UK Health Security Agency

Guidance

Good infection prevention practice: using ultrasound gel

Updated 30 January 2025

Applies to England

Contents

This publication is available at https://www.gov.uk/government/publications/ultrasound-gel-good-infection-prevention-practice/good-infection-prevention-practice-using-ultrasound-gel

Background

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 (1 to 9, 33, 34). Such outbreaks have typically included serious clinical infections (1 to 5), (8, 33, 34).

Standard ultrasound gel is not produced as a sterile product, although sterile versions are available. Examinations using ultrasound 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 document provides guidance on the safe use of ultrasound gel to reduce risk of transmission of infection arising from these products. This replaces interim guidance first published by Public Health England (PHE), now the UK Health Security Agency (UKHSA), in January 2021 and is an outcome of close collaboration between UKHSA and important stakeholders with expertise relating to the use of ultrasound in UK settings (see Production and feedback section). This updated guidance clarifies the aims, implications, and user groups targeted. It includes additional guidance including on scenarios when sterile gel is recommended and what types of gel containers should be used.

Aim

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

Audience and target groups

These include:

- anyone using ultrasound gel in a health or care setting
- healthcare service providers, managers, procurement leads (NHS and independent sector) and commissioners providing ultrasound services

This guidance applies for all settings and uses of ultrasound gel, though it is most pertinent to inpatient areas where invasive procedures may be undertaken and where potentially vulnerable groups may be cared for (for example, in critical care, emergency and urgent assessment units, medical, surgical, maternity, paediatric, neonatal and radiology settings). For the purposes of this guidance, ultrasound gel refers to any gel-based product used to facilitate ultrasound procedures.

Scope

This guidance relates to the use of ultrasound gel. The principles outlined are applicable to non-invasive and invasive ultrasound procedures and therapeutic ultrasound.

Links to other guidance are provided for reference (see Useful resources section). These focus on related infection prevention and control (IPC) considerations, for example ultrasound transducer and intracavity ultrasound probe decontamination (https://www.sor.org/learning-advice/professional-body-guidance-and-publications/documents-and-publications/policy-guidance-document-library/sor-and-bmus-guidelines-for-ultrasound-8th).

Implications

Consider the following:

- this guidance should be used alongside resources including the National infection prevention and control manual (NIPCM) for England (https://www.england.nhs.uk/national-infection-prevention-and-control-manual-nipcm-for-england/), and the Health and Social Care Act 2008: code of practice on the prevention and control of infections (https://www.gov.uk/government/publications/the-health-and-social-care-act-2008-code-of-practice-on-the-prevention-and-control-of-infections-and-related-guidance)
- whilst evidence and expert consensus have been used to inform this guidance, registered providers should read and consider this document and its application in the appropriate sector. They should develop their own local risk assessment and may augment these recommendations accordingly
- this guidance should be incorporated into education and training provided to staff groups undertaking ultrasound procedures, together with core IPC principles, ensuring staff proficiency in undertaking procedures, and embedding quality assurance systems
- though patient safety is paramount, the environmental impact associated with adhering to this guidance should be considered

When to use sterile and non-sterile ultrasound gel

A decision tree indicating which gel to use in various clinical situations is available to download.

Decision tree: which gel to use in various clinical situations (https://khub.net/documents/135939561/554202359/Decision+tree+%E

2%80%93+IPC+guide+on+how+to+use+ultrasound+gel.pdf/83543594-993e-3150-3e7a-5467ce62babd?t=1636462765735)

Type of gel to be used

Sterile ultrasound gel in single-use sachets or tubes should be used in the following scenarios:

- for invasive procedures, that is, any ultrasound-guided procedure that involves passing a device through skin into sterile tissue, such as vascular access or fine needle aspirate
- if an invasive procedure is likely or planned on or near the site in the following 24 hours – this includes 'viewing or initial assessment' of a site by ultrasound prior to undertaking an (aseptic) invasive procedure. There is potential risk of transient contamination of the skin (including ducts, glands and follicles), and subsequent infection as a device is passed through (see Appendix 2). If an unplanned invasive procedure is indicated and undertaken within 24 hours of non-sterile gel use, then clean and prepare the site as indicated in the general principles of non-sterile ultrasound gel use section
- in labour where there is high likelihood of caesarean-section or invasive instrumentation during delivery
- 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 vascular access device or suprapubic catheter
- where there is contact with a mucous membrane (for example for transrectal, transvaginal, transoesophageal or ophthalmic procedures) when a probe cover is required, sterile single-use gel should be used inside and outside of the probe cover - where pre-filled probe covers are used and only non-sterile gel products are available, caution should be applied to avoid puncture (see Appendix 2)
- for examinations on severely immunocompromised individuals (such as conditions explained in Appendix 2, this may be guided by a clinical risk assessment)
- in all intensive care, including neonatal intensive care, high-dependency and equivalent units

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

- during examinations of low-risk patients with intact skin and where there is no contact with mucous membranes
- 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, in accordance with the NIPCM for England (https://www.england.nhs.uk/national-infection-prevention-and-control-manual-nipcm-for-england/)
- ensure any ultrasound gel is thoroughly removed from the patient's skin
- ultrasound probes must be effectively decontaminated (https://www.sor.org/learning-advice/professional-body-guidance-and-publications/documents-and-publications/policy-guidance-document-library/sor-and-bmus-guidelines-for-ultrasound-8th) before and after use on a patient
- ultrasound gel should be stored according to manufacturer's instructions in an area that is dry and away from potential sources of contamination
- dispose of ultrasound gel bottle, tube or sachet if it appears soiled, is damaged or is out of date

For sterile ultrasound gel:

- use only single-use unopened sachets or tubes that are labelled as 'sterile'
- do not reuse the tube 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:

- use single-use sachets or pre-filled, multi-patient disposable bottles [note 1] – pre-filled disposable bottles must not be re-filled
- gel should not be decanted from a larger container into other bottles
- once opened, date the bottle and dispose of it when either empty, after one month, on expiry date or sooner if recommended by manufacturer, whichever comes first
- store opened bottles upright to prevent nozzle or tip contamination and potential contamination of the gel inside
- clean the whole bottle, including the tip, with a disinfectant wipe before and after each use, allowing recommended drying time to ensure optimal

disinfectant activity before dispensing gel – clean the nozzle or tip first before cleaning the rest of the bottle to prevent possible contamination

- ensure the nozzle or tip of a multi-use gel bottle does not contact the patient, transducer, or any ancillary equipment – if the multi-use gel bottle nozzle or tip comes into contact, discard the multi-use gel bottle to mitigate any risk of contamination
- after the procedure, ensure any ultrasound gel is thoroughly removed from the patient's skin
- if an invasive procedure is subsequently undertaken within 24 hours 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)

Note 1: to avoid wastage, single use non-sterile ultrasound gel sachets may be preferable and more sustainable in areas where gel is used infrequently or in areas where a high proportion of ultrasound procedures require the use of sterile gel.

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

Useful resources

'Guidelines for Professional Ultrasound Practice (https://www.sor.org/learning-advice/professional-body-guidance-and-publications/documents-and-publications/policy-guidance-document-library/sor-and-bmus-guidelines-for-ultrasound-8th)' 8th edition, Society of Radiographers (SoR) and British Medical Ultrasound Society (BMUS) 2023

'Guidelines for infection prevention and control in sonography: reprocessing the ultrasound transducer (https://www.sdms.org/resources/other-guidelines-standards/infection-prevention-and-control)' Society of Diagnostic Medical Sonography 2022

‘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)’ CM Nyhsen, H Humphreys, RJ Koerner, N Grenier, A Brady, P Sidhu and others. Insights Imaging 2017: volume 8, issue 6, pages 523 to 535

‘ASA Guideline: The safe use and storage of ultrasound gel (https://www.sonographers.org/resources-tools/clinical-guidance)’ Australasian Sonographers Association 2013

‘ASA Clinical Statement: The safe use and storage of ultrasound gel (https://www.sonographers.org/resources-tools/clinical-guidance)’ Australasian Society for Ultrasound in Medicine 2021

‘AIUM official statement: guidelines for cleaning and preparing external- and internal-use ultrasound transducers and equipment between patients as well as safe handling and use of ultrasound coupling gel (https://onlinelibrary.wiley.com/doi/10.1002/jum.16167)’ American Institute of Ultrasound in Medicine 2023

‘National infection prevention and control manual (https://www.england.nhs.uk/national-infection-prevention-and-control-manual-nipcm-for-england/)’ NHS England

‘Health and Social Care Act 2008: code of practice on the prevention and control of infections (https://www.gov.uk/government/publications/the-health-and-social-care-act-2008-code-of-practice-on-the-prevention-and-control-of-infections-and-related-guidance)’ Department of Health and Social Care

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 important 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
- National Health Service (NHS) Supply Chain
- National Infusion and Vascular Access Society
- The Society of Radiographers
- Royal College of Nursing
- 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
- Royal College of Radiologists
- 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 or feedback related to the guidance provided. Please contact us at:

HCAI, Fungal, AMR, AMU and Sepsis Division, UKHSA
HCAI@ukhsa.gov.uk

Legal statement and disclaimer

While every care has been taken in the preparation of ‘Good infection prevention practice: using ultrasound gel guidance’, UKHSA and the partner organisations shall, to the greatest extent possible under any applicable law, exclude liability for all losses, costs, claims, damages or expenses arising out of or connected with the use of this guidance or any information contained within it.

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 base 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.

Appendix 1. Types of gel containers mentioned in this guidance

Single-use tube or sachet

Used for sterile or non-sterile gel. Tube 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 either empty, after one month, on expiry date or sooner if recommended by manufacturer, whichever comes first.

Bulk dispensing container

Use of these containers is not recommended.

Used to store ultrasound gel to be dispensed into smaller containers which will be used for patient use (often 5L).

Reusable bottle

Use of these bottles is not recommended.

Contains ultrasound gel for current use on more than one patient; supplied empty and filled from a dispensing container (bottle is refillable).

Appendix 2. References and rationale

Rationale and references for when to use sterile and non-sterile ultrasound gel

See When to use sterile and non-sterile ultrasound gel.

Non-sterile gel can be contaminated during manufacture or contaminated through use (5 to 8, 33, 34, 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 17, 33, 34).

Evidence for the recommendations around probe covers suggests that in situations where probe covers are required, sterile gel should be used inside and outside the probe covers where practical because of contamination risk (15, 16). The core working group considered that where possible, sterile gel-containing probe covers should be used in preference to non-sterile gel-containing products. Where pre-filled probe covers are used and only non-sterile containing products are available, these can be used, though caution should be applied to avoid puncture (18). If probe covers are prepared manually these should contain sterile gel only.

Findings from outbreak investigations were suggestive of risk of serious infection in some patients after having an ultrasound procedure where non-sterile gel was used on a site followed by an invasive intervention, such as for a biopsy (19).

There is a risk of transient contamination of the skin and subsequent infection if contaminated non-sterile gel is used prior to invasive procedures. Although standard disinfection procedures can be effective at removing microbes from sites where these procedures are to take place, application of contaminated ultrasound gel could allow penetration of microbes into skin ducts, glands and follicles where they are less accessible to disinfectant (20 to 22).

Notably, non-resident bacteria can survive for hours to a few days on skin, but it is anticipated that within a 24-hour period numbers of Gram-negative bacteria, potentially introduced via contaminated gel, would typically decline substantially (21).

The use of sterile gel 24 hours before a likely or planned invasive procedure was considered by the subject matter experts from the core working group (CWG) as a pragmatic precaution to mitigate the risk of infection. However, it was acknowledged that there are likely to be circumstances where an invasive procedure is clinically indicated within 24 hours of non-sterile gel use on or near the site. In such circumstances, preceding use of non-sterile gel should not delay the procedure, but particular emphasis should be placed on appropriate gel removal and thorough antiseptic skin preparation in line with local policy for the procedure.

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 or 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 (23).

- 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 having 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 6 months 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, 24).

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 references for safe use of ultrasound gel

See section on the safe use of ultrasound gel.

The CWG considered the risks arising from using gel that is decanted from larger dispensing containers into reusable 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, 25).

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 (26, 27).

The outside of the bottle and other ultrasound equipment can act as a potential source of contamination and spread microbes between patients (28, 29). The CWG agreed that cleaning the outside of bottles with a disinfectant wipe between each patient use would be a reasonable way to mitigate this.

The CWG recommend that if the tip of a pre-filled bottle touches another surface or person, the bottle tip should be cleaned with a disinfectant wipe immediately. This recommendation is consistent with guidance published elsewhere (26).

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 (25, 29, 30). The CWG recommends that gel warming should only be done in situations where the benefits of using warmed gel (clinical or arising from improved patient engagement) 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 (25, 31, 32).

The CWG recommendations for keeping gel bottles upright and cleaning the equipment are based on consensus and consistent with guidance published elsewhere (16, 25).

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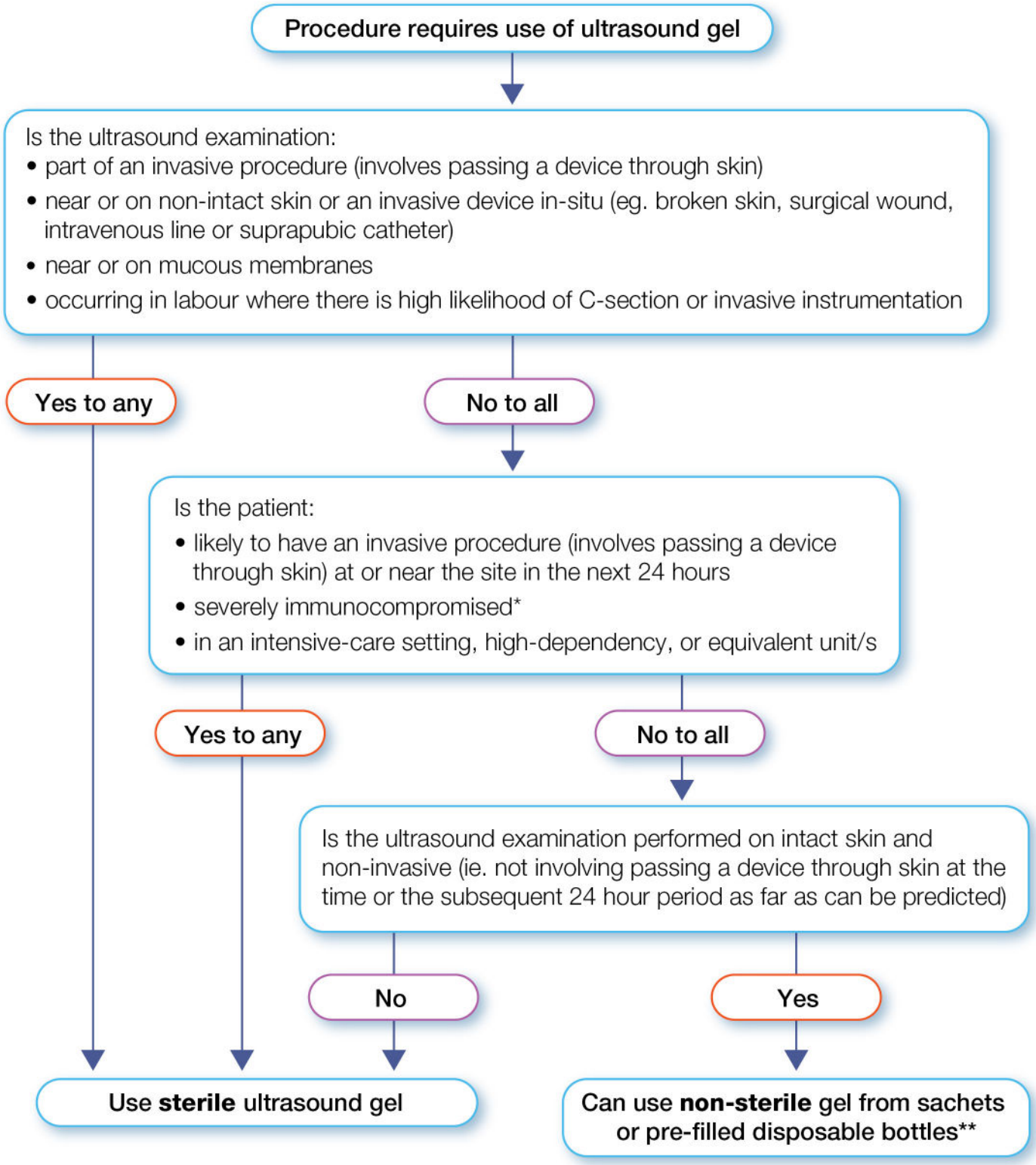
UK Health Security Agency

Good infection prevention practice: using ultrasound gel

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



* such as people with conditions which are explained in Appendix 2, this may be guided by a clinical risk assessment

** single use non-sterile ultrasound gel sachets/containers may be preferable in areas where gel is used infrequently

This decision tree is part of UKHSA guidance:
www.gov.uk/government/publications/ultrasound-gel-good-infection-prevention-practice