevention & control audits and mandatory training will be prepared by the relevant business unit / divisional Lead • Report on non-compliance with IPC policies will be prepared by the relevant divisional IPC lead or Lead Nurse IPC
Monitoring Report presented to:	Infection Control Operational Group – items escalated to infection control operational group as necessary
Frequency of Report	Monthly

6. References (including any links to NICE Guidance etc.)

Useful reference links

Guidelines for Professional Ultrasound Practice

(https://www.bmus.org/static/uploads/resources/2020_Guidelines_for_Professional_Ultrasound_Practice.pdf), Society and College of Radiographers (SCoR) and British Medical Ultrasound (BMUS) 2020.

Guidelines for infection prevention and control in Sonography: Reprocessing the Ultrasound Transducer (<https://www.sdms.org/docs/default-source/Resources/8756479320933256.pdf>) Society of Diagnostic Medical Sonography 2020.

Infection prevention and control in ultrasound – best practice recommendations from the European Society of Radiology Ultrasound Working Group (<https://link.springer.com/content/pdf/10.1007/s13244-017-0580-3.pdf>), C. M. Nyhsen, H. Humphreys, R. J. Koerner, N. Grenier, A. Brady, P. Sidhu, and others. Insights Imagine 2017 Vol. 8 Issue 6 Pages 523-535.

ASA Guideline: The safe use and storage of ultrasound gel (https://www.sonographers.org/publicassets/15ff1612-1189-ea11-90fb-0050568796d8/0445_PUB_Gel_Useage_SEP18_FOR-WEB.pdf) Australasian Sonographers Association, 2013.

ASA Clinical Statement: The safe use and storage of ultrasound gel (https://www.sonographers.org/publicassets/56fbc98d-abc9-eb11-90fe-0050568796d8/PUB_0872_safe_Use_and_Storage_of_Ultrasound_Gel_FEB21.pdf) , Australasian Society for ultrasound in Medicine, 2021.

Production and feedback:

About the guidance

This guidance has been produced by UKHSA through review of published literature, informed through outbreak investigations, and through consultation with key medical and subject matter experts and users of ultrasound gel within the UK.

Recommendations were discussed in workshops and agreed upon in consultation with a core working group (CWG) of stakeholders that included representatives from the following organisations:

- British Medical Ultrasound Society

- Healthcare Infection Society
- Infection Prevention Society
- Intensive Care Society
- Medicines and Healthcare products Regulatory Agency
- National Health Service (NHS) England and NHS Improvement
- National Health Service (NHS) Supply Chain
- National Infusion and Vascular Access Society
- The Society and College of Radiographers
- Royal College of Nurses
- Royal College of Midwives
- Society of Vascular Technology

The guidance was reviewed by a wider stakeholder consultation group that included public and private sector organisations or societies and user representatives. We would like to thank the following groups for their input:

- Individual user representatives
- Royal College of Emergency Medicine
- British Society of Echocardiography
- Representatives from Public Health Wales, Public Health Agency Northern Ireland and NHS National Services Scotland

This guidance will be reviewed every 3 years or if relevant research is published that warrants a change to the recommendations.

We welcome thoughts of feedback related to the guidance provided. Please contact us at: HCAI, Fungal, AMR, AMU and Sepsis Division

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Legal statement/disclaimer

While every care has been taken in the preparation of 'Good infection prevention practice: using ultrasound gel guidance', UKHSA and the partner organisations,

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If alterations are made by an end user to this guidance for local use, it must be made clear within the amended document where the alterations have been made and by whom. It should also be acknowledged that UKHSA and the partner organisations shall bear no liability for such alterations.

This guidance is for application in England. The evidence based and expert consensus recommendations are as complete as possible at the date of issue. Any omissions and new material will be considered at the next review.

This guidance is Crown copyright, which should be acknowledged where appropriate.

7. Documentation Controls

Development of Guideline:	Author Karen Wiley, Patient Safety Nurse on behalf of the Infection Prevention & Control Team. Guideline sits with the IPC Team
Consultation with:	Infection Prevention & Control and the Trustwide Clinical Guidelines Group.
Approved By:	Infection Prevention & Control 30 June 2022 Trustwide Clinical Guideline Group 29 July 2022
Review Date:	May 2025
Key Contact:	Infection Prevention & Control Team Justine Halliwell

8. Appendices

Appendix 1: types of gel containers mentioned in this guidance

Single-use tube or sachet

Used for sterile or non-sterile gel. Bottle or sachet is discarded after single examination is completed not reusable.

Pre-filled disposable bottle

Contains ultrasound gel for current use on more than one patient – bottle is not refillable and is discarded when empty after one month or on expiry date, whichever comes first.

Bulk dispensing container

Used to store ultrasound gel to be dispensed into smaller containers which will be used for patient use (often 5L). Note: use of these containers is not recommended.

Reusable bottle

Contains ultrasound gel for current use on more than one patient; supplied empty and filled from a dispensing container (bottle is refillable). Note: use of these bottles is not recommended.

Appendix 2: reference and rationale

Rationale and reference for [When to use sterile and non-sterile ultrasound gel](#) section

Non-sterile gel can be contaminated during manufacture or contaminated through use ([5 to 8, 10, 11](#)).

Outbreak investigations show that non-sterile gel can cause infections if used before or during an invasive procedure, on mucus membranes, or near non-intact skin ([1, 3 to 6, 9, 12 to 16](#)).

Sterile gel should be used inside, and outside probe covers because of the contamination risk, ([15,16](#)).

There is a risk of transient contamination of the skin and subsequent infection if non-sterile gel is used prior to invasive procedures. Therefore, the use of sterile gel 24 hours before an invasive procedure was a recommendation by subject experts from the CWG involved in the development of this guidance.

Immunocompromised individuals should be determined by clinical risk assessment, where practical, and are at increased risk of infection and /or adverse outcome from exposure to contaminated ultrasound gel ([1,16](#)). The following list provides examples of medical issues/conditions that could cause a patient to be severely immunocompromised. This list has been adapted from previous population risk assessment in the coronavirus (COVID-19) context. It is not intended to be exhaustive and local risk assessment may be required to inform practice ([17](#)):

- Solid organ transplant recipients
- People with specific cancers:
 - People with cancer who are undergoing active chemotherapy
 - People with lung cancer who are undergoing radical radiotherapy
 - people with cancers of the blood or bone marrow such as leukaemia, lymphoma or myeloma who are at any stage of treatment
 - people have immunotherapy or other continuing antibody treatments for cancer
 - people having other targeted cancer treatments that can affect the immune system, such as protein kinase inhibitors or PARP inhibitors
 - people who have had bone marrow or stem cell transplants in the last 6months or who are still taking immunosuppression drugs
- People with severe respiratory conditions including cystic fibrosis, severe asthma and severe chronic obstructive pulmonary disease (COPD)
- People with diseases that significantly increase the risk of infections (such as severe combined immunodeficiency (SCID), homozygous sickle cell disease)
- People on immunosuppression therapies sufficient to significantly increase risk of infection
- People receiving dialysis

Patients in high dependency and intensive care settings (including neonatal intensive care units) are also specifically vulnerable to infection from contaminated ultrasound gel ([1, 3 to 5, 8, 14, 18](#)).

Because opened gel bottles should be thrown away after one month, the CWG recommends that single-use sachets would reduce waste in low-use areas.

Rationale and reference for [Safe use of ultrasound gel](#) section

The CWG considered the risks arising from using gel that is decanted from larger dispensing containers into re-useable bottles. In view of prolonged use and storage of gel, exposure to air (facilitating bacterial replication), and the potential for multiple patient exposures, the group recommended that only pre-filled disposable bottles are used (9,19).

The one-month disposal date is a pragmatic decision based on balance of risk of propagation of contamination and potential risk to patients, versus practicality and wastage including environmental impact. In order to gauge the length of time in use, the bottle must be dated with a marker that is resistant to being wiped off when cleaning. Gel should be stored according to manufacturer's guidelines in areas free of excessive moisture and sources of potential contamination. These recommendations are consistent with guidance published elsewhere (20,21).

The outside of the bottle and other ultrasound equipment can act as a potential source of contamination and spread microbes between patients (22,23). The CWG agreed that cleaning the outside of the bottles with a disinfectant wipe between uses would be a reasonable way to mitigate this.

The core working group recommend that if the tip of a pre-filled bottle touches another surface/person, the bottle tip should be cleaned with a disinfectant wipe immediately. This recommendation is consistent with guidance published elsewhere (20).

There is a risk of infection if contaminated gel is left on a patient's skin and minimal evidence to inform what constitutes adequate removal. The CWG recommends removing gel and advising patients to wash the area when feasible. The CWG considered this method to be practical and appropriate appreciating constraints within the clinical environment.

Rationale for discouraging warming of gel

There is an increased risk of contamination from gel warmers and routine use should not be encouraged (19, 23, 24). The CWG recommends that gel warming should only be done in situations where the clinical benefits of using warmed gel outweigh the discomfort of applying gel stored at room temperature.

Water baths have been identified as a means of contamination for medical gel and other medical supplies/instruments, supporting the recommendation that dry heat should be used if gel is warmed (19, 25, 26).

The CWG recommendations for keeping gel bottles upright and cleaning the equipment are based on consensus and consistent with guidance published elsewhere (16,19).

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Appendix 3:

**Good infection prevention
Practice: using ultrasound gel**

Decision tree for gel type to use in
Various clinical settings/situations

