Management of non-invasive, reusable, shared care equipment Literature Review

Evidence Tables

Version 1.0

26 March 2026

Antimicrobial Resistance & Healthcare Associated Infection (ARHAI) Scotland
An NHS Scotland Assure Service

Version history

This literature review will be updated in real time if any significant changes are found in the professional literature or from national guidance/policy.

Version	Date	Summary of changes
1.0	March 2026	First version to accompany version 2.0 of the literature review.

Contents

Introduction

All studies which are critically appraised as part of the literature review are assigned a grade of evidence based on the SIGN 50 methodology grading system (SIGN, 2019), which allows scientific studies to be assessed for quality using a number of reviewing forms (available from the SIGN website). Guidelines are appraised and graded using the AGREE II grading system (details available from the AGREE website).

Main conclusions from evidence sources (studies and guidance) are summarised along with a brief description of the methods and limitations within evidence table entries. Evidence sources with sufficient quality, which specifically answer a defined research question, are grouped together to enable the formation of an overall assessment regarding the evidence base.

Evidence grading

The following grades were given to the papers included in this evidence table:

SIGN 50 Evidence levels

The SIGN 50 methodology was used to appraise and grade primary studies and expert opinion guidance documents.

Grade	Description
1++	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1-	Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2++	High quality systematic reviews of case-control or cohort studies. High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal

Grade	Description
2+	Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
2-	Case control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal
3	Non-analytic studies, for example case reports, case series
4	Expert opinion

AGREE II Evidence levels

The AGREE II tool was used to appraise guidelines which were based on a systematic review of evidence, and experts have formulated the recommendations/ statements.

Grade	Description
AGREE 'Recommend'	This indicates that the guideline is of high overall quality and can be considered for use in practice without modifications.
AGREE 'Recommend with modifications'	This indicates that the guideline is of moderate overall quality. This could be due to insufficient or lacking information in the guideline for some items. If modifications are made, the guideline could still be considered for use in practice when no other guidelines on the same topic are available.
AGREE 'Do not Recommend'	This indicates that the guideline is of low overall quality and has serious shortcomings. Therefore, it should not be recommended for use in practice.

Research questions for evidence tables

Question 1. What legislative requirements or standards should be adhered to when decontaminating non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 1040: 2005. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of basic bactericidal activity of chemical disinfectants and antiseptics. Test method and requirements (phase 1) January 2006.	British standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: This British Standard is the official English language version of EN 1040:2005, it supersedes the previous version: 1040:1997. It was reported as prepared by a technical committee.

This standard provides a summary of testing methods and minimum requirements of bacterial activity for chemical disinfectants and antiseptic products (that form homogenous, physically stable preparation when diluted with water). Products may be tested at 80% or less.

Main findings:

“This European Standard applies to active substances (antibacterial biocides) and to formulations under development that are planned to be used in food, industrial, domestic, and institutional, medical, and veterinary areas. It applies also to the evaluation of bactericidal activity of chemical antiseptics and disinfectants when appropriate standards are not available.”

- The standard provides details regarding the requirements (including >5 decimal log reduction when tested per methodology within 5 minutes.
- Test methods are also described including the use of *pseudomonas* and *staphylococcus aureus* as test organisms as well as culture media and reagents, use of apparatus and glassware, preparation of test organism suspensions and product test solutions, procedure for assessing the bactericidal activity of the product, experimental data and calculation, verification methodology expression of results and precision, interpretation of results, and test report.

“Where indicated, bactericidal activity could be determined applying additional contact times, temperatures and test organisms”.

Assessment of evidence

Limitations:

- The process of development and roles of development committee members are not specified.
- The methods for selecting the minimum requirements and test methods are unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 13727:2012+A2:2015. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of bactericidal activity in the medical area. Test method and requirements (phase 2, step 1). 2015.	British standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: This British Standard is the UK implementation of EN 13727:2012+A2:2015. It supersedes BS EN 13727:2012+A1:2013. It was reported as prepared by a technical committee.

Main findings:

"This European Standard applies to products that are used in the medical area in the fields of hygienic handrub, hygienic handwash, surgical handrub, surgical handwash, instrument disinfection by immersion, and surface disinfection by wiping, spraying, flooding or other means."

- The standard provides detail regarding the requirements (including >5 decimal log reduction when tested per methodology within 5 minutes.
- Test methods are also described including the use of *Enterococcus hirae, pseudomonas aeruginosa and staphylococcus aureus* ("when temperature is 40°C or higher: only E. Faecium" for instruments only) as test organisms with test temperatures of 20-70°C or 4-30°C. There are specific requirements for different types of products including hand rubs and washes. With a contact time of < 5-60 minutes (unless for instrument then <60mins). Clean and dirty condictiones are required and described.

Limitations:

- The process of development and roles of development committee members are not specified.
- The methods for selecting the minimum requirements and test methods are unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 14885:2022. Chemical disinfectants and antiseptics. Application of European Standards for chemical disinfectants and antiseptics. April 2023 Last accessed 26/06/2025.	British standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: This British Standard is the UK implementation of EN 14885:2022, incorporating corrigendum March 2023. It supersedes BS EN 14885:2018 and PD CEN/TR 17296:2018. It was reported as prepared by a technical committee.

Assessment of evidence

Main findings:

"This document specifies the European Standards to which products have to conform in order to support the claims for microbicidal activity which are referred to in this document".

"It is applicable to products for which activity is claimed against the following microorganisms: vegetative bacteria (including mycobacteria and Legionella), bacterial spores, yeasts, fungal spores and viruses (including bacteriophages)".

"It is applicable to products to be used in the area of human medicine, the veterinary area and in food, industrial, domestic and institutional areas. In the area of human medicine (Working Group 1, i.e., WG 1), it is applicable to chemical disinfectants and antiseptics to be used in areas and situations where disinfection or antisepsis is medically indicated. Such indications occur in patient care — in hospitals, in community medical facilities, dental institutions and medical laboratories for analyses and research, — in clinics of schools, of kindergartens and of nursing homes, — and may also occur in the workplace and in the home. It may also include services such as in laundries and kitchens supplying products directly for the patient".

This document includes details about the standards to be followed for products used in medical settings and other settings.

Limitations:

- The process of development and roles of development committee members are not specified.
- The methods for selecting the minimum requirements and test methods are unclear.
- The tests (suspension and surface tests) recommended in this standard are laboratory-based tests, thus activity claim may have limited generalisability to usage on equipment in real world settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 16615:2015. Chemical disinfectants and antiseptics. Quantitative test method for the evaluation of bactericidal and yeasticidal activity on non-porous surfaces with mechanical action employing wipes in the medical area (4- field test). Test method and requirements (phase 2, step 2). April 2015.	British standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: “This British Standard is the UK implementation of EN 16615:2015. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics.”

Main findings:

“This European Standard specifies a test method and the minimum requirements for bactericidal and yeasticidal activity of chemical disinfectant products that form a homogeneous, physically stable preparation when diluted with hard water - or in the case of ready-to-use products - with water”.

A British standard detailing laboratory tests with regards to establishing whether a chemical disinfectant for use of surfaces meets minimum requirements for bacterial and yeasticidal activity. It includes ‘ready to use’ impregnated wipes. This standard details phase 2, step 2 tests for chemical disinfectants and antiseptics.

“This European Standard applies to products that are used in the medical area for disinfecting non-porous surfaces including surfaces of medical devices by wiping – regardless if they are covered by the 93/42/EEC Directive on Medical Devices or not.” The testing methods are described including such detail as test organisms (*staphylococcus aureus, pseudomonas aeruginosa, enterococcus hirae* and *candida albicans*).

Limitations:

- The process of development and roles of development committee members are not specified.
- The methods for selecting the minimum requirements and test methods are unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British standards institute (BSI). PD CEN ISO/TR 24971:2020 – TC. Medical devices. Guidance on the application of ISO 14971. July 2020. Last accessed 26/06/2025.	British standards	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "This Published Document is the UK implementation of CEN ISO/TR 24971:2020. It is identical to ISO/TR 24971:2020. It supersedes PD ISO/TR 24971:2020, which is withdrawn." Produced by a technical committee and provides guidance on the development, implementation, and maintenance of a risk management system for medical devices according to ISO 14971:2019.

Main findings:

"Development, implementation, and maintenance of a management process for medical devices that aims to meet the requirements of ISO 14971:2019, Medical devices- Application of management to medical devices. It guides the application of ISO 14971:2019 for a wide variety of medical devices".

Assessment of evidence

"PD CEN ISO/TR 24971 guideline helps you to develop, implement and maintain a management process for all medical devices that aim to meet the requirements of BS EN ISO 14971. It covers a wide variety of medical devices including active, non-active, implantable, and non-implantable medical devices, software as medical devices, and in vitro diagnostic medical devices. This helps in minimising and improving the workflow of operations".

Limitations:

- The process of development and roles of development committee members are not specified.
- The methods for selecting the minimum requirements and test methods are unclear.
- Guidance on adhering to a standard, related to a large group of equipment.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 13624:2021 – TC. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of fungicidal or yeasticidal activity	British Standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
in the medical area. Test method and requirements (phase 2, step 1). March 2022. Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the UK implementation of EN 13624:2021. It supersedes BS EN 13624:2013". This British standard was prepared by technical committee CH/216 (membership not stated).

Main findings:

"This document specifies a test method and the minimum requirements for fungicidal or yeasticidal activity of chemical disinfectant and antiseptic products that form a homogeneous, physically stable preparation when diluted with hard water, or – in the case of ready-to-use products – with water. Products can only be tested at a concentration of 80 % or less (97 % with a modified method for special cases) as some dilution is always produced by adding the test organisms and interfering substance".

"This document applies to products that are used in the medical area in the fields of hygienic handrub, hygienic handwash, surgical handrub, surgical handwash, instrument disinfection by immersion, and surface disinfection by wiping, spraying, flooding or other means.

"This document applies to areas and situations where disinfection or antisepsis is medically indicated. Such indications occur in patient care, for example: — in hospitals, in community medical facilities and in dental institutions; — in clinics of schools, of

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kindergartens and of nursing homes; and can occur in the workplace and in the home. It can also include services such as laundries and kitchens supplying products directly for the patients".

This document provides phase 2, step 1 of testing requirements for chemical disinfectants and antiseptics including the test methods and interpretation. Contact times and temperatures are per the intended use of the item such as hand rub, disinfection on equipment or surfaces. Test organisms: *candida albicans, aspergillus brasiliensis*. Reduction: ≥4 decimal log reduction.

Limitations:

- Unclear committee membership and unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN ISO 17664-1:2021 – TC. Processing of health care products. Information to be provided by the medical device manufacturer for the processing of medical devices -	British Standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Critical and semi-critical medical devices. September 2021. Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: **“**This British Standard is the UK implementation of EN ISO 17664-1:2021. It is identical to ISO 17664-1:2021. It supersedes BS EN ISO 17664:2017”.

Main findings:

“This document applies to manufacturers of those medical devices that are intended to be cleaned, disinfected and/or sterilized by the processor to be made ready for use. This includes:

- Medical devices that are intended for reuse and require processing to take them from their state after clinical use to the state of being ready for their next use. This may include one or more of cleaning, disinfection and sterilization.
- Single-use medical devices that require processing before use and are intended to be used in a clean and/or disinfected and/or sterile state”.

This document provides minimum standards for manufacturers producing medical device that will be cleaned, disinfected, sterilised including items (including single use) decontaminated before use and any that may be reprocessed. The focus of the

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standard appears to be on the detail manufacturers should provide rather than the reprocessing itself. Applied to critical and semi-critical medical device.

Limitations:

- Unclear committee membership and unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British standards Institute (BSI). BS EN 14561:2006. Chemical disinfectants and antiseptics. Quantitative carrier test for the evaluation of bactericidal activity for instruments used in the medical area. Test method and requirements (phase 2, step 2).	British standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
2006. Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the official English language version of EN 14561:2006. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"BS EN 14561 specifies a carrier test for establishing whether a chemical disinfectant for use on instruments (surgical instruments, anaesthesia material, endoscopes etc.) has a bactericidal activity in the fields described in the scope. It includes general guidelines for the application and interpretation of test methods in accordance with European Standards for chemical disinfectants and antiseptics".

"The laboratory test closely simulates practical conditions of application including pre-drying bacteria on a carrier, contact time, temperature, test organisms and interfering substances, i.e. conditions which may influence the action of chemical disinfectants in practical situations".

This document provides minimum standards regarding the use of chemical disinfectants and antiseptics in medical settings. It provides phase 2 of test methods for instruments decontaminated via immersion, but it does note that it applies even if they are not covered by the EU Directive on Medical Devices.

Limitations:

- Unclear committee membership and unclear development methodology.

Assessment of evidence
• This standard may not be applicable to non-invasive, reusable, shared care equipment. • A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 14562:2006. Chemical disinfectants and antiseptics. Quantitative carrier test for the evaluation of fungicidal or yeasticidal activity for instruments used in the medical area. Test method and requirements (phase 2, step 2). 2006.	British Standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the official English language version of EN 14562:2006. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This European Standard specifies a carrier test for establishing whether a chemical disinfectant for use on instruments (surgical instruments, anaesthesia material, endoscopes etc.) has a fungicidal or yeasticidal activity in the fields described in the scope".

"The laboratory test closely simulates practical conditions of application including pre-drying fungi on a carrier, contact time, temperature, test organisms and interfering substances i.e. conditions which may influence the action of chemical disinfectants in practical situations".

"The obligatory conditions are intended to cover general purposes and to allow reference between laboratories and product types. Each utilization concentration of the chemical disinfectant found by this test corresponds to defined experimental conditions. However, for some applications the recommendations and/or instructions of use of a product may differ and therefore additional test conditions need to be used".

This document provides minimum standards regarding the use of chemical disinfectants for instruments with fungicidal or yeasticidal activity described within the scope. It provides phase 2 of test methods for instruments decontaminated via immersion, but it does note that it applies even if they are not covered by the EU Directive on Medical Devices.

Assessment of evidence

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.
- A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 14348:2005. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of mycobactericidal activity of chemical disinfectants in the medical area including instrument disinfectants. Test	British Standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
methods and requirements (phase 2, step 1). 2005. Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the official English language version of EN 14348:2005. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

"This document applies to products that are used in the medical area including those that are covered by the EEC/93/42 Directive on Medical Devices".

Main findings:

This document provides minimum standards for "mycobactericidal (or tuberculocidal) activity of chemical disinfectant products that form a homogeneous, physically stable preparation when diluted with hard water — or in the case of ready-to-use products — with water. Products can only be tested at a concentration of 80 % or less as some dilution is always produced by adding the test organisms and interfering substance".

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.

Assessment of evidence
• A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 14563:2008. Chemical disinfectants and antiseptics. Quantitative carrier test for the evaluation of mycobactericidal or tuberculocidal activity of chemical disinfectants used for instruments in the medical area. Test method and requirements (phase 2, step 2).	British Standard	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
2008. Last accessed 26/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the official English language version of EN 14563:2008. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This European Standard specifies a carrier test for establishing whether a chemical disinfectant for use on instruments (surgical instruments, anaesthesia material, endoscopes etc.) has a mycobactericidal or tuberculocidal activity in the area described in the scope.

The laboratory test closely simulates practical conditions of application including pre-drying mycobacteria on a carrier, contact time, temperature, test organisms and interfering substances, i.e. conditions which may influence the action of chemical disinfectants in practical situations.

The obligatory conditions are intended to cover general purposes and to allow reference between laboratories and product types. Each utilization concentration of the chemical disinfectant found by this test corresponds to defined experimental conditions. However, for some applications the recommendations of use of a product may differ and therefore additional test conditions need to be used".

Limitations:

- Unclear committee membership and unclear development methodology.

Assessment of evidence
• This standard may not be applicable to non-invasive, reusable, shared care equipment. • A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British standards Institute (BSI). BS EN 14476:2013+A2:2019. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of virucidal activity in the medical area. Test method and requirements (Phase 2/Step 1). August 2019. Last accessed 26/06/2025.	British standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the UK implementation of EN 14476:2013+A2:2019. It supersedes BS EN 14476:2013+A1:2015. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This document specifies a suspension test for establishing whether a chemical disinfectant or an antiseptic has a virucidal activity in the area and fields described in the scope.

This laboratory test takes into account practical conditions of application of the product including contact time, temperature, test organisms and interfering substances, i.e. conditions which may influence its action in practical situations. Each utilisation concentration of the chemical disinfectant or antiseptic found by this test corresponds to the chosen experimental conditions".

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.
- A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 17111:2018. Chemical disinfectants and antiseptics. Quantitative carrier test for the evaluation of virucidal activity for instruments used in the medical area. Test method and requirements (phase 2, step 2). 2018. Last accessed 26/06/2025.	British Standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: **“**This British Standard is the UK implementation of EN 17111:2018. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics”.

Assessment of evidence

Main findings:

“This European Standard specifies a carrier test for establishing whether a chemical disinfectant for use on instruments (surgical instruments, anaesthesia material, endoscopes etc.) has a virucidal activity in the fields described in the scope.

The laboratory test closely simulates practical conditions of application including pre-drying viruses on a carrier, contact time, temperature, test organisms and interfering substances, i.e. conditions which may influence the action of chemical disinfectants in practical situations. Each utilization concentration of the chemical disinfectant found by this test corresponds to defined experimental conditions”.

This standard provided minimum standards and methods for chemical disinfectants and antiseptics regarding virucidal activity for instruments used ion a medical area, for produced diluted with water or ready to use. It is stated that this standard applies to products used in the medical area and is applicable to disinfection of instruments by immersion, but it does note that it applies even if they are not covered by the EU Directive on Medical Devices.

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.
- A full text was not available for this standard

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British standards Institute (BSI). BS EN 17126:2018. Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of sporicidal activity of chemical disinfectants in the medical area. Test method and requirements (phase 2, step 1). December 2018. Last accessed 26/06/2025.	British standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the UK implementation of EN 17126:2018. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This European Standard specifies a suspension test for establishing whether a chemical disinfectant has a sporicidal activity in the area and fields described in the scope".

This laboratory test takes into account practical conditions of application of the product including contact time, temperature, test organisms, and interfering substances, i. e. conditions which may influence its action in practical situations.

Each utilization concentration of the chemical disinfectant found by this test corresponds to the chosen experimental conditions".

This document provides minimum standards and test methods for chemical disinfectants and antiseptics with regards to sporicidal activity. It applies to instruments disinfected via immerse and surface wiping, spraying or other means.

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to all non-invasive, reusable, shared care equipment.
- A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 16777:2018. Chemical disinfectants and antiseptics. Quantitative non-porous surface test without mechanical action for the evaluation of virucidal activity of chemical disinfectants used in the medical area. Test method and requirements (phase 2/step 2). December 2018. Last accessed 26/06/2025.	British Standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the UK implementation of EN 16777:2018. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This document describes a surface test method for establishing whether a product proposed as a disinfectant in the fields described in Clause 1 has or does not have virucidal activity on non-porous surfaces.

The laboratory test closely simulates practical conditions of application. Chosen conditions (contact time, temperature, organisms on surfaces etc.) reflect parameters which are found in practical situations including conditions which may influence the action of disinfectants. Each use concentration found from this test corresponds to defined experimental conditions".

This document provides minimum standards and test methods for virucidal activity of chemical disinfectants and antiseptics which are diluted with water or ready to use. It applies to products used to disinfect non-porous surfaces.

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.
- A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British Standards Institute (BSI). BS EN 17387: 2021. Chemical disinfectants and antiseptics. Quantitative test for the evaluation of bactericidal and yeasticidal and/or fungicidal activity of chemical disinfectants in the medical area on non-porous surfaces without mechanical action. Test method and requirements (phase 2, step 2). August 2021. Last accessed 26/06/2025.	British Standard	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "This British Standard is the UK implementation of EN 17387:2021. The UK participation in its preparation was entrusted to Technical Committee CH/216, Chemical disinfectants and antiseptics".

Main findings:

"This document specifies a test method and the minimum requirements for bactericidal and yeasticidal and additionally fungicidal activity of chemical disinfectant products that form a homogeneous, physically stable preparation when diluted with hard water – or in the case of ready-to-use products – with water".

"This document applies to products that are used in the medical area for disinfecting non-porous surfaces without mechanical action".

"This document applies to areas and situations where disinfection or antisepsis is medically indicated. Such indications occur in patient care, for example:

- in hospitals, in community medical facilities and in dental institutions;
- in clinics of schools, of kindergartens and of nursing homes; and can occur in the workplace and in the home. It can also include services such as laundries and kitchens supplying products directly for the patients".

"Using this document, it is possible to determine the activity of products like commercial formulations or active substances on bacteria and/or fungi in the conditions in which they are used and therefore it corresponds to a phase 2, step 2 test.

This method excludes the evaluation of the activity of products against mycobacteria and bacterial spores".

Limitations:

- Unclear committee membership and unclear development methodology.
- This standard may not be applicable to non-invasive, reusable, shared care equipment.

Assessment of evidence

- A full text was not available for this standard.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
UK Government. Statuatory Instruments No. 618. The Medical Device Regulations 2002, as amended 2020. Last updated 31 December 2020. Last accessed 24/06/2025.	Legislation	Mandatory	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: **“**These Regulations contain the legislative measures necessary for the implementation of three European Community Directives: Council Directive 90/385/EEC on the approximation of the laws of the Member States relating to active implantable medical devices, as amended; Council Directive 93/42/EEC concerning medical devices, as amended; and Directive 98/79/EC of the European Parliament and of the Council onin vitro diagnostic medical devices (“the Medical Devices Directives”). They also

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contain the legislative measures necessary for the implementation, in relation to medical devices, of the agreements on mutual recognition between the European Community and Australia, New Zealand, Canada and the United States of America—and of the Association Agreement between the European Communities, and their Member States, and Hungary".

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
UK Government. Statutory Instruments No. 2677. The control of substances hazardous to Health regulations (COSHH) 2002. Last updated December 2020. Last accessed 26/06/2025.	Legislation	Mandatory	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: THE COSHH regulations apply in the UK and outline responsibilities for workplaces including health and care settings. Application of the regulations aims to "protect persons against a risk to their health, whether immediate or delayed, arising from exposure to substances hazardous to health" except where other listed regulations apply. This regulation would apply to the use of the chemicals that may be used as part of decontamination processes.

Main Findings:

- "Every employer shall ensure that the exposure of his employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled."
- "In complying with his duty of prevention under paragraph (1), substitution shall by preference be undertaken, whereby the employer shall avoid, so far as is reasonably practicable, the use of a substance hazardous to health at the workplace by replacing it with a substance or process which, under the conditions of its use, either eliminates or reduces the risk to the health of his employees."
- "3) Where it is not reasonably practicable to prevent exposure to a substance hazardous to health, the employer shall comply with his duty of control under paragraph (1) by applying protection measures appropriate to the activity and consistent with the risk assessment, including, in order of priority— (a) the design and use of appropriate work processes, systems and engineering controls and the provision and use of suitable work equipment and materials; (b) the control of exposure at source, including adequate ventilation systems and appropriate organisational measures; and (c) where adequate control of exposure cannot be achieved by other means, the provision of suitable personal protective equipment in addition to the measures required by sub-paragraphs (a) and (b)."
- "2) In these Regulations, a reference to an employee being exposed to a substance hazardous to health is a reference to the exposure of that employee to a substance hazardous to health arising out of or in connection with work at the workplace."
- "An employer shall not carry out work which is liable to expose any employees to any substance hazardous to health unless"… "made a suitable and sufficient assessment of the risk created by that work to the health of those employees

Assessment of evidence
and of the steps that need to be taken to meet the requirements of these Regulations" and this should be recorded along with mitigation steps where there are "5 or more employees".

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health and Safety Executive (HSE). Control of Substances hazardous to health (2002) as amended Approved code of practice and guidance. 6th Edition. 2013. Accessed 24 May 2024.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

- **Country:** United Kingdom
- **Scope:** “This Approved Code of Practice (ACOP) “outlines the preferred or recommended methods that can be used to comply with the Regulations and the accompanying guidance also provides advice on achieving compliance, such as the control of carcinogenic substances or those causing occupational asthma, monitoring control measures and conducting health surveillance”.

Main findings:

- Guidance - “9 COSHH applies to a wide range of substances and preparations (mixtures of two or more substances) which have the potential to cause harm to health if they are ingested, inhaled, or are absorbed by, or come into contact with, the skin, or other body membranes. Hazardous substances can occur in many forms, including solids, liquids, vapours, gases and fumes. They can also be simple asphyxiants or biological agents”.
- ACOP - “Employers must not carry out work which can expose any of their employees to any substance hazardous to health until: a suitable and sufficient assessment of the risks to employees’ health created by that work has been carried out; and the steps needed to comply with the Regulations have been identified; and those steps have been put into operation.”
- Guidance - “The purpose of the risk assessment is to enable employers to make valid decisions about the measures needed to prevent or adequately control the exposure of their employees to substances hazardous to health arising from the work”
- Guidance - “Employers should decide what information is required and the amount of detail needed to carry out the assessment. Safety data sheets for chemicals and products must be provided by the supplier to meet their legal responsibilities. These safety data sheets provide hazard/health effect details and the general precautions needed when handling a substance or product. The employer’s knowledge and experience of the work activity and the circumstances of use will provide useful information for carrying out the assessment.”

Assessment of evidence

- ACOP -“Once employers have carried out the risk assessment and identified the steps required to: prevent or adequately control exposures; ensure correct use and efficient maintenance, examination and testing of the control measures; ensure that exposure monitoring and health surveillance are carried out, if required; ensure information and instruction are provided and training is carried out; deal with accidents, incidents and emergencies; the steps must be implemented before the work proceeds.
- Guidance - “To help implement the steps, employers could draw up a prioritised action plan detailing the steps required, timescales for action and giving details of the person or persons responsible for implementing each step of the plan.”
- ACOP – “An employer’s overriding duty and first priority is to consider how to prevent employees being exposed to substances hazardous to health by all routes (regulation 7(1) and 7(2)). The duty to prevent exposure should be achieved by measures other than the use of PPE. Employers can best comply with this requirement by completely eliminating the use or production of substances hazardous to health in the workplace. This might be achieved by: changing the method of work so that the operation giving rise to the exposure is no longer necessary; or modifying a process to eliminate the production of a hazardous by-product or waste product; or substituting, wherever reasonably practicable, a non-hazardous substance which presents no risk to health where a hazardous substance is used intentionally.”
- Guidance - “Employers have a responsibility to manage and minimise the risks from work activities. They must develop suitable and sufficient control measures and ways of maintaining them. They should: identify hazards and potentially significant risks; take action to prevent and control risks; keep control measures under regular review.”
- Guidance – “The more severe the potential health effect, and the greater the likelihood of it occurring, the stricter the measures required to control exposure. Control measures that are adequate should take into account the nature and severity of the hazard and the magnitude, frequency and duration of exposure. They should be proportionate to the risk”.

Limitations:

- Guidance not IPC specific.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Acts of the Scottish Parliament. Public Health etc. (Scotland) Act 2008. Last updated September 2022. Last accessed 24/06/2025.	Legislation	Mandatory	N/A	N/A	N/A
Assessment of evidence					
Country: Scotland **Scope:** This legislation states that it is the duty of health boards to protect public health, including prevention and control of infectious diseases and provision of facilities for decontamination and disinfection.					

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
UK Government. Statutory instruments No. 880. The Biocidal Products Regulations 2001. Last accessed 24/06/2025.	Legislation	Mandatory	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: This regulations details provisions for getting authorised to place on the market or use a biocidal product, including products used for the disinfection equipment in health and care settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health and safety executive (HSE). Biocides: introduction to regulation, supply and use. No date. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Main findings:

“Biocidal products are used to protect people and animals, preserve goods, stop pests like insects or rodents and control viruses, bacteria and fungi through a chemical or biological action. Common examples are disinfectants, wood preservatives and insect repellents.

Typically, a biocidal product will be a mixture of chemicals and will include the 'active substance'. The active substance has the controlling effect on the harmful organism.

Biocidal products can also be:

- 100% active substance with no other components
- articles that have been impregnated with the active substance, such as disinfecting wipes

Assessment of evidence

- bacteria, viruses, or other micro-organisms”

“Biocidal products without an active substance. The active substance could be created when the product is used, either from:

- mixing the product with another chemical
- a reaction with the air or moisture

This is called 'in-situ generation'. It’s still covered by the law, even if no products are supplied and the biocide is generated from everyday things. For example, when a machine generates ozone from oxygen in the air to be used as a disinfectant”.

“If you want to import or make a biocidal product available on the market in Great Britain or Northern Ireland the biocidal product must comply with the relevant regulations”.

“A biocidal product must be authorised before it can be made available on the market. Before the product can be authorised, the active substance or substances it contains or generates must be approved for use in that product type”.

“**Using biocidal products**

If you use biocides in your workplace or home, you’re responsible for using them correctly so they do not cause harm to people, pets, the environment, or wildlife”.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
European Parliament. Regulation (EU) 2017/745. Medical Device Regulations. Last updated 10 January 2025. Last accessed 24/06/2025.	Legislation	Mandatory	N/A	N/A	N/A

Assessment of evidence

Country: EU/EEA

Scope: An EU parliament legislation regarding medical device.

Assimilated as UK domestic law as per the Retained EU Law (Revocation and Reform) Act 2023 – not listed in Schedule 1 (revoked REUL). 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC (Text with EEA relevance).

Main findings:

“The reprocessing and further use of single-use devices should only take place where permitted by national law and while complying with the requirements laid down in this Regulation. The reprocessor of a single-use device should be considered to be the manufacturer of the reprocessed device and should assume the obligations incumbent on manufacturers under this

Assessment of evidence

Regulation. Nevertheless, Member States should have the possibility of deciding that the obligations relating to reprocessing and re-use of single-use devices within a health institution or by an external reprocessor acting on its behalf may differ from the obligations on a manufacturer described in this Regulation. In principle, such divergence should only be permitted where reprocessing and reuse of single-use devices within a health institution or by an external reprocessor are compliant with CS that have been adopted, or, in the absence of such CS, with relevant harmonised standards and national provisions. The reprocessing of such devices should ensure an equivalent level of safety and performance to that of the corresponding initial single-use device."

"For the purposes of this Regulation, the following definitions apply: (1) 'medical device' means any instrument, apparatus, appliance, software, implant, reagent, material or other article intended by the manufacturer to be used, alone or in combination, for human beings for one or more of the following specific medical purposes: — diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease, — diagnosis, monitoring, treatment, alleviation of, or compensation for, an injury or disability, — investigation, replacement or modification of the anatomy or of a physiological or pathological process or state, — providing information by means of in vitro examination of specimens derived from the human body, including organ, blood and tissue donations, and which does not achieve its principal intended action by pharmacological, immunological or metabolic means, in or on the human body, but which may be assisted in its function by such means. The following products shall also be deemed to be medical devices: — devices for the control or support of conception; — products specifically intended for the cleaning, disinfection or sterilisation of devices as referred to in Article 1(4) and of those referred to in the first paragraph of this point."

"'invasive device' means any device which, in whole or in part, penetrates inside the body, either through a body orifice or through the surface of the body;"

"'single-use device' means a device that is intended to be used on one individual during a single procedure;"

"'CE marking of conformity' or 'CE marking' means a marking by which a manufacturer indicates that a device is in conformity with the applicable requirements set out in this Regulation and other applicable Union harmonisation legislation providing for its affixing;"

Assessment of evidence

“reprocessing’ means a process carried out on a used device in order to allow its safe reuse including cleaning, disinfection, sterilisation and related procedures, as well as testing and restoring the technical and functional safety of the used device;”

“Manufacturer responsibilities include determining reprocessing requirements”.

Instructions for use should include:

- “the appropriate processes for allowing reuse, including cleaning, disinfection, packaging”
- “when the device should no longer be reused, e.g. signs of material degradation or the maximum number of allowable reuses;”

“Devices that are reusable shall bear a UDI carrier on the device itself.”

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland’s Health and Social Care Services (SHTN 00-04).	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last updated August 2024. Last accessed 24/06/2025.					

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: "This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Main findings:

This document presents several legislative requirements and standards (including for quality) for medical device and equipment, many of which are, and some which are not, relevant to this review or IPC. This document sets out the legal requirements for the management (from purchase to decommissioning) of medical device and other equipment. Requirements for UKCA and CE marking on products are also described.

"Reprocessing/ decontamination

The decontamination process may include cleaning and/ or disinfection and/ or sterilization. The appropriate level of decontamination process is determined by clinical procedure and must follow manufacturer's instruction for use (IFU)".

"The level of decontamination required for non-critical equipment (In contact with intact skin only) such as Blood pressure cuff, electrocardiogram leads, stethoscope, pulse oxymetry probe; is Cleaning (and low-level disinfection as per IFU)".

Assessment of evidence

Limitations:

- Unclear development methodology.

Question 2. How should care equipment be categorised?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Institute of Ultrasound in Medicine (AIUM). 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. Journal of ultrasound in Medicine, 42(7), E13–E22.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United States of America (USA)

Setting: Acute healthcare settings

Scope: "The purpose of the first section of this document is to provide guidance regarding the cleaning and preparation of ultrasound transducers".

Main findings:

"Medical instruments fall into different categories with respect to their potential for pathogen transmission. Therefore, different types of medical instruments require different cleaning methods. The most critical instruments are those that are intended to penetrate skin or mucous membranes, such as scissors, forceps, tweezers, or hemostats. These require sterilization. Less critical instruments (often called "semicritical" instruments) that simply come into contact with mucous membranes, such as endocavitary transducers, require HLD rather than sterilization. "Noncritical" devices that come into contact with intact skin but not mucous membranes, such as blood pressure cuffs, a stethoscope, or external transducers, require LLD."

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australasia

Setting: Acute healthcare settings

Assessment of evidence

Main findings:

This document refers to the Spaulding classifications to categorise equipment listing them as follows:

“Non-critical medical devices - Ultrasound transducers that come into contact with intact skin are considered non-critical medical devices and as such are reprocessed by cleaning and may be followed by low-level disinfection (LLD) method as described in Section 7.1 ‘Low-level disinfection’.

Semi-critical medical devices - Ultrasound transducers that come into contact with non-intact skin and / or mucous membranes and transducers that have had likely contact with blood / body fluids are considered as semi-critical medical devices due to the high risk of potential contamination. These transducers are reprocessed by cleaning followed by a high-level disinfection (HLD) method as described in Section 7.2 ‘High-level disinfection’.

Critical devices - Transducers are extremely delicate and heat sensitive and as such are reprocessed as a semi-critical medical device by cleaning followed by a HLD method as described in Section ‘Highlevel disinfection’. An appropriate sterile sheath or transducer cover is applied, allowing it to be used on the critical aseptic field (AS/NZS4187:2014 Clause 5.1.3 (e))”

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia. 2019. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Assessment of evidence

Main findings:

Table 7 lists the classifications and descriptions. The authors state that these are per the Spaulding classification.

“Critical – These items confer a high risk for infection if they are contaminated with any microorganism and must be sterile at the time of use. This includes any objects that enter sterile tissue or the vascular system, because any microbial contamination could transmit disease.

Semi-critical – These items come into contact with mucous membranes or non-intact skin, and should be single use or sterilised after each use. If this is not possible, high-level disinfection is the minimum level of reprocessing that is acceptable.

Non-critical – These items come into contact with intact skin but not mucous membranes. Thorough cleaning is sufficient for most non-critical items after each individual use, although either intermediate or low-level disinfection may be appropriate in specific circumstances.”

- Additional information from ‘Table 8’: Critical: “Entry or penetration into sterile tissue, cavity or blood stream”.

Single patient use equipment:

- For transmission-based precautions for contact precautions. - “Conditional recommendation Updated 22. It is suggested that patient-dedicated equipment or single-use patient-care equipment be used for patients on contact precautions. If common use of equipment for multiple patients is unavoidable, clean the equipment and allow it to dry before use on another patient.”

Limitations:

- No references provided for this statement
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.

Assessment of evidence
• Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. Updated 13 December 2022. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Settings: Health-care settings **Country:** England

Assessment of evidence

Methods: "The previous Health and Social Care Act 2008: Code of Practice document for health and adult social care on the prevention and control of infections and related guidance. The code applies to NHS bodies and providers of independent healthcare and adult social care in England, including primary dental care, independent sector ambulance providers and primary medical care providers". This document sets out how English healthcare providers may adhere to the H&SCA 2008 regulations.

Main findings:

Equipment terms are defined in the glossary as quoted below:

"medical device - Any instrument, apparatus, appliance, material or other article (whether used alone or in combination), including the software necessary to use it properly, intended by the manufacturer to be used for people for the purpose of: diagnosis, prevention, monitoring, treatment or alleviation of disease; diagnosis, monitoring, alleviation of or compensation for any injury or disability; investigation, replacement or modification of the anatomy or of a physiological process; control of conception. This also includes devices intended to administer a medicinal product."

"invasive device - A device that, in whole or part, penetrates inside the body, either through a body orifice or through the surface of the body."

"single use device - A medical device that is intended to be used on an individual patient during a single procedure and then discarded."

"single patient use device - Where a medical device has been designated as suitable for single patient use; more than one episode of use of this device on the same patient is permitted. The device may undergo some form of decontamination between each use in accordance with the manufacturer's instructions for reuse."

Examples provided for 'non-invasive service user equipment': "beds, commodes, mattresses, hoists and slings, examination couches, trolleys and stretchers."

Limitations:

- Unclear development process and applicable to English settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations from the European Society of Radiology Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated

Assessment of evidence

that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

The Spaulding classification is cited and adapted/described as follows:

Non-critical – “non-invasive, contact of US transducer with intact skin only, requiring low level disinfection.”

Critical – “invasive, such as US-guided punctures or injections, contact of the US transducer with mucous membranes and body fluids, or a combination of both”

The authors have purposefully excluded the ‘semi-critical’ classification for the following reasons – “in contact with intact mucous membranes of non-sterile body sites such as the vagina. Because the integrity of these mucous membranes cannot be taken for granted and procedure-associated micro-trauma can never be excluded, this category has been omitted”.

Limitations:

- Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care. 31 March 2022. Updated 01 March 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

Reusable equipment is categorised into its level of risk based on table 4 which is quoted below:

Assessment of evidence

Level of risk	Description	Method	Example
Low	Items that come into contact with intact skin. Items that do not come into contact with people.	Cleaning. Disinfection if an increased infection risk is suspected.	
Medium	Items that come into contact with intact mucous membranes or items contaminated with particularly virulent or readily transmissible pathogens. Items used with people who are immunocompromised. Low risk items contaminated with blood or body fluids.	Cleaning (followed by disinfection or sterilisation if being used for more than one client).	Respiratory equipment, thermometer, commodes, urinals, bedpans.
High	All reusable medical devices that are used in close contact with a break in the skin or mucous membranes, and devices that enter a sterile area of the body.	Follow manufacturer's instructions. This may include chemical disinfectant methods or sterilisation through an authorised sterilisation centre.	Wound dressing - sterile and single use.

Other equipment types are also provided and described as follows:

Single use equipment - "A device designated as single use should not be re-used as this can affect safety, performance, and effectiveness, exposing people to unnecessary risk. Anyone reprocessing or reusing devices designated as single use bears the full responsibility for its safety and effectiveness.

Assessment of evidence

A single-use device should only be used on an individual person during a single procedure, and then safely disposed of. It is not intended to be used again, even on the same person".

Single person use items – "These items are intended to be used by only one person for a limited number of uses. They must not be used by different individuals. Follow the manufacturer's instructions regarding re-use and decontamination."

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Main findings:

This document described decontamination as a combination of processes.

“Equipment used in health care may be designated as single use, single patient use or reusable multi-patient use. Any equipment not designated as a single use item must be made safe following use to prevent micro-organisms being transferred from equipment to patients and potentially resulting in infection. Decontamination is the method for achieving this”

Single use – “Single use equipment (where the item can only be used once) must not be re-processed or re-used. Examples include disposable jugs, thermometer covers, syringes and needles. Single use equipment will be clearly marked with the following symbol” (please see document for symbol of the number 2 within a circle with a line through it.

Single patient use – “Single patient use equipment (where the item can be repeatedly used for the same patient) includes items such as nebulisers and disposable pulse oximeter probes. Between use, items must be cleaned in line with local policies. The decontamination of such items must not be performed in hand washing sinks. Single patient use equipment should be clearly identified for use by that specific patient only.”

Reusable multi-patient use equipment – “Reusable, multi-patient use equipment such as commodes, beds, pressure relieving mattresses and blood pressure cuffs, requires decontamination after each episode of use by a patient. This must be undertaken in line with local policies in appropriate facilities.”

Table 1 also presents the level of decontamination required per the classification of equipment as high, intermediate or low risk.

High risk items are listed as equipment “in close contact with a break in the skin or mucous membrane, introduced into sterile body areas”, (requiring sterilisation, examples include surgical instrument).

Assessment of evidence

Intermediate equipment are described as “in contact with mucous membranes. Contaminated with particularly virulent or readily transmissible organisms. Prior to use on immune compromised patients” (requiring sterilisation or disinfection, example include bedpan, flexible endoscope).

Low risk equipment is described as “in contact with healthy skin. Not in contact with patient” (requiring cleaning and disinfection – if outbreak, examples include bed frame, patient wheelchair, toilet).

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the ultrasound transducer.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Updated 20 October 2020. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Main findings:

The authors refer to the Spaulding classification and the CDC's version of this. They state that transducer equipment may be:

Critical – "Transducer contacts sterile tissues or a device (e.g., needle, catheter) inserted into sterile tissue during the procedure. Sterile tissue includes body sites, cavities, or tissues that are endogenously free from all living organisms. This includes, but is not limited to the vascular system, joints and joint spaces, other internal body fluids (e.g., blood, synovial fluid), the vasculature, internal body organs, peritoneum, and retroperitoneum."

Semi-critical – "Transducer contacts mucous membranes or non-intact skin or a device that contacts mucous membranes or non-intact skin during the procedure (i.e., no risk of contact with sterile tissues). Mucous membranes produce mucus and line cavities or surfaces of the body that open to the external environment, such as the digestive tract, the respiratory passages, and the genitourinary tract. Non-intact skin includes cuts, punctures, abrasions, dermatitis, etc."

Assessment of evidence

Non-critical – “Transducer only contacts intact skin, or a device used during the procedure that contacts intact skin (i.e., no risk of contact with sterile tissues, mucous membranes, or non-intact skin). Intact skin is completely healthy and does not have open cuts, punctures, abrasions, dermatitis, etc.”

It is reported that the use of a transducer cover does not alter the classifications above.

Limitations:

- Unclear development process
- This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rathore MH, Jackson MA, Committee on Infectious Diseases et al. Infection prevention and control in pediatric ambulatory settings. Pediatrics. 2017; 140(5):e20172857. Reaffirmed December 2022.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
doi:10.1542/peds.2017-2857. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Paediatric ambulatory settings

Country: USA

Main findings:

It is reported in Table 6 that equipment may be considered as:

Critical – any device entering tissue such as needles, surgical instruments, catheters etc.

Semicritical – any item with contact with mucous membranes but does not enter tissue including laryngoscope

Noncritical - instruments that touch only intact skin including stethoscopes and blood pressure cuffs.

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. September, 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

Assessment of evidence

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or "predictive power of the study designs from which that data were obtained" (domains listed are "strength of study design, quality of study, number of studies, consistency of results and directness of evidence"). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

Reference to the Spaulding classifications is provided in the main body of text separating equipment into critical, semi-critical and non-critical. This classification can be used to assist with understanding the level of cleaning, disinfection and sterilisation specifications for equipment used in patient care.

The following have been extracted from the glossary included in appendix V.

"Critical items – Instruments and devices that enter sterile tissues, including the vascular system. Reprocessing critical items, such as surgical equipment or intravascular devices, involves meticulous cleaning followed by sterilization"

"Non-critical items − Items that touch only intact skin but not mucous membranes. Reprocessing of non-critical items involves thorough cleaning and/or low-level disinfection."

"Semi-critical items − Items that come in contact with non-intact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semi-critical items involves meticulous cleaning followed by high-level disinfection." This guidance does not cover prions.

Assessment of evidence

Recommendations under additional precautions – contact precautions – “All equipment/supplies should be identified and stored in a manner that prevents use by or for other patients. [CII] Non-critical patient-care equipment (e.g., thermometers, blood pressure cuff, pulse oximeter) should be dedicated to the use of one patient and cleaned and disinfected as per Routine Practices before reuse with another patient or a single-use device should be used and discarded in garbage after use. [BII] Toys, electronic games or personal effects should not be shared between patients. [CI]”

Recommendations for contact precautions – “Bedpans and commodes should be provided for single patient use and labelled appropriately. Bedpans and commodes should be reprocessed with cleaning and low-level disinfection before use by another patient. The use of single-patient-use disposable bedpans is acceptable. [CII]”

Evidence grading summary:

BII - Direct evidence from any combination of strong or moderate design studies of high/medium quality, with a clear trend but some inconsistency of results or Extrapolation from multiple strong design studies of medium quality or moderate design studies of high/medium quality, with consistency of results or one strong design study with support from multiple weak design studies of high/medium quality, with consistency of results

CI - Direct evidence from multiple weak design studies of high/medium quality, with consistency of results or Extrapolation from any combination of strong/moderate design studies of high/medium quality, with inconsistency of results.

CII - Studies of low quality, regardless of study design or Contradictory results, regardless of study design or Case series/case reports or Expert opinion.

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
UK Government. Statutory Instruments No. 618. The Medical Device Regulations 2002, as amended 2020. Last updated 31 December 2020. Last accessed 24/06/2025.	Legislation	Mandatory	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: "These Regulations contain the legislative measures necessary for the implementation of three European Community Directives: Council Directive 90/385/EEC on the approximation of the laws of the Member States relating to active implantable medical devices, as amended; Council Directive 93/42/EEC concerning medical devices, as amended; and Directive 98/79/EC of the European Parliament and of the Council on in vitro diagnostic medical devices ("the Medical Devices Directives"). They also contain the legislative measures necessary for the implementation, in relation to medical devices, of the agreements on mutual recognition between the European Community and Australia, New Zealand, Canada and the United States of America—and of the Association Agreement between the European Communities, and their Member States, and Hungary".

Assessment of evidence

Main findings:

Definition of a medical device – “

“**7.**—(1) For the purposes of this Part and Part VI, devices are classified as belonging to Class I, IIa, IIb or III in accordance with the classification criteria set out in Annex IX of Directive 93/42”. The EU directive is included below and is therefore applicable in the UK.

Within the interpretation section it states ““intended for clinical investigation” means—

(a) intended for use by a registered medical practitioner when conducting investigations of that device in an adequate human clinical environment; or

(b) intended for use by any other person in who, by virtue of their professional qualification, is authorised to carry out investigations of that device in an adequate human clinical environment;

“intended purpose” means—

(a) in relation to an active implantable medical device, the use for which it is intended and for which it is suited according to the data supplied by the manufacturer in the instructions relating to it;

(b) in relation to any other medical device, the use to which the device is intended according to the data supplied by the manufacturer on the labelling, the instructions for use and/or the promotional materials”

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

Table 2 provides detail about how reusable equipment may be classified and is based on the Spaulding classification.

High (critical) – “Items that are involved with a break in the skin or mucous membrane or entering a sterile body cavity”, including surgical instruments, implants, rigid endoscopes, syringes, needles.

Assessment of evidence

Intermediate (semi-critical) – “Items in contact with mucous membranes or body fluids”, including respiratory equipment, non-invasive flexible endoscopes, bedpans, urine bottles”.

Low (non-critical) – “Items in contact with intact skin”, including blood pressure cuffs and stethoscopes.

Table 2. **Policy for the local decontamination of reusable equipment according to the Spaulding classification**

Risk category	Recommended level of decontamination	Examples of medical devices
High (critical) Items that are involved with a break in the skin or mucous membrane or entering a sterile body cavity	Sterilization	Surgical instruments, implants/prostheses, rigid endoscopes, syringes, needles
Intermediate (semi-critical) Items in contact with mucous membranes or body fluids	Disinfection (high level)	Respiratory equipment, non-invasive flexible endoscopes, bedpans, urine bottles
Low (non-critical) Items in contact with intact skin	Cleaning (visibly clean)	Blood pressure cuffs, stethoscopes

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health-care settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Assessment of evidence

Main findings:

Equipment is defined as critical, semicritical or noncritical. These are defined in detail on page 11-12.

Critical items – may be associated with a high risk of infection if contained. “objects that enter sterile tissue or the vascular system must be sterile because any microbial contamination could transmit disease. This category includes surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities. Most of the items in this category should be purchased as sterile or be sterilized with steam if possible”

Decontamination methods for this level are described as follows: “Heat-sensitive objects can be treated with EtO, hydrogen peroxide gas plasma; or if other methods are unsuitable, by liquid chemical sterilants. Germicides categorized as chemical sterilants include ≥2.4% glutaraldehyde-based formulations, 0.95% glutaraldehyde with 1.64% phenol/phenate, 7.5% stabilized hydrogen peroxide, 7.35% hydrogen peroxide with 0.23% peracetic acid, 0.2% peracetic acid, and 0.08% peracetic acid with 1.0% hydrogen peroxide. Liquid chemical sterilants reliably produce sterility only if cleaning precedes treatment and if proper guidelines are followed regarding concentration, contact time, temperature, and pH”

Semicritical items – equipment that comes into contact with mucous membranes or nonintact skin (provided examples include respiratory therapy or anaesthesia equipment, endoscopes, laryngoscope blades, other probes and scopes or catheters). “These medical devices should be free from all microorganisms; however, small numbers of bacterial spores are permissible.”

Decontamination methods for this level were: “Semicritical items minimally require high-level disinfection using chemical disinfectants. Glutaraldehyde, hydrogen peroxide, ortho-phthalaldehyde, and peracetic acid with hydrogen peroxide are cleared by the Food and Drug Administration (FDA) and are dependable high-level disinfectants provided the factors influencing germicidal procedures are met (Table 1). When a disinfectant is selected for use with certain patient-care items, the chemical compatibility after extended use with the items to be disinfected also must be considered. High-level disinfection traditionally is defined as complete elimination of all microorganisms in or on an instrument, except for small numbers of bacterial spores. The FDA definition of high-level disinfection is a sterilant used for a shorter contact time to achieve a 6-log10 kill of an appropriate

Assessment of evidence

Mycobacterium species. Cleaning followed by high-level disinfection should eliminate enough pathogens to prevent transmission of infection.”.

“Some items that may come in contact with nonintact skin for a brief period of time (i.e., hydrotherapy tanks, bed side rails) are usually considered noncritical surfaces and are disinfected with intermediate-level disinfectants (i.e., phenolic, iodophor, alcohol, chlorine) 23. Since hydrotherapy tanks have been associated with spread of infection, some facilities have chosen to disinfect them with recommended levels of chlorine”

Noncritical items – are reported to come into contact with intact skin but not mucous membranes. The guidelines describes noncritical surfaces and care equipment (bedpans, blood pressure cuffs, crutches and computers). Low level disinfectants are listed in table 1 (ethyl or isopropyl alcohol 70%, sodium hypochlorite 5.25-6.15% household diluted bleach 1:5000 providing >100 ppm available chlorine, phenolic germicidal detergent solution, iodophor germicidal detergent solution, quaternary ammonium germicidal detergent solution. Manufacturer provided exposure times should be followed.

This document describes the Spaulding classification system. However, disadvantages of this system are noted on page 14. This included oversimplification which may not account for more complex equipment or prion decontamination. It is also stated that consideration should be provided to equipment which is used alongside other equipment of a higher (greater risk) classification and how this may then be classified.

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland's Health and Social Care Services (SHTN 00-04). Last updated August 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: Scotland

Scope: "This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices, and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Assessment of evidence

This may not apply to all equipment but does apply to all equipment considered as a medical device. It should be considered as accompanying the medical device regulations. It is not in itself regulatory though does refer to legislation where relevant throughout.

Main findings:

Medical devices are defined on page 11-15. “There are multiple interpretations for the terms health technology and for medical equipment but medical device are explicitly defined by the medical device regulations”.

Health technology is variably defined according to this document but a WHO definition is provided as “the application of organised knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of life’ and clarifies that the term is used interchangeably with ‘Health-care Technology’”. Health technology may be considered an umbrella term per Figure 2 which is quoted below (page 11). Within this definition is medical equipment and medical device are considered as “overlapping subcategories of health technology”.

Medical equipment is described as having no one clear definition and is variably defined and a WHO, BS EN (60601-1/61010-1) and MHRA definitions are provided. It is stated that due to variable definitions the document considered medical equipment as overlapping with medical device rather than two separate subsets of health technology.

Medical devices - “Decisions about whether a product is a medical device or not is based on the principal intended purpose of the product, as stated by its manufacturer, and upon its mode of action: a medical device is a product which is designed and manufactured with an ‘intended medical purpose’ on human subjects as its ‘principal intended action’. It acts in vivo or in vitro on diseases, injuries, disabilities, anatomy, or on physiological or pathological state; products that are primarily drugs are not medical devices”.

The authors described that the first point of contact in trying to establish the classification of equipment as a medical device is the supplier/seller who should be asked to “share the conformity certification of the device”. A definition from the medical device regulations 2002 as amended is included below and therefore the quotation provided in this document is not included in this evidence table entry but it is provided.

Assessment of evidence

Other definitions outside of the scope of this review as it has a focus on non-invasive, shared care equipment only is provided as 'active implantable device'.

Equipment is categorised in table 1 and it is noted that this is based on the Spaulding classification:

Critical – "Entering usually sterile tissues or entering the vascular system." Including needles, surgical instruments, implants. (sterilisation)

Semi-critical – "In contact with mucous or non-intact membrane but not penetrating sterile tissue". Including flexible endoscopes, vaginal specula, endocavity probes. (high level disinfection and sterilisation preferred if possible)

Non-critical – "In contract with intact skin only". Including blood pressure cuff, electrocardiogram leads, stethoscope, pulse oximetry probe. (cleaning and low level disinfection where necessary).

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
European Parliament. Regulation (EU) 2017/745. Medical Device Regulations.	Legislation	Mandatory	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last updated 10 January 2025. Last accessed 24/06/2025.					

Assessment of evidence

Country: EU/EEA

Scope: An EU parliament legislation regarding medical device.

Assimilated as UK domestic law as per the Retained EU Law (Revocation and Reform) Act 2023 – not listed in Schedule 1 (revoked REUL). 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC (Text with EEA relevance).

Main findings:

Article 1: definition and Scope:

"'medical device' means any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, including the software intended by its manufacturer to be used specifically for diagnostic and/or therapeutic purposes and necessary for its proper application, intended by the manufacturer to be used for human beings for the purpose of:

— diagnosis, prevention, monitoring, treatment or alleviation of disease,

— diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap,

— investigation, replacement or modification of the anatomy or of a physiological process,

— control of conception,

Assessment of evidence

and which does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which may be assisted in its function by such means;

(b) 'accessory' means an article which whilst not being a device is intended specifically by its manufacturer to be used together with a device to enable it to be used in accordance with the use of the device intended by the manufacturer of the device"

"Article 9: Classification

1. Devices shall be divided into Classes I, IIa, IIb and III. Classification shall be carried out in accordance with Annex IX".

1.1. Rule 1- "All non-invasive devices are in Class I, unless one of the rules set out hereinafter applies". Note this is unless channelling or storing blood, body fluids or tissues, liquids or gases for purpose of eventual infusion, administration or introduction into the body. Or modifying biological or chemical composition of blood, other body liquids or other liquids intended for the body. This document also described invasive equipment including surgically invasive equipment.

1.4. Rule 4- "All non-invasive devices which come into contact with injured skin:

— are in Class I if they are intended to be used as a mechanical barrier, for compression or for absorption of exudates,

— are in Class IIb if they are intended to be used principally with wounds which have breached the dermis and can only heal by secondary intent,

— are in Class IIa in all other cases, including devices principally intended to manage the micro-environment of a wound"

Invasive – "A device which, in whole or in part, penetrates inside the body, either through a body orifice or through the surface of the body."

Implantable – "Any device which is intended:

— to be totally introduced into the human body or,

— to replace an epithelial surface or the surface of the eye, by surgical intervention which is intended to remain in place after the procedure.

Assessment of evidence
Any device intended to be partially introduced into the human body through surgical intervention and intended to remain in place after the procedure for at least 30 days is also considered an implantable device.”

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Medicines and Healthcare Products Regulatory Agency (MHRA). Medical devices: how to comply with legal requirements in Great Britain. August 2013. Updated January 2025. Last accessed 24/06/2025 .	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Scope: This guidance document aimed to support compliance with medical device law with direct reference and quotation of legislation.

Main findings:

Definition of a medical device – "According to the Medical Devices Regulations 2002 (SI 2002 No 618, as amended) (UK MDR 2002), a medical device is described as any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, together with any accessories, including the software intended by its manufacturer to be used specifically for diagnosis or therapeutic purposes or both and necessary for its proper application, which is intended by the manufacturer to be used for human beings for the purpose of:

- diagnosis, prevention, monitoring, treatment or alleviation of disease
- diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap
- investigation, replacement or modification of the anatomy or of a physiological process, or
- control of conception

A medical device does not achieve its main intended action by pharmacological, immunological or metabolic means although it can be assisted by these. A medical device includes devices intended to administer a medicinal product or which incorporate as an integral part a substance which, if used separately, would be a medicinal product and which is liable to act upon the body with action ancillary to that of the device".

"The 3 main types of medical devices and their associated Part in the UK MDR 2002 are:

- general medical devices: Part II of the UK MDR 2002

Assessment of evidence
• active implantable medical devices: Part III of the UK MDR 2002 • in vitro diagnostic medical devices (IVDs): Part IV of the UK MDR 2002”

Question 3: What is the risk of healthcare associated infection (HAI) from non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Gras-Le Guen C, Lepelletier D, Debillon T, et al. Contamination of a milk bank pasteuriser causing a Pseudomonas aeruginosa outbreak in a neonatal intensive care unit. Archives of Disease in Childhood-Fetal and Neonatal Edition. 2003 Sep 1;88(5): F434-5.	Outbreak investigation	Level 3	N/A	N/A	N/A

Assessment of evidence

Country: France

Infective agent: *Pseudomonas aeruginosa (P. aeruginosa)*

Presentation: 31 neonatology and NICU patients cared for between July 2000 to September 2001. 14 symptomatic patients (4 BSI, 6 RTI, 4 otitis media) and 17 with gastrointestinal tract colonisation. Patient details are provided in table 1 (p. F434) including birth weight, age, and symptoms), four neonates died all with 'very low birth weight'.

Sampling/testing: Pulse field gel electrophoresis (PFGE) used to confirm serotype in patients, all Q10. Swabbing of 69 water taps all negative. The mild bank pasteuriser (used to thaw bottles of milk, located three floors below unit) positive for Q10 strain, matching patients. A further milk pasteurizer on the unit was also confirmed as positive for *P. Aeruginosa* (but unclear strain).

Source: Pasteurizer used to thaw milk, confirmed via PFGE

IPC measures: Pasteurisers involved were not used and aseptic technique for bottle handling was "intensified".

Confirmation and date of end of outbreak: Outbreak was declared as ended in September 2001 following screening of stool sample from all patients in the department. None were positive (including three patients previously involved in the outbreak).

Summary:

This outbreak investigation study, associated thirty-one cases of *Pseudomonas aeruginosa* infection (14 symptomatic, 17 colonised) in neonates within a French neonatology and neonatal intensive care unit to a contaminated milk bank pasteuriser, used for thawing bottles of human donor milk. However, this study has multiple limitations as detailed below.

Limitations:

- It is noted that the aseptic bottle handling technique was "intensified" but it is not clear what this means, other IPC measures in place are not clear.
- The outbreak took place 2000-2001 which may not reflect current IPC and healthcare provisions in Scottish setting.
- Specific to one centre, small number of patients and may not generalise to other patients/settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Alfandari S, Gois J, Delannoy PY, et al. Management and control of a carbapenem-resistant Acinetobacter baumannii outbreak in an intensive care unit. Medecine et maladies infectieuses. 2014 May 1;44(5):229-31.	Outbreak investigation	Level 3	N/A	N/A	N/A

Assessment of evidence

Country: France

Infective agent: Carbapenem-resistant *Acinetobacter baumannii (*CRAB)

Presentation: 8 (40%) patients had infections (4 cases of pneumonias, 3 of bacteremia, 1 of pyelonephritis). 6 patients died, 1 death being attributable to a CRAB bacteremia. First case (patient 1) identified in September 2011. Twenty patient cases were identified in total, 15 were ICU patients.

Assessment of evidence

Sampling/testing: 222 environmental sample (beds, carts, infusion pumps, ventilator pads, ultrasound, EKG), phones, stethoscopes were collected before and after room cleaning, in February 2012. Second round of samples collected in April 2012, with 84 environmental and 13 HCW hand samples. Two samples from blood pressure cuff Velcro were positive for CRAB, after aerosolised hydrogen peroxide exposure.

Source: Blood pressure cuffs with Velcro (PFGE confirmed match to 14 patients)

IPC measures: All models of blood pressure cuff with Velcro were removed for submersible cuffs. Final case of clone 1 (linked to blood pressure cuffs) identified in May 2012. But note that the final CRAB case was identified 22 June 2012, however this was clone 2 and did not appear to be associated with the blood pressure cuffs.

Confirmation and date of end of outbreak: Unclear how long after final case before closing the outbreak.

Summary:

This outbreak investigation study associated a carbapenem-resistant Acinetobacter baumannii (CRAB) outbreak in a French hospital ICU to Velcro-closing blood pressure cuffs. However, this study has multiple limitations as detailed below.

Limitations:

- The outbreak took place in 2011-2012 in France, thus, may not reflect current IPC and healthcare provisions and practices in Scottish settings.
- Specific to one centre, small number of patients and may not generalise to other patients/settings,
- But within the methods section it is reported that the ICU was involved in voluntary weekly screening that was ongoing, other IPC measures in place are not clear.
- Unclear how long patients were followed up and the level of patient sampling to confirm close of outbreak.
- The outbreak of clone 2 appeared to have a different source and was not associated with the ICU. This is not well described in the report and appears to be a separate outbreak.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Engür D, Çetinkaya Çakmak B, et al. A milk pump as a source for spreading Acinetobacter baumannii in a neonatal intensive care unit. Breastfeeding Medicine. 2014 Dec 1;9(10):551-4.	Outbreak investigation	Level 3	N/A	N/A	N/A

Assessment of evidence

Country: Turkey

Infective agent: *Acinetobacter baumannii*

Presentation: Respiratory distress, mechanically ventilated. Outbreak occurred in July 2009 (no A. baumannii since 1998 before this). Two neonates (one 2-days old term and one premature) with positive results within 2 days of one another prompted outbreak management. Eight patients (three with infection and five colonised) in total across full outbreak (see table 1 for details).

Sampling/testing: Multiple testing conducted and PFGE to confirm link between cases and breast milk pump.

Assessment of evidence

Source: Breast milk pumps. Authors report that the breast milk pump in use (one only on ward) was 'hospital-grade' and designed for multiple users. They also suggest it was cleaned daily with a surface disinfectant which was approved by the US environmental protection agency (unclear what product).

IPC measures: Breast milk pump underwent enhanced cleaning which involved cleaning the electrical unit and outer surface of equipment after every use. Hand hygiene protocol was established (unclear what this involved), new milk collection kits were issued, and mothers/parents were educated on how to clean these, mothers were also examined for signs of mastitis (none positive). Baby bottles and lids were discarded, and the refrigerator was cleaned. New admissions were admitted to a patient room for a 'few days' (there were no isolation rooms so this was introduced as an alternative). Terminal disinfection was conducted with sodium hypochlorite (details not provided). Patients considered as infected were treated appropriately with antibiotics.

Confirmation and date of end of outbreak: Process for closing the outbreak is not clear. Based on figure 1, there were no cases after the identification of the positive milk pump and control measures applied on 29 July, with no cases reported till September. However, the unit was moved to another facility, it not clear if this was related to the outbreak or a planned move.

Summary:

This outbreak investigation study associated an Acinetobacter baumannii outbreak in a Turkish hospital neonatal intensive care unit with contaminated breastmilk pumps. However, this study has multiple limitations as detailed below.

Limitations:

- Lack of clarity regarding close of outbreak though appears no cases in the months following (29 July – September) suggesting lack of cases was used as measure for end of outbreak.
- Conducted in Turkey in 2009 which may not represent health and care settings in Scotland today and comparability of break milk pump to those used in UK unclear.
- Other IPC practices are unclear, small number of patients, specific to the setting and patients included.

Assessment of evidence
• Bundled measures consistent with outbreak but difficult to understand which had some, most, or any effect.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Falk PS, Winnike J, Woodmansee C, et al. Outbreak of vancomycin-resistant enterococci in a burn unit. Infection Control & Hospital Epidemiology. 2000 Sep;21(9):575-82.	Outbreak investigation	Level 3	N/A	N/A	N/A

Assessment of evidence
Country: USA **Infective agent:** Vancomycin-resistant *enterococci* (VRE) (*E.faecium* of the vanA phenotype) **Presentation:** Outbreak occurred between 06 June 1996 - 14 June 1997. 21 patients on a burn intensive care unit (8 single bedrooms of 800-bed university medical centre), median age 41, mean 44 (19-77), 19 males, mean time to acquisition 21.9 days

Assessment of evidence

(median 14, 3-106). GI colonisation in all patients and several patients with burn colonisation. VRE also cultured from urine of one patient and bronchioalveolar lavage fluid in one patient.

Sampling/testing: Swabbing and culturing conducted (clinical and environmental described), environmental samples included patients' rooms, hydrotherapy rooms, bronchoscopes, other areas of burn unit and kitchenette. Relevant equipment swabbed included pumps, electrocardiogram (EKG) leads, pulse oximeters, stethoscopes, IV poles and other equipment near patients. PFGE used to type patient and environmental samples. HCW hands also sampled. 338/2844 (11.9%) environmental cultures were positive.

Source: Possible several sources for early cases, however, for latter cases a contaminated EKG lead was indicated due to patient negative samples prior to contact with the lead which then was tested positive followed by the patient 3 days later, the patient who occupied the room previously had also been positive. The isolates of these patients matched EKG lead isolates on PFGE.

IPC measures: Usual decontamination of surfaces included use of two quaternary ammonium products. Contact precautions with all HCW wearing gloves and gowns and washing hands with 4% chlorhexidine. Training provided, enhanced cleaning and disinfection (assigned housekeeper to BICU), barrier precautions in some areas.

Confirmation and date of end of outbreak: There was no further cases reported once this item had been decontaminated. Cultures obtained weekly were negative for 3 weeks following the final case, and then cultures obtained monthly were negative over the next year.

Summary:

This outbreak investigation study associated a vancomycin-resistant enterococci (VRE) outbreak in the burns ICU (BICU) of an American hospital with contaminated EKG lead. However, this study has multiple limitations as detailed below.

Limitations:

- The outbreak was conducted pre-2000 in Texas, USA, which may not reflect current practices in Scotland.

Assessment of evidence

- There is a lot of positive VRE environmental samples suggesting possible failures in decontamination practices (338/2844 samples positive).
- No way to state with certainty a single vector for transmission in the early cases where significant contamination in the surrounding patient area and equipment was found.

Question 4: What is the definition of decontamination for non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. Updated 13 December 2022. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** England					

Assessment of evidence

Methods: "The previous Health and Social Care Act 2008: Code of Practice document for health and adult social care on the prevention and control of infections and related guidance. The code applies to NHS bodies and providers of independent healthcare and adult social care in England, including primary dental care, independent sector ambulance providers and primary medical care providers". This document sets out how English healthcare providers may adhere to the H&SCA 2008 regulations.

Main findings:

"Reusable medical devices should be repurposed at one of the following 4 levels: clean (free of visible contamination), disinfected (a process used to reduce the number of viable infectious agents, but which may not necessarily inactivate some microbial agents, such as certain viruses and bacterial spores), sterile (at point of use), sterilised (meaning it has been through the sterilisation process)"

Decontamination is defined in the glossary as "The combination of processes (including cleaning, disinfection and sterilisation) used to make a reusable item safe for further use on service users and for handling by staff."

Limitations:

- Unclear development process and applicable to English settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care. 31 March 2022. Updated 01 March 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

“There are 3 categories of decontamination processes:

- cleaning - a process that physically removes contamination but does not necessarily destroy pathogens
- disinfection - a process that reduces the number of viable pathogens, but which may not necessarily inactivate some pathogens such as certain viruses and bacterial spores

Assessment of evidence

- sterilisation - a process used to make an object free from all viable pathogens including viruses and bacterial spores

The choice of decontamination process for reusable care equipment depends on the assessment of risk. Risks fall broadly into 3 categories: high, medium, and low."

This suggests that decontamination is a summation of the aspects involved in cleaning, disinfection and sterilisation. These may be part of the decontamination process depending on the category of equipment and its intended use.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Main findings:

“Decontamination is an umbrella term used to describe processes that make equipment safe for re-use which includes the destruction or removal of micro-organisms”.

“Decontamination is a combination of processes – cleaning, disinfection and/or sterilisation – that are used to ensure a reusable medical device or patient equipment is safe for further use”.

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 2030 Parts 1, 2 and 3: Washer-	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Disinfectors. Version 2. October 2001. Last accessed 16/06/2025.					

Assessment of evidence

Country: Scotland

Settings: Healthcare settings

Scope: This document is aimed to provide guidance to Scottish hospitals, laboratories and healthcare facilities regarding the choice, specification, purchase, installation, validation, periodic testing, operation, and maintenance of washer-disinfectors.

Main findings:

It is stated that washer-disinfectors are used to decontaminate items intended for re-use.

Decontamination – “Decontamination: The combination of processes, including cleaning and disinfection and/or sterilization, used to render a re-usable item safe for further use”.

Limitations:

- Unclear methodology

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: England

Main findings:

“Decontamination: Cleaning, disinfection and sterilisation are all decontamination processes. In the context of the environment or non-critical equipment (i.e., equipment or devices that are in contact with intact skin only), the term is usually refers to cleaning and disinfection, either using separate cleaning and disinfecting agent in a two-step process, or a ‘2 in 1’ product that cleans and disinfects in one step”.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

Decontamination - “Removes soil and pathogenic microorganisms from objects so they are safe to handle, subject to further processing, use or discard. (Centers for Disease Control and Prevention [CDC] Guidelines for Disinfection and Sterilization in Healthcare Facilities, 2008).”

Assessment of evidence
Limitations: • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations from the European Society of Radiology Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

Decontamination appears to be used to describe cleaning, disinfection and sterilisation. These are defined in the document as "decontamination procedures".

Limitations:

- Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Infection in Healthcare Settings. September, 2017. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or “predictive power of the study designs from which that data were obtained” (domains listed are “strength of study design, quality of study, number of studies, consistency of results and directness of evidence”). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.

Assessment of evidence

- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

The following definitions were provided in the glossary (appendix V):

“Decontamination − The removal of microorganisms to leave an item safe for further handling”

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra:	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Commonwealth of Australia. 2019. Last accessed 16/06/2025.					

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Main findings:

Decontamination: “Use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item so that they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.”

Limitations:

- No references provided for this statement
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.
- Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Assessment of evidence

Main findings:

"Decontamination removes pathogenic microorganisms from objects so they are safe to handle, use, or discard."

"Decontamination: according to OSHA, "the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal" [29 CFR 1910.1030]. In health-care facilities, the term generally refers to all pathogenic organisms."

Various aspects of cleaning are provided which include but as not specifically linked to the term "decontamination": sterilisation, disinfection, cleaning.

The Spaulding classification is criticised for being potentially oversimplified. The authors outline that it does not consider complications where equipment is not appropriate or some sterilisation methods (such as heat on heat-sensitive equipment). The classifications are also criticised because some equipment may be used in conjunction with other more highly classified equipment but require sterility or a higher level of disinfection.

There are a number of pathogens listed with examples of decontamination processes.

It is stated that this same classification and process of decontamination should be used within ambulance and outpatient settings.

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Question 5: How should decontamination methods be categorised?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
British standards institute (BSI). BS EN ISO 14937:2009. Sterilization of health care products. General requirements for characterization of a sterilizing agent and the development, validation, and routine control of a sterilization process for medical devices. March 2010. Last accessed 26/06/2025.	British standards	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: This British Standard is the UK implementation of EN ISO 14937:2009. It supersedes BS EN ISO 14937:2001. It was reported as prepared by Technical Committee CH/198, Sterilization of medical devices.

Main findings:

“BS EN ISO 14937 is the standard that specifies the general requirements for the characterization of a sterilizing agent and for the development, validation and routine monitoring and control of a sterilization process for medical devices.

Although BS EN ISO 14937’s scope is limited to medical devices, the requirements it specifies can also be applied to sterilization processes for other health care products.

BS EN ISO 14937 applies to sterilization processes in which microorganisms are inactivated by physical and/or chemical means. It is intended to be applied by process developers, manufacturers of sterilization equipment, manufacturers of medical devices to be sterilized, and organizations responsible for sterilizing medical devices”.

Limitations:

- Unclear committee membership and unclear development methodology

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australasia

Setting: Acute healthcare settings

Main findings:

The following definitions are provided and noted as adapted from AS/NZS4187:2014.

Cleaning – “removal of contamination from an item to the extent necessary for further processing or for intended use”

Disinfection – “The destruction of many microorganisms (including human pathogens) using thermal or chemical means. Unlike sterilisation, disinfection is not effective against high numbers of bacterial endospores. Disinfectants are classified by grade as follows: • Low-level instrument grade: disinfectant that kills vegetative bacteria, some fungi and some viruses. • Intermediate-level instrument grade: disinfectant that kills vegetative bacteria, Mycobacteria, viruses and most fungi but not bacterial endospores. • High-level instrument grade: disinfectant that kills all microorganisms with the exception of high numbers of bacterial endospore”

Sterilisations – “Sterilisation destroys microorganisms on an object rendering it free from viable microorganisms”.

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 01-01. Decontamination of medical devices in a Central Decontamination Unit. Part A: Management. September 2018. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Setting: Healthcare settings

Main findings:

This technical memorandum, part A, applies to the decontamination of reusable (or single use that required pre-use decontamination) equipment which is contaminated in a central decontamination unit. It may not be fully applicable as it is

Assessment of evidence

primarily focused on medical equipment that required sterilisation (such as surgical instruments) most of which would not be considered as relevant to this review which focuses on non-invasive care equipment only. This document should be considered as outlining best practice but is not currently considered as legislative.

Main findings:

Washer disinfector decontamination is described and note the following “Cleaning and disinfection should be carried out using a validated automated process such as a thermal washer disinfector (WD) complying with EN ISO 15883 – 1: 2014 and 2: 2009, unless it is not in line with the manufacturers’ IFUs”

Sterilization is described to align with medical device that are for invasive procedures and therefore the detail provided about this within the SHTM is not relevant to the current review.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
31 March 2022. Updated 01 March 2024. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

“There are 3 categories of decontamination processes:

- cleaning - a process that physically removes contamination but does not necessarily destroy pathogens
- disinfection - a process that reduces the number of viable pathogens, but which may not necessarily inactivate some pathogens such as certain viruses and bacterial spores
- sterilisation - a process used to make an object free from all viable pathogens including viruses and bacterial spores

The choice of decontamination process for reusable care equipment depends on the assessment of risk. Risks fall broadly into 3 categories: high, medium and low.”

This suggests that decontamination is a summation of the aspects involved in cleaning, disinfection, and sterilisation. These may be part of the decontamination process depending on the category of equipment and its intended use.

Assessment of evidence
Limitations: • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** UK **Main findings:** This document described decontamination as a combination of processes.					

Assessment of evidence

Cleaning – “Cleaning is the critical element of the process and should always be undertaken thoroughly regardless of the level of decontamination required.” And “This process uses water and detergent to remove visible contamination but does not necessarily destroy micro-organisms, although it should reduce their numbers. Effective cleaning is an essential prerequisite to both disinfection and sterilisation.”

Disinfection – “This process uses chemical agents or heat to reduce the number of viable organisms. It may not necessarily inactivate all viruses and bacterial spores. Where equipment will tolerate sterilisation, disinfection should not be used as a substitute. The use of disinfectants is governed by the Control of Substances Hazardous to Health (COSHH) Regulations 2002 which require employers to assess and manage the risks from exposure to disinfectants and provide staff with information, instruction and training. Refer to your local policies for more information.”

Sterilisation – “This guidance does not include specific information relating to the sterilisation of reusable items. This process requires additional measures and greater scrutiny and validation of processes involved. For further information, consult your local infection prevention policies or seek advice from your infection prevention advisers.”

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 2030 Parts 1, 2 and 3: Washer-Disinfectors. Version 2. October 2001. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Healthcare settings

Scope: This document is aimed to provide guidance to Scottish hospitals, laboratories and healthcare facilities regarding the choice, specification, purchase, installation, validation, periodic testing, operation and maintenance of washer-disinfectors.

Main findings:

It is stated that washer-disinfectors are used to decontaminate items intended for re-use.

Assessment of evidence

“These are intended for use in emptying, cleaning and disinfecting bed pans, urinals, suction bottles and similar containers, and for the rigid supports used to hold disposable bedpans. They may have a large volume or mass of material to be removed (faeces, urine, blood, serum, mucous) and many of these materials have a high biomass of potentially infective organisms. The processed product will usually be used without further treatment.”

Cleaning – flushing machines (flushing with water, no detergent), Washing machine (water and detergents), ultrasonic machine (ultrasound energy to removal soil), solvent cleaning machines (use of solvent).

Disinfection – thermal (heat), chemical (microbicidal chemical based on concentration, exposure time or temperature).

Drying – may be included and may involve hot air, solvent drying system, dry product.

It is stated that the selection of product to be used within the disinfector compatibility must be considered including with the process, with the items (e.g., phenolic compounds may cause material changes in rubbers/plastics), with the quality of water, with other chemical additives, and with subsequent decontamination processes.

Limitations:

- Unclear methodology for development.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Sehulster L and Chinn RYW. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR. 2003; 52(10):1-42. Updated July 2019. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: This document main aim is “to develop an environmental infection-control guideline that reviews and reaffirms strategies for the prevention of environmentally-mediated infections, particularly among health-care workers and immunocompromised patients.” The methods utilised are unclear and therefore they are considered as expert opinion. The recommendations are graded per CDC grading and those recommendations related to equipment are included in the environment services section. A literature search of Medline is reported but unclear how this informed recommendations.

Main findings:

Cleaning: “a form of decontamination that renders the environmental surface safe to handle or use by removing organic matter, salts, and visible soils, all of which interfere with microbial inactivation. The physical action of scrubbing with detergents and surfactants and rinsing with water removes large numbers of microorganisms from surfaces. If the surface is not cleaned before the terminal reprocessing procedures are started, the success of the sterilization or disinfection process is compromised.”

“select EPA-registered disinfectants, if available, and use them in accordance with the manufacturer's instructions. Category IC (EPA: 7 United States Code [USC] § 136 et seq.)”

Limitations:

- Poor reporting of methodology – search terms or strategy, critical appraisal, selection of evidence, expert opinion consensus process etc.
- Relevant content on equipment classification cites CDC resource from 1991 – may not align with current evidence base and/or expert opinion consensus.
- Risk of publication bias – MEDLINE searched for published studies and no reporting of grey literature search methodology aside from ‘reviewing’ or ‘revising’ other CDC guidelines.
- Unclear which recommendations are informed by updates to guidelines.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American College of Emergency Physicians (ACEP). Guideline for ultrasound transducer cleaning and disinfection. June 2018. Updated 2021. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: US level 4 guideline targeted at members of ACEP provides recommendations for “the use of use of ultrasound gels, protective covers, probe cleaning and disinfection”. Users are signposted to professional resources for ultrasound programme management for further guidance outside the provided content. No methodology is provided or linked to within the document. An addendum has been added to these guidelines following the COVID-19 pandemic.

Main findings:

Defines cleaning and disinfection via CDC ‘Guideline for Disinfection and Sterilization in Healthcare Facilities’.

Assessment of evidence

Cleaning – “the removal of visible soiling from the surfaces and lumens of equipment by a manual or mechanical process, commonly with water and detergent or an enzymatic cleaner. Cleaning prepares the items for safe handling and/or further decontamination.”

Disinfection – “the thermal or chemical destruction of pathogenic and other types of microorganisms. Disinfection is less lethal than sterilization as it destroys most recognized pathogenic microorganisms, but not necessarily all microbial forms (eg, bacterial spores).”

Further defines low-level, intermediate/mid-level and high-level disinfectants as per the same reference. Level of disinfection may vary with concentration, methods and contact time.

Limitations:

- No methodology provided – not reported how references were obtained.
- Some recommended decontamination products are based on registration by the ‘Environmental Protection Agency’ – a US government authority – thus may not be transferable to Scottish health and care settings.
- Appendix on process of decontamination is in relation to disinfectant wipes – not included in this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: England

Main findings:

"Cleaning: Involves 'fluid' – usually detergent and water, and 'friction' – the mechanical or physical removal of organic matter including dirt, debris, blood, and bodily fluids. Micro-organisms are removed rather than killed. Effective cleaning leaves a surface or equipment visibly clean. This alone may be enough in foyers, offices, corridors and other 'low risk' environments, the disinfection is also needed in many healthcare environments. Cleaning is a pre-requisite to effective disinfection. Some disinfectants are readily deactivated by organic matter." Directions for cleaning include – "To minimise recontamination of an area and transfer of micro-organisms, clean from: • top to bottom • clean to dirty Dusting technique should not disperse the dust (i.e. use damp cloths/dusting devices). High horizontal surfaces should be cleaned first." and "Large and flat surfaces should be cleaned using an 'S' shape motion, starting at the point furthest away, then overlapping slightly but without going back over the area to avoid recontamination."

- Disinfection: Process of eliminating or reducing harmful micro-organisms from inanimate objects and surfaces. Sterilisation: The process of killing all micro-organisms through physical or chemical means.
- Sterilisation is used only for critical items, i.e. objects or instruments that enter or penetrate sterile tissues, cavities, or the bloodstream."
- "Local policy should outline where and when detergent and water are enough and where a detergent and disinfectant (or combined cleaning and disinfecting agent) are required."

Assessment of evidence

"A disinfectant must be in contact with a surface for a specified time and the surface needs to remain wet for that time. Staff should know the contact times for the disinfectants in use locally. Products with realistic contact times for use in a busy healthcare environment should be selected."

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rathore MH, Jackson MA, Committee on Infectious Diseases et al. Infection prevention and control in pediatric ambulatory settings. Pediatrics. 2017; 140(5):e20172857. Reaffirmed December 2022. doi:10.1542/peds.2017-2857.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Paediatric ambulatory settings

Country: USA

Main findings:

Sterilisation – “eliminates or destroys all forms of microbial life, including spores.” Chemical sterilising agents or dry heat considered. Manual cleaning with soap and water required before sterilisation.

Disinfection – “reduces but does not eliminate the microbial burden. The extent of disinfection depends on the type of disinfectant and its concentration, the resistance of the microbes, contact time, and amount of organic material.” Disinfection is split into high level (glutaraldehyde, 0.55% ortho-phthalaldehyde, or stabilized hydrogen peroxide (a combination of hydrogen peroxide and peracetic acid)), intermediate level (“70% ethyl or isopropyl alcohol, iodine and iodophors, or a 1:50 dilution of sodium hypochlorite”) and low level (“Low-level disinfection is appropriate for equipment that does not touch mucous membranes; examples include blood pressure cuffs, crutches, stethoscopes, and tabletops. Low-level disinfectants include phenolic compounds, quaternary ammonium compounds, and a 1:500 dilution of sodium hypochlorite”)

Cleaning – “Cleaning with detergent to remove organic material from medical instruments and other devices is a prerequisite to sterilization and disinfection.”

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Assessment of evidence

Main findings:

The level of required disinfection is based on the risk associated with the equipment as based on critical, semi-critical or non-critical classification.

High level disinfection – “the removal of all microorganisms except bacterial endospores, of which small numbers are permitted to remain”.

Low level disinfection – “is the inactivation of vegetative bacteria, enveloped viruses, some non-enveloped viruses, and most fungi in a practical period of time (≤10 minutes)”.

Sterilisation – “Common sterilization options for the transducer include ethylene oxide gas, hydrogen peroxide gas plasma, and liquid chemicals with extended contact times (e.g., glutaraldehyde, ortho-phthalaldehyde).2 It is critical to ensure that any sterilization process is compatible with the transducer and will not cause damage (see manufacturer’s IFU)”

High level disinfection – “A few disinfectants, known as chemical sterilants, will kill spores with prolonged exposure times (3–12 hours). At similar concentrations but with shorter exposure periods (e.g., 20 minutes for 2% glutaraldehyde), these same disinfectants are called high-level disinfectants and will kill all microorganisms except large numbers of bacterial spores” and “Automated HLD methods include hydrogen peroxide mist devices and liquid soak devices using approved liquid chemicals such as glutaraldehyde, ortho-phthalaldehyde, and accelerated hydrogen peroxide. Manual HLD can safely occur using HLD vapor control soaking stations with approved liquid chemicals such as glutaraldehyde, ortho-phthalaldehyde, peracetic acid, hydrogen peroxide, and accelerated hydrogen peroxide. Automated processes are preferable due to the reduced risk of operator error”.

Limitations:

- Unclear development process
- This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations from the European Society of Radiology Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated

Assessment of evidence

that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

Decontamination appears to be used to describe cleaning, disinfection and sterilisation. The below are defined in the document as “decontamination procedures”:

Cleaning – “Removal of dirt and any visible materials thus rendering items macroscopically clean. The use of detergents will remove most viable bacteria. Thorough cleaning must always precede any disinfection or sterilisation procedure”

Disinfection – “Inactivation of most viable bacteria.” “Low level disinfection (LLD): Elimination of most bacteria, some fungi and some viruses. Intermediate level disinfection: Elimination of most bacteria including mycobacteria, most fungi and some viruses but not bacterial spores. High level disinfection (HLD): Elimination of all viable pathogens apart from spores”.

Sterilisation – “Elimination of all microbes including bacterial and fungal spores. This is usually achieved through autoclaving (using steam under high pressure) or exposing instruments to high temperatures; thus it is not suitable for US transducers. Current methods of sterilisation do not inactivate prions. Chemical sterilisation by exposing medical devices to chemical agents such as peracetic acid, hypochloric acid, etc., is possible”.

Limitations:

- Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. September 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

Assessment of evidence

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or "predictive power of the study designs from which that data were obtained" (domains listed are "strength of study design, quality of study, number of studies, consistency of results and directness of evidence"). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

The following definitions were provided in the glossary (appendix V):

"Decontamination − The removal of microorganisms to leave an item safe for further handling"

"Cleaning − The physical removal of foreign material (e.g., dust, soil, organic material such as blood, secretions, excretions, and microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished using water and detergents in conjunction with mechanical action."

"Disinfectant − Product used on inanimate objects to reduce the quantity of microorganisms to an acceptable level. Hospital-grade disinfectants need a Drug Identification Number (DIN) for sale in Canada."

"High-level disinfection is the level of disinfection needed when processing semi-critical items. High-level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores. Low-level disinfection is the level of disinfection needed when processing non-critical items or some environmental surfaces. Low-level disinfectants kill most vegetative bacteria and some fungi, as well as enveloped (lipid) viruses (e.g., influenza, hepatitis B and C and HIV). Low-level disinfectants do not kill mycobacteria or bacterial spores."

Assessment of evidence

"Sterilization − The destruction of all forms of microbial life, including bacteria, viruses, spores and fungi."

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health and Safety Executive (HSE). Decontamination against bloodborne viruses. 15 February 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: This page explains various processes you can use depending on the level of decontamination required, not specific to a particular setting.

Assessment of evidence

Main findings:

- “Physical cleaning - Successful disinfection and sterilisation are dependent on the number of microorganisms initially present. Therefore, it can be important to physically clean before effective disinfection and sterilisation. Various powder or liquid detergents are available which may need to be diluted in hot water”.
- “Ultrasonication - This liquid-based cleaning method uses cavitation (rapid formation and collapse of minute bubbles in liquid). Treated items must be submersible”.
- “Sterilisation - In contrast to disinfection, this is an absolute term denoting destruction of all microorganisms, including bacterial spores”.

“Disinfection and sterilisation using heat.

Heat treatment is the most effective routine means of destroying the infectivity of all microorganisms, including BBVs, and mainly involves the use of autoclaves (pressure steam sterilisers).

Boiling and dry heat ovens do achieve raised temperatures that can kill microorganisms. However, they may lack the required level of heat delivery and treatment control offered by steam sterilisers, so are less reliable.

Whatever system is used must be maintained and periodically tested to ensure that it is achieving sterilising conditions consistently”.

- “Autoclaving - Saturated steam under pressure provides reliable sterilisation of waste and autoclavable, reusable equipment”.
- “Thermal washer disinfection - Use a combination of physical cleaning and thermal biocidal action to achieve disinfection of contaminated, reusable items”.
- “Dry heat - Dry heat sterilisers offer another method of sterilisation. It is effective provided that the steriliser has an automatic controller that will ensure appropriate temperatures are achieved throughout the load”.
- “Boiling - Boiling does not necessarily remove all biological agents, but it may be used for disinfection”.

Assessment of evidence

- Disinfection - This is a process of reducing the numbers of microorganisms to an acceptable level.
- “Chemical disinfection - The protein in blood and other body fluids may confer a protective effect for viruses, and in some cases may reduce the effectiveness of chemical disinfectants.

  It is reasonable to assume that, because of the viral robustness, any preparation effective against hepatitis B virus will also be effective against other BBVs.

  Disinfection of contaminated surfaces with bleach solution (minimum 1000 parts per million (ppm) active chlorine) is known to be effective for the inactivation of BBVs, but bleach is also susceptible to inactivation by organic soiling. This underlines the need for prior cleaning when disinfecting any soiled items, to reduce the organic load.

  Some chemical disinfectants have been tested for their activity against BBVs in the presence of whole blood or plasma (the fluid component of blood) to simulate in-use conditions.

  Removal of organic material should not be done manually if operator safety is compromised. However, in these situations it may be achievable by alternative means, for example using an ultrasonication tank or washer disinfector”.

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

It is repeated throughout this document across sections that manufacturer's instructions should be followed, this includes with regards to the equipment being decontaminated and the cleaning products or equipment being used whether it be detergent, disinfectants, mechanical washing etc.

Assessment of evidence

Cleaning – “The physical removal of body materials, dust or foreign material. Cleaning will reduce the number of microorganisms as well as the soil, therefore allowing better contact with the surface being disinfected or sterilized and reducing the risk of soil being fixed to the surface. Removal of soil will reduce also the risk of inactivation of a chemical disinfectant and the multiplication of microorganisms. The removal of contamination from an item to the extent necessary for further processing or for intended use”. Table 4 states that cleaning results are measured by “visual control or by using a cleaning test”. It is reported that equipment should be disassembled before manual cleaning to assure an effective clean.

“Ensure that the device to be cleaned is compatible with the chemical solutions used in the facility. Completely submerge immersible items during the cleaning process to minimize aerosolization and to assist in cleaning. Remove gross soil using tools, such as brushes and single-use cloths. Minimize the production of aerosols when cleaning non-immersible devices. Clean devices that have lumens with an appropriate brush, then manually or mechanically flush with a detergent solution and rinse with potable water. Check devices with lumens for obstructions and leakage”.

Manual cleaning would be indicated if immersion is not possible. Rinsing and drying is also advised as essential parts of ‘cleaning’.

Good practice for cleaning included “Ensure detergent is prepared at the correct concentration and temperature and used for the recommended contact time. Keep instruments moist and clean as soon as possible after the procedure. Disassemble instruments prior to cleaning. Open hinged/jointed instruments to ensure access to all surfaces. Use appropriate sized brushes to clean lumened items. Use soft bristle brushes to clean serrations and box locks. Inspect instruments after cleaning. Clean instruments under the surface of the water to reduce the risk of aerosol production. Follow manufacturer’s instructions for the cleaning of all medical devices”

There are a number of product types provided as examples that should be used for cleaning which include enzymatic (proteolytic) cleaners and cleaning chemicals (detergents) which were outlined as potentially involved in initial cleaning stage of decontamination. The concentration of detergent is reported as critical and things such as water hardness, pH and other considerations re also outlined. IT is advised that chemicals be prepared correctly and to align with manufacturer’s instructions.

Assessment of evidence

Disinfection – “The destruction or removal of microorganisms at a level that is not harmful to health and safe to handle. This process does not necessarily include the destruction of bacterial spores”. Table 4 states that disinfection is measured per load and per time of exposure.

“Must have high germicidal activity. Will rapidly kill a wide range of microorganisms, including spores. Is chemically stable. Is effective in the presence of organic compounds. Is compatible with the surface being disinfected. Has the ability to penetrate into crevices (desirable). Must be inexpensive and aesthetically acceptable”.

Figure 19 provides some further examples of specific pathogens of concern and the type of disinfection level that may be required. This included bacterial spores such as “c. diff, clostridium, bacillus substilis (sterilisations), Mycobacteria such as mycobacterium tuberculosis (high level disinfection), nonlipid or small viruses such as poliovirus, coxsackie virus and rhinovirus (intermediate level disinfection), Vegetative bacteria such as pseudomonas aeruginosa, e.coli, staph. aureus, salmonella, enterococci, Neisseria meningitidis (low level disinfection)”.

Factors that are listed to impact the effectiveness of the disinfection process are listed and described, including quantity of the microorganisms (as the bioburnden increases, the amount of time that a disinfectant needs to act also increased), Organic matter (the presence of biofilms and/or organics matter may disrupt the effectiveness of the disinfectant), resistance of microorganism to the chemical agent (spectrum of antimicrobial activity of agent), concentration of agent (the required concentration to reach the required antimicrobial action also may impact material e.g., corrosion), physical and chemical factors (potential impact of efficacy), Duration of exposure (contact time to achieved required desired result), stability (“some disinfectants are unstable at use concentration, e.g. chlorine-releasing agents, and should be discarded as recommended by the disinfectant manufacturer/supplier”).

Sterilisation – “The complete destruction or removal of microorganisms, including bacterial spores. Sterility State of being free from viable microorganisms. Sterilization Validated process used to render a product free from viable microorganisms”. Chemical and heat sterilisation is measured per process, item and per indicators (biological, chemical, physical, external). It is reported that sterilisation is required for equipment considered as critical or those devices that “have contact with sterile body tissues or fluids are considered critical items. All critical medical devices shall be cleaned and then sterilized because microbial contamination

Assessment of evidence

could result in disease transmission". It also reported that semi critical items should be sterilised "Whenever possible". Stem sterilisers include prevacuum (dynamic air removal), stem-flush pressure-pulse or passive air removal (gravity). Correct procedure for loading "Package placement to avoid overloading. Non-perforated tray and container placed on their edge. Packages away from chamber walls. Concave devices on an angle to avoid condensate pooling. Textile packs perpendicular to the sterilizer cart shelf. Steri-peel on its edge with multiple packages being placed paper to plastic. Rigid containers shall not be stacked unless validated by the manufacturer for that configuration".

Where heat cannot be used a chemical sterilant may be used. Chemical sterilant listed in this document include, ethylene oxide gas, hydrogen peroxide gas, hydrogen peroxide gas plasma, formaldehyde gas, ozone and dry heat are discussed.

Processing equipment – "All processing equipment must be evaluated for performance and to ensure that the correct medical devices are processed in the correct machine".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC).	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Main findings:

“When chemicals are used to destroy all forms of microbiologic life, they can be called chemical sterilants. These same germicides used for shorter exposure periods also can be part of the disinfection process (i.e., high-level disinfection)”

“A few disinfectants will kill spores with prolonged exposure times (3–12 hours); these are called chemical sterilants. At similar concentrations but with shorter exposure periods (e.g., 20 minutes for 2% glutaraldehyde), these same disinfectants will kill all microorganisms except large numbers of bacterial spores; they are called high-level disinfectants. Low-level disinfectants can kill

Assessment of evidence

most vegetative bacteria, some fungi, and some viruses in a practical period of time (≤10 minutes). Intermediate-level disinfectants might be cidal for mycobacteria, vegetative bacteria, most viruses, and most fungi but do not necessarily kill bacterial spores. Germicides differ markedly, primarily in their antimicrobial spectrum and rapidity of action."

"Terms with the suffix cide or cidal for killing action also are commonly used. For example, a germicide is an agent that can kill microorganisms, particularly pathogenic organisms ("germs"). The term germicide includes both antiseptics and disinfectants. Antiseptics are germicides applied to living tissue and skin; disinfectants are antimicrobials applied only to inanimate objects. In general, antiseptics are used only on the skin and not for surface disinfection, and disinfectants are not used for skin antisepsis because they can injure skin and other tissues. Virucide, fungicide, bactericide, sporicide, and tuberculocide can kill the type of microorganism identified by the prefix. For example, a bactericide is an agent that kills bacteria".

- A key consideration was the pre-disinfection/sterilisation cleaning stage which physically removes contamination and may reduce variability of germicide efficacy.
- Resistance should also be considered "Except for prions, bacterial spores possess the highest innate resistance to chemical germicides, followed by coccidia (e.g., Cryptosporidium), mycobacteria (e.g., M. tuberculosis), nonlipid or small viruses (e.g., poliovirus, and coxsackievirus), fungi (e.g., Aspergillus, and Candida), vegetative bacteria (e.g., Staphylococcus, and Pseudomonas) and lipid or medium-size viruses (e.g., herpes, and HIV). The germicidal resistance exhibited by the gram-positive and gram-negative bacteria is similar with some exceptions (e.g., P. aeruginosa which shows greater resistance to some disinfectants)"

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia. 2019. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Assessment of evidence

Main findings:

"Cleaning is the removal of foreign material (e.g., soil and organic material) from objects and is normally carried out using detergent, water and physical action. […] If an item cannot be cleaned, it cannot be disinfected or sterilised."

- "The two essential components of manual cleaning are:
  - friction—rubbing/scrubbing the soiled area with an appropriately sized soft brush
  - fluidics—use of fluids to remove soil and debris from internal channels after brushing with an appropriately sized brush and when the design does not allow passage of a brush through a channel."

"Disinfection is a process that inactivates non-sporing infectious agents. Disinfection processes may include automated, high-level disinfection systems either, chemical, heat or light-based. Items need to be cleaned before being disinfected."

- "There are three levels of disinfection, depending on the intended use of the instruments:
  - High level disinfection—a disinfectant that kills all microbial pathogens, except large numbers of bacterial endospores when used as recommended by manufacturer.
  - Intermediate level disinfection—a disinfectant that kills all microbial pathogens except bacterial endospores, when used as recommended by the manufacturer. It is bactericidal, tuberculocidal, fungicidal (against asexual spores but not necessarily dried chlamydospores or sexual spores) and virucidal.
  - Low level disinfection—a disinfectant that rapidly kills most vegetative bacteria as well as medium sized lipid containing viruses, when used according to labelling. It cannot be relied upon to destroy, bacterial endospores, mycobacteria, fungi or all small nonlipid viruses."

"Sterilisation destroys all microorganisms on the surface of an instrument or device, to prevent disease transmission associated with the use of that item."

Assessment of evidence

Limitations:

- No references provided for this statement.
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.
- Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Academy of Ophthalmology (AAO). Information statement. Infection prevention in eye care services and operating areas. August 2012. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Setting: Eye care settings

Methods: This guidance was based on guidance from other organisations and regulations in the USA. The recommendations related to 'instruments' are not considered as these would be considered as invasive, where involved in surgical procedures.

Main findings:

Cleaning:

- "The purpose of cleaning is to remove soil and debris physically through friction, and to reduce the presence of microorganisms. Cleaning does not kill microorganisms. Any instrument must be thoroughly cleaned prior to disinfection or sterilization."

Disinfection:

- "Disinfection is a process to eliminate most or all pathogenic microorganisms (except for bacterial spores) from inanimate objects, such as medical devices or equipment. This is usually performed using chemicals known as germicides or disinfectants. High-level disinfection kills all organisms and is performed using a germicide which is regulated by the FDA. The CDC recommends that if there are questions about high-level disinfectants or how to disinfect a particular medical device, the office should contact the manufacturer of the product."

Sterilisation:

- "Sterilization is the process of eliminating all organisms, including spores, and is carried out in health care settings by physical or chemical methods."

Limitations:

- Unclear development process. There is a risk of publication bias as this document is based on other guidance from organisations which have also been considered for this review including CDC, AORN, APIC.

Assessment of evidence
• May have limited applicability as guidance is developed for USA eye care services.

Question 6: When and how should detergents be used to decontaminate non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Institute of Ultrasound in Medicine (AIUM). 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. Journal of ultrasound in Medicine, 42(7), E13–E22. .	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United States of America (USA)

Setting: Acute healthcare settings

Scope: "The purpose of the first section of this document is to provide guidance regarding the cleaning and preparation of ultrasound transducers".

Main findings:

"Cleaning of all transducers—Disconnect the transducer from the ultrasound scanner as appropriate. After removal of the transducer cover (when applicable), remove bulk gel or debris from the transducer. Consider the use of a small brush, especially for crevices and areas of angulation, depending on the design of the particular transducer. Use a damp gauze pad or other soft cloth and a small amount of mild nonabrasive liquid soap, e.g., household dishwashing liquid, or use a wipe to remove any remaining gel (film)".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health and Safety Executive (HSE). Decontamination against bloodborne viruses. 15 February 2024.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Country: United Kingdom

Scope: This page explains various processes you can use depending on the level of decontamination required, not specific to a particular setting.

Main findings:

- “Physical cleaning - Successful disinfection and sterilisation are dependent on the number of microorganisms initially present. Therefore, it can be important to physically clean before effective disinfection and sterilisation. Various powder or liquid detergents are available which may need to be diluted in hot water”.
- Disinfection - This is a process of reducing the numbers of microorganisms to an acceptable level.

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australasia

Setting: Acute healthcare settings

Assessment of evidence

Main findings:

"Any equipment that has been in contact with the patient or operator should be cleaned with a detergent / disinfectant wipe or solution between use, for example the leads to the transducer, the keyboard or the bed."

"Ensure that all cleaning agents used for the general environment have been approved by the equipment manufacturer."

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
2019. Last accessed 16/06/2025.					

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Main findings:

Good practice point 10. Reads as follows “It is good practice for shared clinical equipment to be cleaned with a detergent solution between patient uses, and disinfected where indicated.”

The authors state the following: “Shared equipment should be cleaned with a detergent solution after each use with cleaning agents compatible with the piece of equipment being cleaned, as per manufacturer instructions.” With step up to disinfection where appropriate.

Discusses enzymatic cleaning solutions and their requirements, including how they can be inactivated by germicides.

- After decontamination rinse enzymatic products off before use of equipment.

Detergents discussed under ‘use of disinfectants’ section for environmental cleaning – 2-step clean or 2-in-one clean.

Assessment of evidence

Table 8 identifies level of risk for equipment and the recommended decontamination process for each risk category – detergent mentioned for cleaning of non-critical devices prior to disinfection (as necessary).

- Duplication of source (Rutala and Weber)

Glossary

- "Detergent Solution: A detergent product which is intended to be used in the cleaning of surfaces or other medical devices diluted with water as per manufacturer's instructions."

Appendix Table A2.2 lists recommended detergent use for specific items of shared patient equipment:

Bed, bed rail, blood pressure cuff, catheter stand/bracket, commode, drip/IV stand, hoist, mattress, "medical equipment (e.g. IV infusion pumps", "medical gas equipment", oxygen equipment, patient slide/board, wheelchair.

Limitations:

- No references provided for this statement
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.
- Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Assessment of evidence

Main findings:

- “Meticulously clean patient-care items with water and detergent, or with water and enzymatic cleaners before high-level disinfection or sterilization procedures. Category IB.” i) “Remove visible organic residue (e.g., residue of blood and tissue) and inorganic salts with cleaning. Use cleaning agents that are capable of removing visible organic and inorganic residues. Category IB. and ii) Clean medical devices as soon as practical after use (e.g., at the point of use) because soiled materials become dried onto the instruments. Dried or baked materials on the instrument make the removal process more difficult and the disinfection or sterilization process less effective or ineffective. Category IB”
- “Perform either manual cleaning (i.e., using friction) or mechanical cleaning (e.g., with ultrasonic cleaners, washer-disinfector, washer-sterilizers). Category IB”
- “Ensure that the detergents or enzymatic cleaners selected are compatible with the metals and other materials used in medical instruments. Ensure that the rinse step is adequate for removing cleaning residues to levels that will not interfere with subsequent disinfection/sterilization processes. Category II.”

“Cleaning is the removal of visible soil (e.g., organic and inorganic material) from objects and surfaces and normally is accomplished manually or mechanically using water with detergents or enzymatic products. Thorough cleaning is essential before high-level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes.” The important of cleaning equipment is reported for all levels of equipment (critical, semi critical and noncritical).

It is also reported that washer-decontaminations/disinfectors may utilise detergents. But the efficacy of this is not clear.

Some products listed in table 1 are labelled as detergents in this document. This includes: Phenolic germicidal detergent solution (follow product label for use-dilution), odophor germicidal detergent solution (follow product label for use-dilution), Quaternary ammonium germicidal detergent solution (follow product label for use-dilution). However, they are also listed as ‘germicides’.

Assessment of evidence

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 2030 Parts 1, 2 and 3: Washer-Disinfectors. Version 2. October 2001. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Healthcare settings

Scope: This document is aimed to provide guidance to Scottish hospitals, laboratories and healthcare facilities regarding the choice, specification, purchase, installation, validation, periodic testing, operation, and maintenance of washer-disinfectors.

Main findings:

It is stated that the selection of product to be used within the washer-disinfectors (WD)compatibility must be considered including with the process, with the items (e.g., phenolic compounds may cause material changes in rubbers/plastics), with the quality of water, with other chemical additives, and with subsequent decontamination processes.

“When items being decontaminated by a WD are intended to be used again without further treatment (such as a terminal sterilization process) before being re-used, the disinfection process in the WD must produce an item which is microbiologically safe for its intended use.”

“The decontamination process involves two distinct stages: cleaning and microbial inactivation (disinfection). WDs are used to decontaminate items intended for re-use by subjecting the items to an automated process of cleaning and disinfection.”

“Products which are intended to be re-used may be decontaminated, in accordance with the manufacturer’s instructions, by: a. manual cleaning followed by disinfection and/or sterilization; b. machine cleaning followed by disinfection and/or sterilization; c. automated machine decontamination incorporating cleaning and disinfection (or more rarely sterilization).”

Limitations:

- Unclear methodology

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: England

Main findings:

“Local policy should outline where and when detergent and water are enough and where a detergent and disinfectant (or combined cleaning and disinfecting agent) are required.”

“To minimise recontamination of an area and transfer of micro-organisms, clean from: • top to bottom • clean to dirty Dusting technique should not disperse the dust (i.e., use damp cloths/dusting devices). High horizontal surfaces should be cleaned first. Floors should be cleaned last, with adequate signage placed while floors are cleaned and dry to prevent slips, trips and falls on wet floors. Once floors are completely dry, they must be removed as they present a trip hazard.”

Transference – “Micro-organisms can be transferred between surfaces on cleaning cloths and wipes as well as hands. Care should be taken to avoid cross contamination”.

Assessment of evidence
Limitations: • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rathore MH, Jackson MA, Committee on Infectious Diseases et al. Infection prevention and control in pediatric ambulatory settings. Pediatrics. 2017; 140(5):e20172857. Reaffirmed December 2022. doi:10.1542/peds.2017-2857. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Paediatric ambulatory settings

Country: USA

Main findings:

It is reported in Table 6 that intermediate-level disinfection including “germicidal detergents” (phenolic solution or iodophor solution) or disinfectants (sodium hypochlorite 1000ppm or isopropyl and ethyl alcohol) may be considered for use on noncritical instruments or devices including stethoscope and blood pressure cuffs – including those with visible blood contamination.

“soap and water” or low level disinfection is recommended for environmental surfaces which include knobs, handles, carts and tabletops. Use of soap and water is also recommended before sterilisation.

Noncritical equipment is reported to be disinfected and there is no mention of detergent in this section.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Gemmell L, Birks R, Radford P, et al. Association of Anaesthetists of Great Britain and Ireland. Infection Control in Anaesthesia. Anaesthesia. 2008; 63:1027-36. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: United Kingdom

Main findings:

This guidance has a small section related to non-invasive equipment which indicates that detergent should be used once a day or when visibly soiled.

“Local policies should be in place to ensure that all equipment that touches intact skin, or does not ordinarily touch the patient at all, is cleaned with a detergent at the end of the day or whenever visibly contaminated. This includes non-invasive blood pressure

Assessment of evidence

cuffs and tubing, pulse oximeter probes and cables, stethoscopes, electrocardiographic cables, blood warmers etc., and the exterior of anaesthetic machines and monitors. Items such as temperature probes should be for single patient use".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Main findings:

Detergent appears to be a potential part of the 'cleaning' stage which is a part of all of the classifications of equipment as a first or only step.

"Effective disinfection or sterilization requires adequate cleaning. Cleaning should remove all visible gel, soil, and bioburden on all surfaces of the transducer or any ancillary equipment including any indentations or complex surfaces. Potential cleaning agents for the transducer include neutral pH cleaner, approved wipes, soap and running water, and enzyme soaks. Selection of a cleaning process should factor in manufacturer's IFU, cleaning efficacy, cost, time, complexity, safety, and designated location for reprocessing".

Limitations:

- Unclear development process
- This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

It is repeated throughout this document a number of times across sections that manufacturer's instructions should be followed and this includes with regards to the equipment being decontaminated but also with the cleaning products or equipment being used whether it be detergent, disinfectants, mechanical washing and etc.

Assessment of evidence

- Indication that there are a number of products and the type of contamination may impact the best products/method to use - “There is no single cleaning agent that removes all types of bioburden. Bioburden is made up of a variety of matter, which may be soluble or insoluble in water and can be organic or inorganic.”
- Enzymatic (proteolytic) cleaners – “Gross soil should first be removed by rinsing with detergent and water. If blood or exudates have dried or hardened, soaking in a warm solution of an enzymatic cleaner is required. Cleaning agents containing enzymes to break down proteinaceous matter may be used for sensitive equipment if the equipment manufacturer approves their use.” – this suggests enzymatic products may be used following cleaning with detergent.
- Detergents - “Considerations when selecting a detergent. Follow the manufacturer’s recommendation for the type of soiling against which the detergent is effective. Follow the manufacturer’s recommendations for compatibility with the device to be cleaned. Select the appropriate cleaning agent to use with an ultrasound cleaner. Degree of water hardness – choose the appropriate detergent based on the manufacturer’s guidelines. Do not substitute unless approved by the manufacturer”
- “A mild alkaline detergent is preferred for manual cleaning, ultrasonic cleaning, or one of the several types of instrument washers. Mild alkaline detergents (pH range, 8.0 – 10.8) are more efficient cleaning agents for surgical instruments than neutral pH detergents or surfactant-based detergents. It is recommended that facilities work with chemical suppliers to determine the best detergent required as this will be dependent on the facilities’ water quality.”
- Concentration/dilution – “For effective cleaning it is essential that the detergents are prepared at the concentration recommended by the manufacturer/supplier. To achieve the correct concentration, the correct volume of concentrated detergent has to be added to the correct volume of water at the correct temperature.” It is also advised that higher concentration does not always mean a higher effectiveness and products should be used at their optimal concentration.
- “Amount and type of soil present. – Cleaning chemicals can become diluted or ineffective in the presence of soil. Water quality and temperature (see previous section on water quality). – Some cleaning chemicals are designed to be used at specific temperatures – If clean water is not available, the water itself might deposit toxins on medical devices – Water hardness (the presence of excess dissolved minerals) can alter the effectiveness of cleaning chemicals and can cause spotting and leave deposits on medical devices. Availability and use of cleaning chemicals. – If cleaning chemicals are not

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available, cleaning must be accomplished with the use of water and friction alone. – It is important to follow the manufacturer's instructions for use regarding the chemical to water dilution rate as the dilution rate (high or low) has a direct effect on the efficacy of the cleaning process. Staff training. – It is essential that staff performing the cleaning process is adequately trained in the use of all equipment, chemicals and tools, such as brushes – Staff must be familiar with medical devices so as to know which method of cleaning is appropriate and how to adequately clean each specific device (e.g. lumens, disassembly and re-assembly of items)."

- How to clean, immersion – "Immersion method. Fill sink or any other appropriate basin with sufficient warm water for complete immersion of the device. Add the appropriate quantity of detergent following the manufacturer's instructions for dosage. Clean the device under the surface of the water so that aerosols are not produced. Use appropriate brushes to properly clean box locks, lumens and other hard-to-clean areas – Use soft (nylon) bristle brushes so that the surface of the instrument is not damaged – Brushes used to clean lumens must be the same diameter as the instrument to ensure that all internal surfaces can be reached – Brushes must also be long enough to exit the distal end of the instrument. In another sink or basin, completely immerse the device in clean purified water and rinse the device thoroughly. Mechanically dry; if this not available or not recommended by the manufacturer, air-dry or hand-dry using a disposable clean, non-linting cloth"
- How to clean, non-immersion – indications for manual clean (cannot be immersed, special cleaning, pre-cleaning for mechanical cleaning. "clean the device by wiping surfaces thoroughly with a disposable, clean, non-linting cloth and detergent ensuring that moisture does not enter critical areas of the device (e.g. power connections) until all visible soil is removed. Rinse the device by wiping surfaces thoroughly with a damp, disposable, clean, non-linting cloth until all detergent residue is removed. Mechanically dry; if this is not available or not recommended by the manufacturer, air-dry or hand-dry using a disposable clean, non-linting cloth. Disposable cloths should be discarded after each use. Cleaning solution and water should be changed at each cleaning session and when visibly soiled."
- How to clean, rinsing – "Rinsing following cleaning is necessary to remove loosened soil and residual detergent. Rinse all devices thoroughly after cleaning with water to remove residues, which might react with the disinfectant/ sterilant. Perform

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the final rinse of lumens of intravascular/ intrathecal devices with commercially-prepared, sterile, pyrogen-free water or reverse osmosis processed water."

- How to clean, drying – "Drying is an important step that prevents microbial growth and dilution of chemical disinfectants, which may render them ineffective. Devices should be air-dried or dried by hand with a clean, non-linting cloth preferably single use. Dry lumens with compressed medical grade or high-efficiency particulate absorption (HEPA)-filtered air at a pressure specified by the device manufacturer. Use a regulator to control pressure. Dry stainless steel devices immediately after rinsing to prevent spotting."

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations from the European Society of Radiology	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.					

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

Recommendations for general principles:

“the length of the drying time between cleaning and disinfection steps depends on the applied disinfectants/method used and no exact recommendations can be made”.

Recommendations for non-critical ultrasound examinations: “decontamination steps necessary at the start of the examination and after every patient are as follows”

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"Thorough cleaning of transducer: It is essential to remove all gel with soap and running water or detergent wipes prior to application of disinfectants. The use of detergents will aid removal of invisible gel remnants that disinfectants cannot penetrate and which may contain pathogens. Using dry paper to wipe transducers will remove some contamination [45, 46], however, this is not recommended as it is less effective than detergent wipes/soap and may scratch transducer surfaces".

"The transducer should be effectively dried: In order to avoid dilution of subsequently applied disinfection agents it is important to allow the transducer to dry. Application of disinfectants on a wet transducer will make them less effective or completely ineffective".

Limitations:

- Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Healthcare Settings. September 2017. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or “predictive power of the study designs from which that data were obtained” (domains listed are “strength of study design, quality of study, number of studies, consistency of results and directness of evidence”). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

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Main findings:

This document described that HCW should consider point-of-care risk assessment to assist in deciding the level of control measures required. Increasing to cleaning and disinfection of care equipment (from cleaning only) is reported as necessary to consider where transmission risks are higher.

Specific care equipment recommended included for routine practices (contact):

“Reusable non-critical equipment that has been in direct contact with a patient or in that patient’s environment should be reprocessed with cleaning and low-level disinfection before use in the care of another patient. [AII]” (direct evidence from multiple moderate study design of high quality with consistent results or extrapolation from multiple strong design studies of high quality, with consistent results)

“Items such as toys and electronic games that have been in direct contact with a patient or in that patient’s environment should be reprocessed with cleaning and low-level disinfection before use by another patient. [AII]” (direct evidence from multiple moderate study design of high quality with consistent results or extrapolation from multiple strong design studies of high quality, with consistent results)

“Bedpans and commodes should be provided for single patient use and labelled appropriately. Bedpans and commodes should be reprocessed with cleaning and low-level disinfection before use by another patient. The use of single-patient-use disposable bedpans is acceptable. [CII]” (CII = studies of low quality, contradictory results, or expert opinion)

“Manufacturer’s written instructions should be followed when using products for cleaning and disinfecting.”

Non-patient care recommendations for ‘additional precautions’ (listed pathogens or scenarios in list 3) included:

“All equipment/supplies should be identified and stored in a manner that prevents use by or for other patients. [CII]” (CII = studies of low quality, contradictory results, or expert opinion)

“Non-critical patient-care equipment (e.g., thermometers, blood pressure cuff, pulse oximeter) should be dedicated to the use of one patient and cleaned and disinfected as per Routine Practices before reuse with another patient or a single-use device should

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be used and discarded in garbage after use. [BII]" (direct evidence from any combination of strong or moderate design evidence of high/medium quality with clear trend or extrapolation from multiple strong design studies of medium or moderate design if high/medium quality with consistency or one strong design study with support from multiple weak design studies of high/medium quality with consistency of results).

The following modification were presented for ambulance care services:

"Equipment and surfaces in direct contact with the patient or infective material (e.g., respiratory secretions, stool, or skin exudates) should be cleaned and disinfected before the room is used for another patient. Contaminated reusable non-critical patient care equipment should be cleaned and disinfected before use with another patient".

Recommendations related to care of patients on 'droplet' and 'airborne' precautions:

"As per routine practices unless contact precautions are also in use, then as per contact precautions".

Please note that where cleaning is referred to this includes physical removal of contamination and soiling with water and detergent per the definition provided in the glossary of this document: "Cleaning − The physical removal of foreign material (e.g., dust, soil, organic material such as blood, secretions, excretions, and microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished using water and detergents in conjunction with mechanical action."

'Appendix VII: Terminal Cleaning'

- "Bedside tables, bedrails, commodes, mattress covers and all horizontal surfaces in the room should be cleaned with a detergent/disinfectant."

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Tacconelli E, Cataldo MA, Dancer SJ et al. ESCMID guidelines for the management of the infection control measures to reduce transmission of multidrug-resistant Gram-negative bacteria in hospitalized patients. Clin Microbiol Infect. 2014;20 Suppl 1:1-55.	Guidelines	AGREE II: Recommend with modifications	N/A	N/A	N/A
Assessment of evidence					
Country: Europe **Setting:** Healthcare settings					

Assessment of evidence

Methods: An ESCMID produced guidance focusing on preventing and controlling multidrug-resistant gram-negative bacteria (MDR-GNB). The methodology includes a systematic search of relevant literature on MDROs and expert opinion consensus on the recommendations.

"We performed a systematic review of the articles published on this topic to determine the effects of different IPC interventions aimed at minimizing the spread of MDR-GNB and to define the indications for application of IPC measures for specific types of resistant strains in adult hospitalized patients. Our guidelines have been drawn up so as to be useful for a wide range of healthcare professionals, namely specialist physicians and other healthcare workers (infectious diseases, microbiology, surgery, intensive care), public health officers, infection control professionals, administrative personnel in hospitals, and epidemiologists".

The level of evidence for and strength of each recommendation, were defined according to the GRADE approach.

Main findings:

Moderate and conditional recommendations:

"Implement regular EC procedures, which include detergents or disinfectants, depending on local practice in order to reduce the transmission rate. Ensure cleaning of patient care equipment and the environment."

'Basic recommendation' for 'endemic situations' for the following pathogens:

- "ESBL-producing Enterobacteriaceae",
- "MDR-Klebsiella pneumoniae",
- "MDR-Pseudomonas aeruginosa",
- "MDR-Acinetobacter baumannii".

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Limitations:

- The experience or expertise of the stakeholders involved in consultation is unclear and there is no indication of patient or public representation. There was some lack of clarity on how the guidance may be used by a target audience. Unclear and limited review of the guideline by external stakeholders.
- Studies which applied a bundled approach were included in this guidance, the authors discussed that if a bundle was considered effective then they placed equal weighing to each aspect of the bundle. This may over/under-inflate some results.
- No procedure for updating the guideline and no updates since 2014.
- Unclear benefits/harms or tools on implementation of the guidance.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Hart KM, Stapleton F, Carnet N et al. Optometry Australia's infection control guidelines 2020. Clinical and Experimental Optometry. 2021	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Apr 3;104(3):267-84. https://doi.org/10.1080/08164622.2021.1887704.					

Assessment of evidence

Settings: Healthcare settings

Country: Australia

Scope: This guidance document provides “current infection control best practice, whilst recognising the practicalities of working in an optometry clinic.” Recommendations cover standard precautions for routine practice and transmission-based precautions based on patient risk targeted at “optometrists and practice staff”.

Main findings:

Level of decontamination required based on the Spaulding classifications. Recommendations for decontamination before and after use of specific non-critical devices is found in Appendix A2 (refer for further details):

- Recommended products for non-contact Fundus lenses include “mild pH neutral detergent” and “multi-purpose solution”.
    - Afterwards “rinse with sterile water/saline” and “Dry with lint-free cloth or air dry in clean area”.
- Follow manufacturer instructions for decontamination of specified non-critical devices.

Limitations:

- Literature review methodology is very brief – does not report search terms, strategy, sources, date range, inclusion and exclusion criteria, selection of evidence, grey literature searches, supplementary searching.

Assessment of evidence

- Does not report how or if expert opinion informed guidelines – 'best practice' recommendations.
- Some recommended decontamination products are based on registration by the 'Therapeutic Goods Administration' – an Australian government authority – thus may not be transferable to Scottish health and care settings.
- Most relevant content (Appendix A2) references 1995 guidelines which may not reflect current IPC practices.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

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Settings: Healthcare settings

Country: UK

Assessment of evidence

Main findings:

For high, intermediate, and low risk equipment cleaning is listed as required as an initial step in the decontamination process. This is defined as requiring “water and detergent to remove visible contamination”.

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Question 7: When and how should disinfectant be used to decontaminate non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
The Association for Professionals in Infection Control and Epidemiology (APIC). Strategies to mitigate cross contamination of non-critical medical devices. 2021. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** USA **Scope:** "This issue brief addresses high-level themes regarding contamination of multiple-use, non-critical medical items frequently used across patient care settings. The goal is to shed light on best practices for minimizing infection risk from these					

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types of items. The brief covers non-invasive, non-critical medical devices such as blood pressure cuffs, oxygen saturation monitors, and stethoscopes, as well as therapy toys and other multiple-use items that come in contact with intact skin, such as medical tape".

Main findings:

This document does not list specific recommendations. It appears to provide details of good practice with references.

Citing the CDC this document highlights the importance of 'low-level disinfection' using EPA-registered hospital products of non-critical care equipment that touches intact skin such as blood pressure cuffs and stethoscopes (both listed). Disinfection was recommended at minimum when the item is visibly soiled and on a routine basis such as between patients, once a day or weekly. It is indicated that manufacturer's instructions should be utilised for the 'correct' use of a disinfectant.

Limitations:

- No methodology provided to explain the included references and no indication of how consensus was reached for expert opinion.
- This document was conducted in partnership with 3m which is a private company. It is not clear what bias this may introduce, if any.
- The citations provide are primarily from the CDC suggesting overlap with those guidance documents which were also considered for inclusion in this review – possible publication bias.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Academy of Ophthalmology (AAO). Information statement. Infection prevention in eye care services and operating areas. August 2012. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

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Country: USA

Setting: Eye care settings

Methods: This guidance was based on guidance from other organisations and regulations in the USA. The recommendations related to 'instruments' are not considered as these would be considered as invasive where involved in surgical procedures.

Main findings:

There are a number of standard precautions within this document relevant to this review which are listed below:

Toys/equipment:

- "Clean and disinfect large stationary toys (e.g., climbing equipment) at least weekly and whenever visibly soiled"

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- “If toys are likely to be mouthed, rinse with water after disinfection; alternatively, wash in a dishwasher”
- “When a toy requires cleaning and disinfection, do so immediately or store in a designated, labeled container separate from toys that are clean and ready for use”
- “Clean and disinfect all equipment used during patient care and prior to use on another patient”
- “Use an EPA-approved cleaner/disinfectant on equipment”.

Not specific to equipment but relevant:

- “Establish policies and procedures for routine and targeted cleaning of environmental surfaces as indicated by the level of patient contact and degree of soiling.”
- “Use EPA-registered disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment. Use in accordance with manufacturer's instructions.”
- “Review the efficacy of in-use disinfectants when evidence of continuing transmission of an infectious agent (e.g., rotavirus, C. difficile, norovirus) may indicate resistance to the in-use product and change to a more effective disinfectant as indicated”
- “If cleaner/disinfectant requires dilution, dilute according to manufacturer’s instructions. Too much cleaner/disinfectant will cause dirt and organisms to adhere to the surface. Using too little cleaner/disinfectant will affect efficacy. “If an item has been used but does not have visible contamination, wipe with a cleaner/disinfectant using friction and let air dry for at least 30-60 seconds”

Section related to decontamination of instruments (likely invasive so limited applicability):

- “Follow manufacturer’s cleaning, disinfection, and sterilization instructions. If instructions are lacking, contact the manufacturer for written instructions. If instructions do not meet established standards, follow the best practice as recommended by AAMI and other infection prevention organizations.” – Manufacturer’s instructions for disinfectant products per EPA were recommended to be followed.

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"High-level disinfection kills all organisms and is performed using a germicide which is regulated by the FDA. The CDC recommends that if there are questions about high-level disinfectants or how to disinfect a particular medical device, the office should contact the manufacturer of the product."

Limitations:

- Unclear development process.
- There is a risk of publication bias as this document is based on other guidance from organisations which have also been considered for this review including CDC, AORN, APIC.
- May have limited applicability as guidance is developed for USA eye care services.
- FDA- and EPA-approved products may not overlap with product regulations in the UK/EU.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Institute of Ultrasound in Medicine (AIUM). Guidelines for cleaning and preparing external- and internal-use ultrasound transducers and equipment between patients as well as	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
safe handling and use of ultrasound coupling gel. Journal of ultrasound in Medicine, 42(7), E13–E22.					

Assessment of evidence

Country: United States of America (USA)

Setting: Acute healthcare settings

Scope: "The purpose of the first section of this document is to provide guidance regarding the cleaning and preparation of ultrasound transducers".

Main findings:

There is one recommendation added which was specific to the COVID-19 pandemic which may no longer apply: "special attention needs to be paid to COVID-19 and other respiratory infection cases requiring aerosolization procedures (eg, mechanical ventilation, aerosolization application, etc). In such cases, a transducer cover should be used, and the entire equipment requires full LLD (top to bottom) as pathogens are likely to become airborne."

Non-COVID specific guidelines for disinfection (low level disinfection = LLD) were as follows:

As standard for external ultrasound transducer – "Cleaning of all transducers—Disconnect the trans-ducer from the ultrasound scanner as appropriate. After removal of the transducer cover (when appli-cable), remove bulk gel or debris from the trans-ducer. Consider the use of a small brush, especially for crevices and areas of angulation, depending on the design of the particular

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trans-ducer. Use a damp gauze pad or other soft cloth and a small amount of mild nonabrasive liquid soap, eg, household dishwashing liquid, or use a wipe to remove any remaining gel (film)" – the flow chart provided is a tool to determine the required level of decontamination (figure 1) low level disinfection recommended for external transducers.

- "Disinfection of all transducers in external procedures, as well as interventional percutaneous procedures, should undergo LLD. If contamination of covered transcutaneous transducers with blood or other bodily fluids occurs, it can be eliminated with low-level disinfectants that are effective against mycobacteria and bloodborne pathogens (including hepatitis B virus, hepatitis C virus, and HIV). Human hands are always cleaned with LLD and covered with gloves"
- "Rinsing—Depending on the employed disinfection agent, the transducer should be thoroughly rinsed and dried after disinfection, following manufacturer guidelines".

The authors report the important of following transducer manufacturers guidelines and in particular with submersion of equipment as some may be partially, fully or not at all suitable for submersion in disinfectant.

Limitations:

- Unclear development process.
- May have limited applicability as guidance applied to ultrasound equipment used in USA only.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40.	Guidance	Level 4	N/A	N/A	N/A

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Country: Australasia

Setting: Acute healthcare settings

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Main findings:

The authors report that sterilisation of transducers would, be considered as impractical in most instances and therefore a high-level disinfection may be use in its place where appropriate. Transducers are reported to be heat -sensitive and therefore low heat methods are recommended. It is also stated that “All transducers must be cleaned according to the manufacturer’s instructions.”

“Ultrasound transducers that come into contact with intact skin are considered non-critical medical devices and as such are reprocessed by cleaning and may be followed by low-level disinfection (LLD) method as described in Section 7.1 ‘Low-level disinfection’” and “3.2 Semi-critical medical devices Ultrasound transducers that come into contact with non-intact skin and / or mucous membranes and transducers that have had likely contact with blood / body fluids are considered as semi-critical medical devices due to the high risk of potential contamination. These transducers are reprocessed by cleaning followed by a high-level disinfection (HLD) method as described in Section 7.2 ‘High-level disinfection’.”

Low level disinfection – (7.1)“Manually remove all ultrasound gel prior to cleaning. (a) Clean transducer using a TGA-approved disposable cleaning wipe or system intended for use on medical devices. or (b) Clean transducer using freshly made-up solution of cleaning agent at the correct concentration. Rinse thoroughly under running water to remove cleaning agent residues. Dry using a single-use low linting cloth”

High level disinfection – (7.2) “(a) Liquid high-level instrument grade chemical disinfectants or (b) Automated high-level disinfection systems, for example chemical or light-based or (c) High-level instrument grade disinfectant wipes”

“Rinsing / neutralisation is an important step to remove any disinfectant residue or by-product post high-level disinfection. All transducers must be rinsed with clean water post-HLD to maintain the microbiological quality of the reprocessed transducer (AS/NZS4187:2014). Transducers should be dried using a single-use low linting cloth”.

“Immediately following HLD and rinsing, transducers should be dried using a sterile single-use low linting cloth prior to insertion into the sterile sheath / sleeve or transducer cover”.

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"Any equipment that has been in contact with the patient or operator should be cleaned with a detergent / disinfectant wipe or solution between use, for example the leads to the transducer, the keyboard or the bed". "Ensure that all cleaning agents used for the general environment have been approved by the equipment manufacturer"

Appendix has a table with types of transducers in different settings, and associated recommendation for disinfection level.

Flow chart 1 in appendix indicates level of disinfection required related to risk level of ultrasound and brief process of disinfection.

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra:	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Commonwealth of Australia. 2019. Last accessed 16/06/2025.					

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Main findings:

Specific recommendations:

- “Good practice statement Updated 10. It is good practice for shared clinical equipment to be cleaned with a detergent solution between patient uses, and disinfected where indicated. Exceptions to this should be justified by risk assessment.”
- “Good practice statement Updated 11. It is good practice that surface barriers are used to protect clinical surfaces (including equipment) that are: touched frequently with gloved hands during the delivery of patient care likely to become contaminated with blood or body substances difficult to clean. Exceptions to this should be justified by risk assessment. Equipment should be appropriately cleaned between patients or uses, regardless of whether a surface barrier has been used.”

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- "Good practice statement New 13. It is good practice to use a chlorine-based product such as sodium hypochlorite or a Therapeutic Goods Administration-listed hospital-grade disinfectant with specific claims in addition to standard cleaning practices to effectively manage norovirus specific outbreaks." It is unclear if this applies to equipment or just the environment.
- "Conditional recommendation New 14. It is suggested that sodium hypochlorite disinfection be used as an adjunct to standard cleaning in healthcare facilities. The use of sodium hypochlorite disinfection in addition to a detergent solution is suggested for terminal cleans of rooms of patients known or suspected to have C. difficile associated disease or multi-drug resistant organisms. The use of sodium hypochlorite disinfection in addition to detergent solution is suggested to terminate outbreaks of C. difficile." – unclear if this applies to equipment or the environment. Other methods included in the 'emerging methods section are not included in this entry due to their overlap with existing ARHAI Scotland reviews.
- Contact precautions conditional recommendations – "It is suggested that patient-dedicated equipment or single-use patient-care equipment be used for patients on contact precautions. If common use of equipment for multiple patients is unavoidable, clean the equipment and allow it to dry before use on another patient."
- MDRO recommendations – "Conditional recommendation Updated. It is suggested that contact precautions be considered for all patients colonised or infected with a multi-resistant organism (MRO) where there is anticipated patient and/or environmental contact, including: • performing hand hygiene and putting on gloves and gowns before entering the patient-care area • using patient-dedicated or single-use non-critical patient-care equipment • using a single-patient room or, if unavailable, cohorting patients with the same strain of MRO in designated patient-care areas (upon approval from the healthcare facility's Infection Control Team) • ensuring consistent cleaning and disinfection of surfaces in close proximity to the patient and those likely to be touched by the patient and healthcare workers."

Notes provided in the summaries:

- "All reusable medical devices and patient-care equipment used in the clinical environment must be reprocessed according to their intended use and manufacturer's advice."

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- "Where indicted, disinfection may also be required following routine cleaning. It is best practice to refer to the manufacturer instructions and product safety data sheet prior to using disinfectants. Choosing a disinfectant that is compatible with the surface material is integral in order to avoid damage to the equipment."
- Disassembled before cleaning and disinfection.
- Products discussed under 'use of disinfectants' section for environmental cleaning – 2-step clean or 2-in-one clean – covers detergent and disinfectants as distinct or combined products.
- 'Hard surface disinfectants'

Limitations:

- No references provided for this statement
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.
- Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Centers for Disease Control and Prevention (CDC). Core infection prevention and control practices for safe healthcare delivery in all settings. 2022. Updated April 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

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Country: USA

Setting: Health and care settings

Methods: CDC healthcare infection control guidelines were reviewed, and recommendations included in more than one guideline were grouped into core infection prevention practice domains (e.g., education and training of HCP on infection prevention, injection and medication safety). Additional CDC materials aimed at providing general infection prevention guidance outside of the acute care setting were also reviewed. HICPAC formed a workgroup led by HICPAC members and including representatives

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of professional organizations (see Contributors in archives for full list). The workgroup reviewed and discussed all of the practices, further refined the selection and description of the core practices and presented drafts to HICPAC at public meeting and recommendations were approved by the full Committee in July 2014. In October 2022, the Core Practices were reviewed and updated by subject matter experts within the Division of Healthcare Quality Promotion at CDC.

Main findings:

This guideline does not state which items should be disinfected/sterilised and does not mention detergent but does report cleaning is required before reprocessing which may include detergent, but this is unclear.

Relevant core practices included in the list are as follows:

5. standard precautions. 5f. “5f. Reprocessing of reusable medical equipment between each patient or when soiled”.

5f. 1. Clean and reprocess (disinfect or sterilize) reusable medical equipment (e.g., blood glucose meters and other point-of-care devices, blood pressure cuffs, oximeter probes, surgical instruments, endoscopes) prior to use on another patient or when soiled”.

1a. “Consult and adhere to manufacturers’ instructions for reprocessing”.

The following detail is also provided in the table: “Manufacturer’s instructions for reprocessing reusable medical equipment should be readily available and used to establish clear operating procedures and training content for the facility. Instructions should be posted at the site where equipment reprocessing is performed”.

Limitations:

- Unclear development process.
- The nature of updates and when they are made is unclear

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care. 31 March 2022. Updated 01 March 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

This guidance states that based on the anticipated risk and intended use of the equipment a risk category of low, medium or high should be considered for reusable care equipment.

- "The choice of decontamination process for reusable care equipment depends on the assessment of risk. Risks fall broadly into 3 categories: high, medium and low."

Assessment of evidence

- "Reusable care equipment must be decontaminated after each use. It must be clear who is responsible for decontaminating the equipment, the frequency, and method of decontamination which conforms with the manufacturer's instructions."
- It is stated that "extra" precautions can be used to prevent transmission, contact, droplet and airborne. These are to be used to support additional precautions. These sections are short, equipment is mentioned only under contact precautions but no recommendations are provided.

According to Table 4 reusable equipment which is considered a low risk require to be cleaned and disinfection should be conducted if there is an "increased infection risk suspected", no examples of this type of equipment are provided. Medium level of risk should be cleaned and then disinfected or sterilised if being used for more than one 'client' examples of equipment of this category include bedpans, commodes, thermometers, respiratory equipment. Where equipment is labelled as 'high' risk the following is stated "Follow manufacturer's instructions. This may include chemical disinfectant methods or sterilisation through an authorised sterilisation centre" with the example of wound dressing provided in the table.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Main findings:

Disinfection is recommended for low-risk equipment (in contact with healthy skin or no contact e.g., wheelchairs) “in outbreak situations on advice of the infection control team”.

Disinfection or sterilisation is also recommended for intermediate risk equipment (in contact with mucous membrane e.g., bedpan, endoscope) between each patient.

Disinfection is described as using chemicals or heat to reduce the number of viable organisms. Though it may not inactivated all viruses or bacterial spores.

Assessment of evidence

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.
- In situ items such as the toilet are listed as equipment however, this would be considered part of the environment as part of the current review – limited applicability of low-risk examples.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Sehulster L and Chinn RYW. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC).	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
MMWR. 2003; 52(10):1-42. Updated July 2019. Last accessed 16/06/2025.					

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: This document main aim is “to develop an environmental infection-control guideline that reviews and reaffirms strategies for the prevention of environmentally-mediated infections, particularly among health-care workers and immunocompromised patients.” The methods utilised are unclear and therefore they are considered as expert opinion. The recommendations are graded per CDC grading and those recommendations related to equipment are included in the environment services section. A literature search of Medline is reported but unclear how this informed recommendations.

Main findings:

- “Select EPA-registered disinfectants, if available, and use them in accordance with the manufacturer's instructions. Category IC (EPA: 7 United States Code [USC] § 136 et seq.)”
- “Do not use high-level disinfectants/liquid chemical sterilants for disinfection of either noncritical instruments and devices or any environmental surfaces; such use is counter to label instructions for these toxic chemicals. Category IC (Food and Drug Administration [FDA]: 21 CFR 801.5, 807.87.e)”
- “Follow manufacturers' instructions for cleaning and maintaining noncritical medical equipment. Category II

Assessment of evidence

“In the absence of a manufacturer's cleaning instructions, follow certain procedures.

1. Clean noncritical medical equipment surfaces with a detergent/disinfectant. This may be followed by an application of an EPA-registered hospital disinfectant with or without a tuberculocidal claim (depending on the nature of the surface and the degree of contamination), in accordance with germicide label instructions. Category II
2. Do not use alcohol to disinfect large environmental surfaces. Category II
3. Use barrier protective coverings as appropriate for noncritical surfaces that are 1) touched frequently with gloved hands during the delivery of patient care; 2) likely to become contaminated with blood or body substances; or 3) difficult to clean (e.g., computer keyboards). Category II”

“Follow proper procedures for effective uses of mops, cloths, and solutions. Category II

1. Prepare cleaning solutions daily or as needed, and replace with fresh solution frequently according to facility policies and procedures. Category II
3. Clean mops and cloths after use and allow to dry before reuse; or use single-use, disposable mop heads and cloths. Category II”

“1. Do not use phenolics or any other chemical germicide to disinfect bassinets or incubators during an infant's stay. Category IB

2. Rinse disinfectant-treated surfaces, especially those treated with phenolics, with water. Category IB”

“When using phenolic disinfectants in neonatal units, prepare solutions to correct concentrations in accordance with manufacturers' instructions, or use premixed formulations. Category IB, IC (EPA: 7 USC § 136 et seq.)”

Section for “special pathogens” –

“Use standard cleaning and disinfection protocols to control environmental contamination with antibiotic-resistant, gram-positive cocci (e.g., methicillin-resistant *Staphylococcus aureus*, vancomycin intermediate sensitive *Staphylococcus aureus*, or vancomycin-resistant *Enterococcus* [VRE]). Category IB

Assessment of evidence

1. Pay close attention to cleaning and disinfection of high-touch surfaces in patient-care areas (e.g., bed rails, carts, charts, bedside commodes, bed rails, doorknobs, or faucet handles). Category IB
2. Ensure compliance by housekeeping staff with cleaning and disinfection procedures. Category IB
3. Use EPA-registered chemical germicides appropriate for the surface to be disinfected (e.g., either low- or intermediate-level disinfection) as specified by the manufacturer's instructions. Category IB, IC (EPA: 7 USC § 136 et seq.)
4. When contact precautions are indicated for patient care, use disposable patient-care items (e.g., blood pressure cuffs) wherever possible to minimize cross-contamination with multiple-resistant microorganisms. Category IB
5. Follow these same surface-cleaning and disinfecting measures for managing the environment of VRSA patients. Category II”

- “Thoroughly clean and disinfect environmental and medical equipment surfaces on a regular basis by using EPA-registered disinfectants in accordance with manufacturers' instructions. Category IB, IC (EPA: 7 USC § 136 et seq.)”
- “No recommendation is offered regarding the use of specific EPA-registered hospital disinfectants with respect to environmental control of *C. difficile*. Unresolved issue”
- “Apply standard cleaning and disinfection procedures to control environmental contamination with respiratory and enteric viruses in pediatric-care units and care areas for immunocompromised patients. Category IC (EPA: 7 USC § 136 et seq.)”
- “Clean surfaces that have been contaminated with body substances; perform low- to intermediate-level disinfection on cleaned surfaces with an EPA-registered disinfectant in accordance with the manufacturer's instructions (*271,293,335*). Category IC (OSHA: 29 CFR 1910.1030 § d.4.ii.A; EPA: 7 USC § 136 et seq.)”

Mattresses and pillows:

A. Keep mattresses dry; discard them if they become and remain wet or stained, particularly in burn units. Category IB

B. Clean and disinfect mattress covers using EPA-registered disinfectants, if available, that are compatible with the cover materials to prevent the development of tears, cracks, or holes in the cover. Category IB

C. Maintain the integrity of mattress and pillow covers. Category II”

Assessment of evidence

"Replace mattress and pillow covers if they become torn or otherwise in need of repair. Category II"

"D. Clean and disinfect moisture-resistant mattress covers between patients using an EPA-registered product, if available. Category IB"

Beds:

"G.VIII. Air-Fluidized Beds A. Follow manufacturers' instructions for bed maintenance and decontamination. Category II". "C. Clean and disinfect the polyester filter sheet thoroughly, especially between patients, using an EPA-registered product, if available. Category IB".

Category meanings:

IB – "Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretical rationale."

IC – "Required by state or federal regulation, or representing an established association standard."

II "Suggested for implementation and supported by suggestive clinical or epidemiologic studies, or a theoretical rationale".

Limitations:

- Poor reporting of methodology – search terms or strategy, critical appraisal, selection of evidence, expert opinion consensus process etc.
- Relevant content on equipment classification cites CDC resource from 1991 – may not align with current evidence base and/or expert opinion consensus.
- Risk of publication bias – MEDLINE searched for published studies and no reporting of grey literature search methodology aside from 'reviewing' or 'revising' other CDC guidelines.
- Unclear which recommendations are informed by updates to guidelines.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American College of Emergency Physicians (ACEP). Guideline for ultrasound transducer cleaning and disinfection. June 2018. Updated 2021. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: This guidance provides recommendations for “the use of use of ultrasound gels, protective covers, probe cleaning and disinfection”. Users are signposted to professional resources for ultrasound programme management for further guidance outside the provided content. No methodology is provided or linked to within the document. An addendum has been added to these guidelines following the COVID-19 pandemic.

Assessment of evidence

Main findings:

For decontamination products, signposts to manufacturer instructions, legislation, and regulations as well as expert opinion from relevant US organisations (CDC, OSHA, EPA, FDA).

Low-level disinfectants should be used for non-critical ultrasound transducers ("external use linear, curvilinear and phased array").

Low-level disinfectants include "ethyl or isopropyl alcohol" and "quaternary ammonium agents without mycobacterial labelling".

"External transducers that become contaminated by blood or bodily fluid should undergo low-level disinfection with an agent that has activity against bloodborne pathogens (hepatitis B virus, hepatitis C virus, and HIV) and tubercle bacilli".

"Recommendations a. Transducers used on clean, intact skin (commonly external linear, curvilinear and phased array) are considered noncritical devices and require low-level disinfection after each use"

COVID-19 addendum:

"When scanning patients who are at low-risk for COVID-19 or are not in droplet precautions, we recommend disinfecting the probe and surfaces that were touched during the examination (screen, keyboard, cable, etc.)". Remove gel/debris then use EPA-registered products.

"In situations when aerosolization or high-risk procedures can occur, probes and machines should be covered (if possible) and disinfected with low-level disinfection (LLD) after every use."

'Handheld devices' (touchscreen and probe) should be cleaned with low-level disinfectant after each use.

"consider common disinfectants for cleaning if there are no alternatives to commercial healthcare products. Examples would include soap and water, diluted bleach, and ammonium chloride derivatives. This should be discussed with the vendor to prevent inadvertent destruction of machine elements."

Assessment of evidence

Limitations:

- No methodology provided – not reported how references were obtained.
- Some recommended decontamination products are based on registration by the 'Environmental Protection Agency' – a US government authority – thus may not be transferable to Scottish health and care settings.
- Appendix on process of decontamination is in relation to disinfectant wipes – not included in this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Hart KM, Stapleton F, Carnet N et al. Optometry Australia's infection control guidelines 2020. Clinical and Experimental Optometry. 2021 Apr 3;104(3):267-84. https://doi.org/10.1080/08164622.2021.1887704.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Australia

Scope: This guidance document provides “current infection control best practice, whilst recognising the practicalities of working in an optometry clinic.” Recommendations cover standard precautions for routine practice and transmission-based precautions based on patient risk targeted at “optometrists and practice staff”.

Main findings:

Relevant content includes types of decontamination methods citing the NHMRC, Spaulding and 1995 optometry guidelines. Recommendations for decontamination before and after use of specific non-critical devices is found in Appendix A2 (refer for further details):

- Non-critical devices should be low- or intermediate-level disinfected.
- Recommended products vary by device listed and include 70% isopropyl alcohol, “multi-purpose solution”, “appropriate surface disinfectant”, “hospital-grade disinfectant”, or simply ‘disinfectant’.
- Follow manufacturer instructions for decontamination of specified non-critical devices.
- Application of 70% isopropyl alcohol may be by swabs or wipes, depending on device.
- Specific recommendations for rinsing and drying are provided. Drying methods include air drying or using ‘lint-free’ cloths.
- For non-contact Fundus lenses, if infection of patient is suspected, then disinfection as per gonioscopy lenses (semi-critical, high-level disinfection).

Despite several limitations (see below), these guidelines are one of few evidence sources for decontamination in optometry settings and are highly detailed in regard to recommended decontamination products and process for non-critical optometry devices.

Assessment of evidence

Limitations:

- Literature review methodology is very brief – does not report search terms, strategy, sources, date range, inclusion and exclusion criteria, selection of evidence, grey literature searches, supplementary searching.
- Does not report how or if expert opinion informed guidelines – 'best practice' recommendations.
- Some recommended decontamination products are based on registration by the 'Therapeutic Goods Administration' – an Australian government authority – thus may not be transferable to Scottish health and care settings.
- Most relevant content (Appendix A2) references 1995 guidelines which may not reflect current IPC practices.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 2030 Parts 1, 2 and 3: Washer-Disinfectors. Version 2. October 2001.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Country: Scotland

Settings: Healthcare settings

Scope: This document is aimed to provide guidance to Scottish hospitals, laboratories and healthcare facilities regarding the choice, specification, purchase, installation, validation, periodic testing, operation and maintenance of washer-disinfectors.

Main findings:

“In choosing the various chemical additives which may be required for effective cleaning and disinfection, it is important to ensure that the formulation of each chemical additive is compatible with: a. the materials of construction of the WD; b. the process being operated in the WD; c. the quality of water available; d. the items to be processed and their intended use; e. any other additives to be used in the WD process; f. any intended subsequent decontamination process (e.g., sterilization). It is also important that the required concentration can be accurately and reproducibly generated by the dosing system(s) on the WD.”

Detergents – “mild alkaline detergents in the pH range 8.0–11.0 are preferred”. Alkalinity is claimed to improve the efficacy of detergents by enhancing their cleaning capabilities (neutralising and helping remove acid, soils, oils, fats, peptidising proteins) and synergy with other detergent compounds, inhibiting growth of micro-organisms. It is claimed that many surfactants perform better in the presence of alkaline builders such as sodium tripolyphosphate. It is stated that “Acid-based detergents should only be used for stainless steel surfaces and then only for limited applications, e.g. for de-scaling instruments that have been processed in hard water”.

“Cleaning agents for use in WDs should be: a. liquid – to facilitate accurate dispensing; b. non-abrasive; c. low foaming; d. free rinsing; e. biodegradable. Cleaning agents should not contain: a. artificial colouring agents; b. optical brighteners; c. perfumes; d. halides at an in-use concentration greater than 120mg/l; e. fatty soaps, glycerine or lanolin.”

Assessment of evidence

Enzymic cleaners – “are themselves proteins (often derived from the bacteria B subtilis and B stearothermophilus) and may be sensitising or allergenic agents. A similar adverse reaction is allegedly produced in some people by domestic biological washing powders.” “Formulations will often include buffering agents to maintain the pH within the preferred range. Most enzymes have an optimum pH at which their activity is greatest and a pH at which the enzyme itself is most resistant to thermal degradation, although these two values are not necessarily the same”. “Enzymes are not themselves cleansing agents. A properly balanced detergent may still be needed to remove the simpler molecular forms resulting from the enzymic action”. Temperature is important for this type of cleaner according to this document. “It is important to ensure that any detergents used are compatible with the enzymes – quaternary ammonium compounds (QACs) deactivate many of these enzymes (the deactivation of enzymes in the bacterial cell is one of the proposed mechanisms of action for the microbicidal action of QACs). Enzymic formulations for cleaning solid surfaces are available in two forms: a. a pre-soak formulation which is used to digest proteinaceous soil and is then followed by normal washing process using detergent; b. a combined enzyme and detergent formulation.”

Disinfection – thermal (in excess of 65-95°C). “the lower the temperature the longer the exposure time in order to obtain the same reduction in microbial population. The thermal disinfection process is reliable, reproducible, free from toxic residues and capable of easy and economical physical monitoring and recording”.

“Chemical disinfection should only be used for products which cannot be treated using thermal disinfection methods.”

“In order to choose a disinfectant for a particular application it is necessary to know the microbicidal activity required – both the number and types of organisms that may be encountered and the assurance that may be required that they have been inactivated. The technical information from the manufacturer of disinfectants should provide the required information about the activity of the product.”

“A solution containing 2% glutaraldehyde is the most commonly used disinfectant. Other aldehydes, quaternary ammonium compounds, hydrogen peroxide, peracetic acid, chlorine dioxide and alcohol solutions have also been recommended by various workers and may have particular benefits in certain applications.”

Assessment of evidence

“a. a freshly activated solution containing 2% glutaraldehyde at room temperature for 30 minutes for dealing with contamination with HIV or HBV; b. a 2% solution of glutaraldehyde for 60 minutes if mycobacterial contamination is suspected.”

“The disinfectant should not cause damage to either load items or the WD in which it is used. Damage which may occur with incompatible disinfectants includes corrosion, embrittlement or swelling of plastics, degradation of lens cement in optical systems etc. The potential for electrolytic attack to occur as a result of different metals in the load and the WD coming into contact, via a powerful electrolyte, should not be overlooked”.

“When items being decontaminated by a WD are intended to be used again without further treatment (such as a terminal sterilization process) before being re-used, the disinfection process in the WD must produce an item which is microbiologically safe for its intended use.”

“The decontamination process involves two distinct stages: cleaning and microbial inactivation (disinfection). WDs are used to decontaminate items intended for re-use by subjecting the items to an automated process of cleaning and disinfection.”

“Products which are intended to be re-used may be decontaminated, in accordance with the manufacturer’s instructions, by: a. manual cleaning followed by disinfection and/or sterilization; b. machine cleaning followed by disinfection and/or sterilization; c. automated machine decontamination incorporating cleaning and disinfection (or more rarely sterilization).”

“Chemical disinfection should only be used for products which cannot be treated using thermal disinfection methods.”

“The disinfectant should not cause damage to either load items or the WD in which it is used”

Limitations:

- Unclear methodology

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Siegel JD, Rhinehart E, Jackson M et al. Management of multidrug-resistant organisms in health care settings, 2006. Updated February 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: This document is aimed to provide guidance regarding the management (including IPC) of multi-drug resistant organisms (MDRO) including MRSA, VRE and other gram-negative bacilli.

Main findings:

Non-specific environmental recommendations – “V.A.6.a. Clean and disinfect surfaces and equipment that may be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for minimal touch surfaces (e.g., horizontal surfaces in waiting rooms). Category IB”

Assessment of evidence

"V.A.6.b. Dedicate noncritical medical items to use on individual patients known to be infected or colonized with MDROs. Category IB"

"V.A.6.c. Prioritize room cleaning of patients on Contact Precautions. Focus on cleaning and disinfecting frequently touched surfaces (e.g., bedrails, bedside commodes, bathroom fixtures in the patient's room, doorknobs) and equipment in the immediate vicinity of the patient. Category IB"

Where "problem MDRO" confirmed enhanced measures – "V.B.8.a. Implement patient-dedicated or single-use disposable noncritical equipment (e.g., blood pressure cuff, stethoscope) and instruments and devices. Category IB"

Please note that there are several recommendations related to dedication of reusable equipment to single patients where MDRO transmission is a concern. While the above is recommended this is where equipment cannot be single patient use.

While not included as a graded recommendation it is clearly stated as part of standard precautions that equipment should be "properly clean and disinfect or sterilize reusable equipment before use on another patient"

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: England

Main findings:

Collaborative approach to development with input from expert organisations (AHCP, contractors, NHS estates, HSE). This document is applicable to equipment and 'all cleaning tasks'. There are not specific equipment recommendations however, it appears this is provided as general principles which may apply across cleaning tasks.

- "Local policy should outline where and when detergent and water are enough and where a detergent and disinfectant (or combined cleaning and disinfecting agent) are required".
- "2.3. Contact time: A disinfectant must be in contact with a surface for a specified time and the surface needs to remain wet for that time. Staff should know the contact times for the disinfectants in use locally. Products with realistic contact times for use in a busy healthcare environment should be selected. 2.4. Direction of cleaning: To minimise recontamination of an area and transfer of micro-organisms, clean from: • top to bottom • clean to dirty Dusting technique should not disperse the dust (i.e. use damp cloths/dusting devices). High horizontal surfaces should be cleaned first. Floors should be cleaned last, with adequate signage placed while floors are cleaned and dry to prevent slips, trips and falls on wet floors. Once floors are completely dry, they must be removed as they present a trip hazard. 2.4. Manual cleaning action: Large and flat surfaces should be cleaned using an 'S' shape motion, starting at the point furthest away, then overlapping slightly but without going back over the area to avoid recontamination".
- "2.6. Transference: During use cleaning solutions can become contaminated during use and need to be regularly replaced in accordance with manufacturers' instructions to prevent transfer of micro-organisms from one surface to the next. Their

Assessment of evidence

replacement may need to be more frequent when cleaning heavily soiled areas, when solutions appear visibly dirty, and immediately after cleaning blood and body fluid spills, e.g. when using a socket mop. Micro-organisms can be transferred between surfaces on cleaning cloths and wipes as well as hands. Care should be taken to avoid cross contamination".

- "Cleaning: Involves 'fluid' – usually detergent and water, and 'friction' – the mechanical or physical removal of organic matter including dirt, debris, blood, and bodily fluids. Micro-organisms are removed rather than killed. Effective cleaning leaves a surface or equipment visibly clean. This alone may be enough in foyers, offices, corridors and other 'low risk' environments, the disinfection is also needed in many healthcare environments. Cleaning is a pre-requisite to effective disinfection. Some disinfectants are readily deactivated by organic matter. Disinfection: Process of eliminating or reducing harmful micro-organisms from inanimate objects and surfaces. Sterilisation: The process of killing all micro-organisms through physical or chemical means. Sterilisation is used only for critical items, i.e. objects or instruments that enter or penetrate sterile tissues, cavities, or the bloodstream. Decontamination: Cleaning, disinfection and sterilisation are all decontamination processes. In the context of the environment or non-critical equipment (i.e. equipment or devices that are in contact with intact skin only), the term is usually refers to cleaning and disinfection, either using separate cleaning and disinfecting agent in a two-step process, or a '2 in 1' product that cleans and disinfects in one step".

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rathore MH, Jackson MA, Committee on Infectious Diseases et al. Infection prevention and control in pediatric ambulatory settings. Pediatrics. 2017; 140(5): e20172857. Reaffirmed December 2022. doi:10.1542/peds.2017-2857. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Paediatric ambulatory settings

Country: USA

Main findings:

Sterilisation – “eliminates or destroys all forms of microbial life, including spores.” Chemical sterilising agents or dry heat considered. Manual cleaning with soap and water required before sterilisation.

Assessment of evidence

Disinfection – “reduces but does not eliminate the microbial burden. The extent of disinfection depends on the type of disinfectant and its concentration, the resistance of the microbes, contact time, and amount of organic material.”

Disinfection is split into high level (glutaraldehyde, 0.55% ortho-phthalaldehyde, or stabilized hydrogen peroxide (a combination of hydrogen peroxide and peracetic acid)), intermediate level (“70% ethyl or isopropyl alcohol, iodine and iodophors, or a 1:50 dilution of sodium hypochlorite”) and low level (“Low-level disinfection is appropriate for equipment that does not touch mucous membranes; examples include blood pressure cuffs, crutches, stethoscopes, and tabletops. Low-level disinfectants include phenolic compounds, quaternary ammonium compounds, and a 1:500 dilution of sodium hypochlorite”)

It appears low level disinfection would most appropriately apply to non-invasive, shared, care equipment.

In the section titled ‘diagnostic and personal equipment it is stated that “A reasonable means of decreasing contamination is to wipe the bell and diaphragm of the stethoscope as well as the handle and body of otoscopes or ophthalmoscopes regularly and, whenever they become soiled, use an EPA-approved disinfectant wipe labelled effective against hepatitis B or a 70% isopropyl alcohol wipe. Disposable ear curettes may be preferred. If not disposable, ear curettes should be cleaned with 70% isopropyl alcohol after each use and, if grossly contaminated by blood and/or body substances, should be cleaned and then disinfected by using a sodium hypochlorite (bleach) solution”.

Terminal clean:

- “follow local procedures for cleaning patient’s bed mattress. If locally this is a task you do, take a disposable cloth and immerse in the pre-made solution of chorine releasing agent, ring out, fold twice over which will give you four clean cloth surfaces, wipe the surface of the mattress surfaces with the damp cloth using one swipe at a time, fold the cloth to reveal a clean side and follow the same process. Use more than one cloth if required.”
- “Note: Ward bed mattress should also be washed with a chlorine releasing agent then rinsed with clear water and dried to avoid damage to mattress.”

Assessment of evidence

- “take a disposable cloth and immerse in the pre-made solution of chorine releasing agent, ring out, fold twice over which will give you four clean cloth surfaces. Wash all bed frame using one swipe, fold a section of the cloth over to reveal a clean unused surface and wipe again. Ensure to always work clean to dirty preventing cross contamination”.

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland’s Health and Social Care Services (SHTN 00-04). Last updated August 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: "This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Main findings:

Equipment is categorised in table 1 and it is noted that this is based on the Spaulding classification and the level of disinfection required is reported to be based on the clinical procedure:

Non-critical – "In contract with intact skin only". Including blood pressure cuff, electrocardiogram leads, stethoscope, pulse oximetry probe (requires cleaning and low-level disinfection where necessary).

Semi critical – "In contact with mucous or non-intact membrane but not penetrating sterile tissue." Including endoscopes, vaginal specula, cavity probes (requires high level disinfection by heat or chemical and noted that sterilisation is preferred if practical)

Critical – "entering usually sterile tissue or the vascular system" including needles surgical instruments noted as requiring sterilisation.

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Assessment of evidence

Main findings:

Sterilisation- “Common sterilization options for the transducer include ethylene oxide gas, hydrogen peroxide gas plasma, and liquid chemicals with extended contact times (e.g., glutaraldehyde, ortho-phthalaldehyde). It is critical to ensure that any sterilization process is compatible with the transducer and will not cause damage (see manufacturer’s IFU)”

The level of required disinfection is based on the risk associated with the equipment as based on critical, semi-critical or non-critical classification.

Critical – “Cleaning followed by sterilization. If sterilization is not possible, then use high-level disinfection (HLD) and a sterile transducer cover and sterile gel”.

Semi-critical – “Cleaning followed by HLD. If not HLD compatible, disinfect to the highest level possible and use with a sterile transducer cover and sterile gel”. Where HLD is high level disinfection.

Non-critical – “Cleaning followed by low-level disinfection (LLD)”.

High level disinfection – “the removal of all microorganisms except bacterial endospores, of which small numbers are permitted to remain”. “A few disinfectants, known as chemical sterilants, will kill spores with prolonged exposure times (3–12 hours). At similar concentrations but with shorter exposure periods (e.g., 20 minutes for 2% glutaraldehyde), these same disinfectants are called high-level disinfectants and will kill all microorganisms except large numbers of bacterial spores” and “Automated HLD methods include hydrogen peroxide mist devices and liquid soak devices using approved liquid chemicals such as glutaraldehyde, ortho-phthalaldehyde, and accelerated hydrogen peroxide. Manual HLD can safely occur using HLD vapor control soaking stations with approved liquid chemicals such as glutaraldehyde, ortho-phthalaldehyde, peracetic acid, hydrogen peroxide, and accelerated hydrogen peroxide. Automated processes are preferable due to the reduced risk of operator error”

Low level disinfection – “is the inactivation of vegetative bacteria, enveloped viruses, some non-enveloped viruses, and most fungi in a practical period of time (≤10 minutes)”. “Common low-level disinfecting agents include quaternary ammonium

Assessment of evidence

compounds, alcohols, and phenols available as sprays and disinfectant wipes. Ensure that the chosen LLD disinfection method is compatible with the transducer. Alcohols are often contraindicated due to material incompatibility".

Limitations:

- Unclear development process
- This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Siegel JD, Rhinehart E, Jackson M et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Updated September 2024.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: The methodology utilised in this document is limited. However, it is stated that for some sections a search on Medline and PubMed were conducted but the dates of this for any updates are unclear. The document is considered as primarily based on CDC expert opinion.

Main findings:

“Medical equipment and instruments/devices must be cleaned and maintained according to the manufacturers’ instructions to prevent patient-to-patient transmission of infectious agents”.

- There were four references for this which focused on pseudomonas or Acinetobacter infections or outbreaks associated with equipment including bronchoscopes.

“Cleaning to remove organic material must always precede high level disinfection and sterilization of critical and semi-critical instruments and devices because residual proteinaceous material reduces the effectiveness of the disinfection and sterilization processes”.

- There are two references both with the same leading author Rutala (2004 and 2008) both of which individually considered for this review.

Assessment of evidence

Graded recommendation:

- “Remove organic material from critical and semi-critical instrument/devices, using recommended cleaning agents before high level disinfection and sterilization to enable effective disinfection and sterilization processes. Category IA”
- “Noncritical equipment, such as commodes, intravenous pumps, and ventilators, must be thoroughly cleaned and disinfected before use on another patient. All such equipment and devices should be handled in a manner that will prevent HCW and environmental contact with potentially infectious material.” (No citations are provided to support this).
- “In all healthcare settings, providing patients who are on Transmission-Based Precautions with dedicated noncritical medical equipment (e.g., stethoscope, blood pressure cuff, electronic thermometer) has been beneficial for preventing transmission”.
- It also states that” When this is not possible, disinfection after use is recommended.” Though no references are provided to support this.

Standard precautions:

- “IV.F.4. If toys are likely to be mouthed, rinse with water after disinfection; alternatively wash in a dishwasher When a toy requires cleaning and disinfection”. (No recommendation grading).
- “IV.F.4. In facilities that provide health care to pediatric patients or have waiting areas with child play toys (e.g., obstetric/gynecology offices and clinics), establish policies and procedures for cleaning and disinfecting toys at regular intervals. Category IB”
- “IV.E.1. Establish policies and procedures for containing, transporting, and handling patient-care equipment and instruments/devices that may be contaminated with blood or body fluids. Category IB/IC”
- “IV.F.2. Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients’ rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms). Category IB”

Assessment of evidence

- "IV.F.3. Use EPA-registered disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment. Use in accordance with manufacturer's instructions. Category IB/IC"

Graded recommendations for TBP:

- "V.B.5.a. Handle patient-care equipment and instruments/devices according to Standard Precautions. Category IB/IC"
- "V.B.5.b. In acute care hospitals and long-term care and other residential settings, use disposable noncritical patient-care equipment (e.g., blood pressure cuffs) or implement patient-dedicated use of such equipment. If common use of equipment for multiple patients is unavoidable, clean and disinfect such equipment before use on another patient. Category IB"

Limitations:

- Unclear development process
- Not all recommendations are adequately supported by evidence, but based on expert opinion.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
from the European Society of Radiology Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.					

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

Recommendations for general principles

“the length of the drying time between cleaning and disinfection steps depends on the applied disinfectants/method used and no exact recommendations can be made. Regarding the choice of disinfectants, some disinfectants (in particular alcohol) may be

Assessment of evidence

ineffective in eliminating HPV type 16, whilst also causing transducer surface damage, although alcohol still seems widely used in some countries."

Recommendations for non-critical ultrasound examinations: "decontamination steps necessary at the start of the examination and after every patient are as follows"

"The transducer should be effectively dried: In order to avoid dilution of subsequently applied disinfection agents it is important to allow the transducer to dry. Application of disinfectants on a wet transducer will make them less effective or completely ineffective".

"Disinfection of US transducer: For this non-critical category, LLD can be achieved using wipes, foam or other approved agents with antibacterial, antiviral and antifungal properties. Products used should always be in compliance with manufacturers' recommendations to avoid transducer surface damage".

"The transducer should be effectively dried: Following application of disinfectants, it is essential to allow sufficient time for the disinfectant to attain maximum effect."

Limitations:

- Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. September 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

Assessment of evidence

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or "predictive power of the study designs from which that data were obtained" (domains listed are "strength of study design, quality of study, number of studies, consistency of results and directness of evidence"). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

This document described that HCW should consider point-of-care risk assessment to assist in deciding the level of control measures required. Increasing to cleaning and disinfection of care equipment (from cleaning only) is reported as necessary to consider where transmission risks are higher.

General recommendations:

- "Policies and procedures, including assigning responsibility, should be developed and implemented for cleaning and disinfection of all non-critical patient care items that are moved in and out of patient care areas (e.g., mobile devices, multi-use electronics, intravenous poles, toys and electronic games) [BII]"
- "Detergent disinfectants with a Drug Identification Number (DIN) that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient care environment should be used. The infection prevention and control program should approve the products purchased. The product should be used in accordance with manufacturer's instructions. [regulated]"

Assessment of evidence

- "Policies and procedures should be developed and implemented for routine scheduled environmental cleaning, including procedures for assigning responsibility and accountability for cleaning, as indicated by the level of patient contact and degree of soiling, including event-related cleaning of environmental surfaces and increased cleaning, as per additional precautions. [CII]"

Specific care equipment recommended included for routine practices:

- "Reusable non-critical equipment that has been in direct contact with a patient or in that patient's environment should be reprocessed with cleaning and low-level disinfection before use in the care of another patient (72;108;239;464). [AII]" (direct evidence from multiple moderate study design of high quality with consistent results or extrapolation from multiple strong design studies of high quality, with consistent results)
- "Items such as toys and electronic games that have been in direct contact with a patient or in that patient's environment should be reprocessed with cleaning and low-level disinfection before use by another patient (93;105;106;108-110;434). [AII]" (direct evidence from multiple moderate study design of high quality with consistent results or extrapolation from multiple strong design studies of high quality, with consistent results)
- "Bedpans and commodes should be provided for single patient use and labeled appropriately. Bedpans and commodes should be reprocessed with cleaning and low-level disinfection before use by another patient (129;130;465). The use of single-patient-use disposable bedpans is acceptable. [CII]" (CII = studies of low quality, contradictory results, or expert opinion)
- "Manufacturer's written instructions should be followed when using products for cleaning and disinfecting."

Non-patient care recommendations for 'additional precautions' (listed pathogens or scenarios in list 3, note applies to contact precautions) included:

- "Non-critical patient-care equipment (e.g., thermometers, blood pressure cuff, pulse oximeter) should be dedicated to the use of one patient and cleaned and disinfected as per Routine Practices before reuse with another patient or a single-use device should be used and discarded in garbage after use (42;70;95;260;289). [BII]" (direct evidence from any combination of strong or moderate design evidence of high/medium quality with clear trend or extrapolation from multiple

Assessment of evidence

strong design studies of medium or moderate design if high/medium quality with consistency or one strong design study with support from multiple weak design studies of high/medium quality with consistency of results).

It was stated that equipment (including toys, personal effects) not be shared.

The following modification were presented for ambulance care services:

“Equipment and surfaces in direct contact with the patient or infective material (e.g., respiratory secretions, stool or skin exudates) should be cleaned and disinfected before the room is used for another patient. Contaminated reusable non-critical patient care equipment should be cleaned and disinfected before use with another patient”

Recommendations related to care of patients on ‘droplet’ (“Solid or liquid particles suspended in the air, whose motion is governed principally by gravity and whose particle size is greater than 10 µm. Droplets are generated primarily as the result of an infected source coughing, sneezing or talking”) and ‘airborne’ (“Transmission of microorganisms via inhalation of aerosols that results in an infection in a susceptible host”) precautions

“As per routine practices unless contact precautions are also in use, then as per contact precautions”

Per the glossary disinfection includes approved products for use in Canada, this is not applicable in Scottish health and care settings “The inactivation of disease-producing microorganisms with the exception of bacterial spores (438). Hospital-grade disinfectants are used on inanimate objects and need a drug identification number (DIN) for sale in Canada.”

“Terminal cleaning − Terminal cleaning refers to the process for cleaning and disinfecting patient accommodation that is undertaken upon discharge of any patient or on discontinuation of contact precautions. The patient room, cubicle, or bedspace, bed, bedside equipment, environmental surfaces, sinks and bathroom should be thoroughly cleaned before another patient is allowed to occupy the space. The bed linens should be removed before cleaning begins.”

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Tacconelli E, Cataldo MA, Dancer SJ et al. ESCMID guidelines for the management of the infection control measures to reduce transmission of multidrug-resistant Gram-negative bacteria in hospitalized patients. Clin Microbiol Infect. 2014;20 Suppl 1:1-55. https://doi.org/10.1111/1469-0691.12427.	Guidelines	AGREE II: Recommend with modifications	N/A	N/A	N/A

Assessment of evidence

Country: Europe

Setting: Healthcare settings

Methods: An ESCMID produced guidance focusing on preventing and controlling multidrug-resistant gram-negative bacteria (MDR-GNB). The methodology includes a systematic search of relevant literature on MDROs and expert opinion consensus on the recommendations.

"We performed a systematic review of the articles published on this topic to determine the effects of different IPC interventions aimed at minimizing the spread of MDR-GNB and to define the indications for application of IPC measures for specific types of resistant strains in adult hospitalized patients. Our guidelines have been drawn up so as to be useful for a wide range of healthcare professionals, namely specialist physicians and other healthcare workers (infectious diseases, microbiology, surgery, intensive care), public health officers, infection control professionals, administrative personnel in hospitals, and epidemiologists".

The level of evidence for and strength of each recommendation, were defined according to the GRADE approach.

Main findings:

Moderate and conditional recommendations:

"Shared equipment should be disinfected between use on different patients"

'Basic recommendation' for 'endemic situations' for the following pathogens:

- "ESBL-producing Enterobacteriaceae",
- "MDR-Pseudomonas aeruginosa",
- "MDR-Acinetobacter baumannii".

"Implement regular EC procedures, which include detergents or disinfectants, depending on local practice in order to reduce the transmission rate. Ensure cleaning of patient care equipment and the environment."

'Basic recommendation' for 'endemic situations' for the following pathogens:

Assessment of evidence

- “ESBL-producing Enterobacteriaceae”,
- “MDR-Klebsiella pneumoniae”,
- “MDR-Pseudomonas aeruginosa”,
- “MDR-Acinetobacter baumannii”.

Limitations:

- The experience or expertise of the stakeholders involved in consultation is unclear and there is no indication of patient or public representation. There was some lack of clarity on how the guidance may be used by a target audience. Unclear and limited review of the guideline by external stakeholders.
- Studies which applied a bundled approach were included in this guidance, the authors discussed that if a bundle was considered effective then they placed equal weighing to each aspect of the bundle. This may over/under-inflate some results.
- No procedure for updating the guideline and no updates since 2014.
- Unclear benefits/harms or tools on implementation of the guidance.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. Updated 13 December 2022. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: England

Methods: “The previous Health and Social Care Act 2008: Code of Practice document for health and adult social care on the prevention and control of infections and related guidance. The code applies to NHS bodies and providers of independent healthcare and adult social care in England, including primary dental care, independent sector ambulance providers and primary medical care providers”. This document sets out how English healthcare providers may adhere to the H&SCA 2008 regulations.

Assessment of evidence

Main findings:

"reusable medical devices should be repurposed at one of the following 4 levels: clean (free of visible contamination), disinfected (a process used to reduce the number of viable infectious agents, but which may not necessarily inactivate some microbial agents, such as certain viruses and bacterial spores), sterile (at point of use), sterilised (meaning it has been through the sterilisation process)"

Decontamination is defined in the glossary as "The combination of processes (including cleaning, disinfection and sterilisation) used to make a reusable item safe for further use on service users and for handling by staff."

Limitations:

- Unclear development process and applicable to English settings. "The use of disinfectants is a local decision and should be based on current evidence and accepted good practice."

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health and Safety Executive (HSE). Decontamination against bloodborne viruses. 15 February 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: This page explains various processes you can use depending on the level of decontamination required, not specific to a particular setting.

Main findings:

Disinfection and sterilisation

“Chemical disinfection - The protein in blood and other body fluids may confer a protective effect for viruses, and in some cases may reduce the effectiveness of chemical disinfectants.

It is reasonable to assume that, because of the viral robustness, any preparation effective against hepatitis B virus will also be effective against other BBVs.

Disinfection of contaminated surfaces with bleach solution (minimum 1000 parts per million (ppm) active chlorine) is known to be effective for the inactivation of BBVs, but bleach is also susceptible to inactivation by organic soiling. This underlines the need for prior cleaning when disinfecting any soiled items, to reduce the organic load.

Some chemical disinfectants have been tested for their activity against BBVs in the presence of whole blood or plasma (the fluid component of blood) to simulate in-use conditions.

Removal of organic material should not be done manually if operator safety is compromised. However, in these situations it may be achievable by alternative means, for example using an ultrasonication tank or washer disinfector”.

Common disinfectants and their use

“Different types of disinfectants are available which will be effective against bloodborne viruses (BBVs). Examples include:

- bleach products, for example from sodium hypochlorite solution or other sources of chlorine such as sodium dichloroisocyanurate (NaDCC) soluble tablets

Assessment of evidence

- alcohol based products, for example containing 60-80% disinfectant sprays or 60-70% alcohol wipes
- halogenated tertiary amines or quaternary ammonium compounds which are available as spray, ready to use bulk solution, powder or wipes
- chlorhexidine based products, for example products containing chlorhexidine gluconate which may be combined with alcohol. Such products are likely to be suitable for skin use".

"Consider the following factors when using disinfectants:

- evidence of the product's effectiveness against BBVs according to the disinfectant manufacturer
- use in accordance with manufacturer's instructions including concentrations, contact times and expiry times.
- the presence of other chemicals may reduce the effect of disinfectants and, or react violently with them. This creates a hazard to those in the vicinity, for example acids or acidic fluids such as urine, with hypochlorite preparations (such as household bleach) generate chlorine gas.
- levels of contamination may vary, and this will influence the degree of cleaning and disinfectant required for different applications. In particular, visible blood or body fluid may require use of a higher concentration of any chosen product
- compatibility of disinfectants with different types of surfaces of equipment or materials to be cleaned or disinfected
- whether it is safe to use on skin".

"All disinfectants are potentially hazardous. An assessment of products in use must form part of the risk assessment from hazardous substances required under the Control of Substances Hazardous to Health Regulations (COSHH)".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Assessment of evidence

Main findings:

Recommendations:

- “Perform low-level disinfection for noncritical patient-care surfaces (e.g., bedrails, over-the-bed table) and equipment (e.g., blood pressure cuff) that touch intact skin (see Recommendation 5g). Category II”
- “Process noncritical patient-care devices using a disinfectant and the concentration of germicide listed in Table 1. Category IB”
- “Disinfect noncritical medical devices (e.g., blood pressure cuff) with an EPA-registered hospital disinfectant using the label’s safety precautions and use directions. Most EPA-registered hospital disinfectants have a label contact time of 10 minutes. However, multiple scientific studies have demonstrated the efficacy of hospital disinfectants against pathogens with a contact time of at least 1 minute. By law, all applicable label instructions on EPA-registered products must be followed. If the user selects exposure conditions that differ from those on the EPA-registered product label, the user assumes liability from any injuries resulting from off-label use and is potentially subject to enforcement action under FIFRA. Category IB.”
- “Ensure that, at a minimum, noncritical patient-care devices are disinfected when visibly soiled and on a regular basis (such as after use on each patient or once daily or once weekly). Category II.”
- “If dedicated, disposable devices are not available, disinfect noncritical patient-care equipment after using it on a patient who is on contact precautions before using this equipment on another patient. Category IB.”
- “Do not use disinfectants to clean infant bassinets and incubators while these items are occupied. If disinfectants (e.g., phenolics) are used for the terminal cleaning of infant bassinets and incubators, thoroughly rinse the surfaces of these items with water and dry them before these items are reused. Category IB.”
- “Use an EPA-registered sporicidal disinfectant for environmental disinfection in units with high rates of endemic Clostridium difficile infection or in an outbreak setting. New Categorization Scheme: Recommendation" (Not graded).

Note that for contamination with bloodborne pathogens the recommendations are stated to remain as above other than for prion.

Assessment of evidence

- “Meticulously clean patient-care items with water and detergent, or with water and enzymatic cleaners before high-level disinfection or sterilization procedures. Category IB”.
- “Remove visible organic residue (e.g., residue of blood and tissue) and inorganic salts with cleaning. Use cleaning agents that are capable of removing visible organic and inorganic residues. Category IB”.
- “Clean medical devices as soon as practical after use (e.g., at the point of use) because soiled materials become dried onto the instruments. Dried or baked materials on the instrument make the removal process more difficult and the disinfection or sterilization process less effective or ineffective. Category IB”.
- “Perform either manual cleaning (i.e., using friction) or mechanical cleaning (e.g., with ultrasonic cleaners, washer-disinfector, washer-sterilizers). Category IB”.
- “If using an automatic washer/disinfector, ensure that the unit is used in accordance with the manufacturer’s recommendations. Category IB”.
- “Ensure that the detergents or enzymatic cleaners selected are compatible with the metals and other materials used in medical instruments. Ensure that the rinse step is adequate for removing cleaning residues to levels that will not interfere with subsequent disinfection/sterilization processes. Category II”.
- “Inspect equipment surfaces for breaks in integrity that would impair either cleaning or disinfection/sterilization. Discard or repair equipment that no longer functions as intended or cannot be properly cleaned, and disinfected or sterilized. Category II”.

Not a recommendation but table 2 does outline the properties of an ideal disinfectant which includes being broad spectrum, being quick, not impacted by environmental factors (e.g., organic matter), nontoxic, compatibility, easy to use, odourless, residual effect, economical, solubility, stability, cleaner, environmentally friendly.

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Loveday HP, Wilson JA, Pratt RJ, et al. epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection. 2014; 1-70. https://doi.org/10.1016/S0195-6701(13)60012-2.	Guidelines	AGREE: Recommend with modifications	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: These guidelines describe clinically effective measures that are used by healthcare workers for preventing infections in hospital and other acute healthcare settings".

Assessment of evidence

Method: Whilst this guideline is based on a systematic literature review, some aspects of its method are not provided, such as the search strategy. The link between recommendations and supporting evidence is also unclear. There are few references regarding equipment decontamination, and it is graded as a good practice point (level D), suggesting it is primarily based on expert opinion. Therefore, although this guideline is graded AGREE: recommend with modifications, the relevant recommendations are expert opinion.

Main findings:

“In some outbreak situations, the use of chlorine-releasing agents and detergent should be considered.” - This is not a specific recommendation, but general information included within the body of text.

“Shared pieces of equipment used in the delivery of patient care must be cleaned and decontaminated after each use with products recommended by the manufacturer. Class D/GPP”

Limitations:

- Last updated 2014, now 10 years out-of-date.
- Limited rigour of development including a lack of detail regarding the systematic methods used to search evidence as well as for selecting evidence.
- The development processes for relevant recommendation is not clear.
- Limited references in this section and considered as expert opinion, despite wider grade of the general document.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

It is repeated throughout this document a number of times across sections that manufacturer's instructions should be followed, and this includes with regards to the equipment being decontaminated but also with the cleaning products or equipment being used whether it be detergent, disinfectants, mechanical washing and etc.

Assessment of evidence

- Disinfection – “The destruction or removal of microorganisms at a level that is not harmful to health and safe to handle. This process does not necessarily include the destruction of bacterial spores”.
- It is explained the disinfectants “Must have high germicidal activity. Will rapidly kill a wide range of microorganisms, including spores. Is chemically stable. Is effective in the presence of organic compounds. Is compatible with the surface being disinfected. Has the ability to penetrate into crevices (desirable). Must be inexpensive and aesthetically acceptable”.
- Figure 19 provides some further examples of specific pathogens of concern and the type of disinfection level that may be required. This included bacterial spores such as *C. diff, clostridium, Bacillus substilis (*sterilisations), Mycobacteria such as *Mycobacterium tuberculosis* (high level disinfection), nonlipid or small viruses such as poliovirus, coxsackie virus and rhinovirus (intermediate level disinfection), Vegetative bacteria such as *Pseudomonas aeruginosa*, *E. coli*, *S. aureus*, *Salmonella*, *Enterococci*, *Neisseria meningitidis* (low level disinfection).
- Factors that impact the effectiveness of the disinfection process are listed and described, including quantity of the microorganisms (as the bioburden increases, the amount of time that a disinfectant needs to act also increased), Organic matter (the presence of biofilms and/or organics matter may disrupt the effectiveness of the disinfectant), resistance of microorganism to the chemical agent (spectrum of antimicrobial activity of agent), concentration of agent (the required concentration to reach the required antimicrobial action also may impact material e.g., corrosion), physical and chemical factors (potential impact of efficacy), Duration of exposure (contact time to achieved required desired result), stability (“some disinfectants are unstable at use concentration, e.g. chlorine-releasing agents, and should be discarded as recommended by the disinfectant manufacturer/supplier”).
- Processing equipment – “All processing equipment must be evaluated for performance and to ensure that the correct medical devices are processed in the correct machine”.

Limitations:

- Unclear development process.

Question 8: Where should non-invasive, reusable, shared care equipment be decontaminated?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** USA					

Assessment of evidence

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Main findings:

Recommendations:

“In hospitals, perform most cleaning, disinfection, and sterilization of patient-care devices in a central processing department in order to more easily control quality. Category II”

Limitations:

- It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Main findings:

“The transducer can potentially be reprocessed in the exam room, if the cleaning and disinfection processes are suitable for use in that environment and a dirty-to-clean workflow is established”.

“If the transducer cannot be safely reprocessed in the exam room, transport the transducer in a designated, approved container to a separate room for reprocessing and then return the transducer in a designated, approved clean or sterile transport container, as appropriate.

Handle and transport the transport containers in a manner to prevent contamination of the transducer, other equipment, and the facility.

Transport containers used to transport contaminated items by hand should be maintained in a position parallel to the floor.

Assessment of evidence
Transport containers and any transport carts should be disinfected. Clearly mark designated, approved containers as clean or dirty with a biohazard symbol". **Limitations:** • Unclear development process • This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Setting: Healthcare settings

Country: International

Methods: The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance.

Main findings:

- The dirty area is defined as the area of the decontamination unit or area that received soiled and used devices that require decontamination. (It is unclear if this area is for all equipment or only those require a certain level of disinfection).
- “a) Be distinctly separate from areas where clean/ disinfected/sterile devices are handled or stored b) Have restricted access from other areas in the setting c) Ensure one-way workflow of staff, as well as medical devices d) Have adequate space for the cleaning process and storage of necessary equipment and supplies e) Have surfaces that can be easily cleaned and disinfected f) Have slip-proof flooring that can withstand wet mopping and hospital-grade cleaning and disinfecting products g) Have easy access to hand hygiene facilities”
- Then room should have “Provision must be made for the following equipment in the wash (dirty) room as follows: Table or surfaces for registering and sorting the devices, Sinks for manual cleaning and disinfection – double sinks with flat surfaces on either side to allow the devices to dry, Cold water jet guns, Medical quality air as used in the health-care facility (for drying lumens), Sluice as dispenser of organic matter Shelves (open slatted or wire racks) for storage of chemicals and cleaning items”.
- There are also details provided regarding decontamination sink requirements and requirements for preparation and packing areas. There are several occupational health recommendations that are also listed. This is outside the scope of this review and included details such as access to appropriate PPE. Also advised is the following, “Before any decontamination can take place, used devices are prepared for reprocessing at the point of use to ensure their safe transport and a minimal risk to SSD staff. This procedure is not a substitute for cleaning.”

Assessment of evidence

- Transport – It is recommended that soiled equipment be transported to a designated decontamination area “as soon as possible” after use. Contaminated device should be transported in containers which should also be decontaminated after each use. Designated route to avoid high traffic areas should be used to transport equipment. All carts and containers containing contaminated equipment must be clearly identified and soiled and sterile equipment “must” not be transported together, and ideally contaminated and decontaminated trolleys should be segregated and identified.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia. 2019.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Main findings:

“Adequate cleaning supplies should be available at or close to the point of care to enable routine management of the physical environment”.

Limitations:

- No references provided for this statement
- Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines.
- Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. Updated 13 December 2022. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: England

Methods: “The previous Health and Social Care Act 2008: Code of Practice document for health and adult social care on the prevention and control of infections and related guidance. The code applies to NHS bodies and providers of independent healthcare and adult social care in England, including primary dental care, independent sector ambulance providers and primary medical care providers”. This document sets out how English healthcare providers may adhere to the H&SCA 2008 regulations.

Assessment of evidence

Main findings:

"Decontamination of reusable medical devices takes place in compliant facilities that are designed for the purpose of decontaminating medical devices through validated processing systems and controlled environmental conditions. This is to ensure that all potential environmental, cross-infection, handling and medical device usage risks are minimised."

Limitations:

- Unclear development process and applicable to English settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Siegel JD, Rhinehart E, Jackson M et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Updated September 2024.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: The methodology utilised in this document is limited. However, it is stated that for some sections a search on Medline and PubMed were conducted but the dates of this for any updates are unclear. The document is considered as primarily based on CDC expert opinion.

Main findings:

“IV.E.1. Establish policies and procedures for containing, transporting, and handling patient-care equipment and instruments/devices that may be contaminated with blood or body fluids. Category IB/IC”

“V.B.5.d In ambulatory settings, place contaminated reusable noncritical patient-care equipment in a plastic bag for transport to a soiled utility area for reprocessing. Category II”

Limitations:

- Unclear development process
- Not all recommendations are adequately supported by evidence but based on expert opinion.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NSS Health Facilities Scotland (HFS). SHFN 30 Part A: Manual. Information for Design Teams, construction teams, Estates & Facilities and Infection Prevention & control Teams. October 2014. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Scotland

Scope: This guidance provides Built Environment Infection Prevention and Control information for Design Teams, Construction Teams, Infection Prevention and Control Teams and Estates & Facilities Teams.

Assessment of evidence

Main findings:

"Using sinks for both hand-washing and the cleaning of equipment is not allowed as this will significantly increase the risk of hand and environmental contamination. Dirty utility rooms should contain: a hopper; a macerator; a separate sink for cleaning equipment; a clinical wash-hand basin; space to accommodate colour-coded disposal bags for bagging waste".

"Convenient access to these is important, as contaminated fluids such as patients' wash-water should not be emptied down clinical wash-hand basins in adjacent ward areas".

"Slop-hoppers should be provided in areas where dirty waste water, is disposed… (Further detail is provided in HBN 00-03 Clinical and clinical support spaces)".

Ancillary areas: "It is important that ancillary areas are of an acceptable standard to support effective infection prevention and control. Clean and dirty areas should be in separate rooms and the workflow patterns of each area should be clearly defined. The design and finish of ancillary areas should facilitate good cleaning, have facilities for hand hygiene, and sufficient storage for supplies and equipment together with provision for the removal of Personal Protective Equipment to waste or to wash."

Dirty room: "A dirty utility room should include facilities for: cleaning items of equipment; testing urine; disposal of body fluids; decontamination of commodes; temporarily holding items requiring reprocessing; hand hygiene." "Space and facilities for holding, reprocessing or disposal of bedpans, urinals and emesis (vomit) bowls are required. Commodes, unused bedpans, urinals, vomit bowls and linen bag carriers can also be stored. Closed storage is required for aprons and gloves. Storage cupboards should be provided." "A working stock of clean goods should be stored within a Dirty Utility Room. Clean goods would include unused bedpans & urinals and cleaned commodes." "Where commodes are to be used, there should be sufficient space allowed for their decontamination and storage of a working stock".

"There needs to be clear demarcation achieved between clean/unused equipment and soiled/dirty equipment. A defined clean-to-dirty workflow is also required." "A clinical wash-hand basin is necessary plus a deep sink for equipment with draining board (or macerator, if available) for urine disposal and a separate deep sink for decontaminating equipment".

Disposal room: "This area should be secure and not be accessible to patients/public. The disposal room is for temporary storage of supplies and equipment that have to be removed for cleaning, reprocessing or disposal, for example, items to be returned to

Assessment of evidence

the sterile services department (SSD). The sizing and location of disposal rooms should be considered at the design stage, taking into account the predicted levels and types of waste to be generated and the planned operational policies relating to frequency and workflow of waste and linen collection".

Domestic services room: rooms should have a sink with draining board and slop-hopper and a wash-hand basin. Space also required for segregation and storage of mops, buckets, and other cleaning equipment and a "lockable COSHH cupboard".

Limitations:

- Unclear development process
- Authors state that this is to "ensure that there are facilities in place to help fulfil the mandatory requirements outlined in the National Infection Prevention and Control Manual". Hence, there's a risk of duplication and bias.

Question 9: When should non-invasive, reusable, shared care equipment be decontaminated?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
The Association for Professionals in Infection Control and Epidemiology (APIC). Strategies to mitigate cross contamination of non-critical medical devices. 2021. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** USA **Scope:** "This issue brief addresses high-level themes regarding contamination of multiple-use, non-critical medical items frequently used across patient care settings. The goal is to shed light on best practices for minimizing infection risk from these types of items. The brief covers non-invasive, non-critical medical devices such as blood pressure cuffs, oxygen saturation					

Assessment of evidence

monitors, and stethoscopes, as well as therapy toys and other multiple-use items that come in contact with intact skin, such as medical tape".

Main findings:

The risk assessment element has relevance to 'when' decontamination should take place. The authors note three risk assessment considerations to determine frequency including 1) the higher the contamination the higher the frequency and rigorously the decontamination should be, 2) items used where "highly vulnerable" (provided examples: high dependency units, units with immunosuppressed patients including those receiving chemotherapy, units with invasive procedures/surgery and area with frequent blood and body fluid exposure such as burn unit, labour delivery) patients are located may require more frequent decontamination, 3) the exposure factor (i.e., how frequently touched, shared items and items touched by both the patient and HCW).

Limitations:

- No methodology provided to explain the included references and no indication of how consensus was reached for expert opinion.
- This document was conducted in partnership with 3m which is a private company. It is not clear what bias this may introduce, if any.
- The citations provide are primarily from the CDC suggesting overlap with those guidance documents which were also considered for inclusion in this review – possible publication bias.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Academy of Ophthalmology (AAO). Information statement. Infection prevention in eye care services and operating areas. August 2012. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Setting: Eye care settings

Methods: This guidance was based on guidance from other organisations and regulations in the USA. The recommendations related to 'instruments' are not considered as these would be considered as invasive where involved in surgical procedures.

Main findings:

There are a small number of recommendations within this document relevant to this review which are listed below:

- "Clean and disinfect large stationary toys (e.g., climbing equipment) at least weekly and whenever visibly soiled"
- "When a toy requires cleaning and disinfection, do so immediately or store in a designated, labelled container separate from toys that are clean and ready for use".

Assessment of evidence
• "Clean and disinfect all equipment used during patient care and prior to use on another patient". **Limitations:** • Unclear development process. • There is a risk of publication bias as this document is based on other guidance from organisations which have also been considered for this review including CDC, AORN, APIC. • May have limited applicability as guidance is developed for USA eye care services.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing ultrasound transducers.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Journal of Ultrasound in Medicine. 2017; 20(1):30-40. https://doi.org/10.1002/ajum.12042					

Assessment of evidence

Country: Australasia

Setting: Acute healthcare settings

Main findings:

"Any equipment that has been in contact with the patient or operator should be cleaned with a detergent/disinfectant wipe or solution between use".

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia. 2019. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Australia

Setting: Health and care settings

Methods: Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”.

Assessment of evidence

Main findings:

The following is provided as a good practice point “10. It is good practice for shared clinical equipment to be cleaned with a detergent solution between patient uses, and disinfected where indicated. Exceptions to this should be justified by risk assessment.” Highlighting it was developed based on expert opinion and not high -quality evidence. Risk harms and other decision making to develop this recommendation are provided.

Beds

- “Clean frame daily”, “underneath weekly” and “whole on discharge” if very high/extreme risk, high risk or medium risk.
- Clean “when visibly soiled & whole on discharge” if low risk

Bed rails

- “Clean twice daily & after discharge” if very high/extreme risk.
- “Clean daily & after discharge” if high or medium risk
- “Clean weekly & after discharge” if low risk

Mattresses

- “Clean when visibly soiled/bodily fluids & after discharge” at any risk level.

For the above, “outbreaks of *Candida auris* or carbapenamase-producing *Enterobacterales*” are examples of very high or extreme risk scenarios.

Decontaminate equipment between uses, “regardless of whether a surface barrier has been used”. Appendix A2.2 lists recommended cleaning frequencies, including specific items of shared patient equipment.

Assessment of evidence
Limitations: • No references provided for this statement. • Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines. • Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Centers for Disease Control and Prevention (CDC). Core infection prevention and control practices for safe healthcare delivery in all settings. 2022. Updated April 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: USA

Setting: Health and care settings

Methods: CDC healthcare infection control guidelines were reviewed, and recommendations included in more than one guideline were grouped into core infection prevention practice domains (e.g., education and training of HCP on infection prevention, injection, and medication safety). Additional CDC materials aimed at providing general infection prevention guidance outside of the acute care setting were also reviewed. HICPAC formed a workgroup led by HICPAC members and including representatives of professional organizations (see Contributors in archives for full list). The workgroup reviewed and discussed all the practices, further refined the selection and description of the core practices and presented drafts to HICPAC at public meeting and recommendations were approved by the full Committee in July 2014. In October 2022, the Core Practices were reviewed and updated by subject matter experts within the Division of Healthcare Quality Promotion at CDC.

Main findings:

The guidelines state that equipment should be decontaminated between each patient (before use on another patient) and when soiled.

Relevant core practices included in the list are as follows:

5. standard precautions.

5f. “5f. Reprocessing of reusable medical equipment between each patient or when soiled”.

5f. 1. “Clean and reprocess (disinfect or sterilize) reusable medical equipment (e.g., blood glucose meters and other point-of-care devices, blood pressure cuffs, oximeter probes, surgical instruments, endoscopes) prior to use on another patient or when soiled”.

Limitations:

- Unclear development process.
- The nature of updates and when they are made is unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care. 31 March 2022. Updated 01 March 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

“Reusable care equipment must be decontaminated after each use. It must be clear who is responsible for decontaminating the equipment, the frequency, and method of decontamination which conforms with the manufacturer’s instructions”.

This suggests that reusable care equipment should be decontaminated after every use.

Assessment of evidence
Limitations: • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Siegel JD, Rhinehart E, Jackson M et al. Management of multidrug-resistant organisms in health care settings, 2006. Updated February 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Country: USA **Settings:** Healthcare settings **Scope:** This document is aimed to provide guidance regarding the management (including IPC) of multi-drug resistant organisms (MDRO) including MRSA, VRE and other gram-negative bacilli.					

Assessment of evidence

Main findings:

Non-specific environmental recommendations –

“V.A.6.a. Clean and disinfect surfaces and equipment that may be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for minimal touch surfaces (e.g., horizontal surfaces in waiting rooms). (111, 297, 373) Category IB”

“V.A.6.c. Prioritize room cleaning of patients on Contact Precautions. Focus on cleaning and disinfecting frequently touched surfaces (e.g., bedrails, bedside commodes, bathroom fixtures in the patient's room, doorknobs) and equipment in the immediate vicinity of the patient. (109, 110, 114- 117, 297, 301, 373, 376, 377) Category IB”

“IV.F.4. In facilities that provide health care to pediatric patients or have waiting areas with child play toys (e.g., obstetric/gynecology offices and clinics), establish policies and procedures for cleaning and disinfecting toys at regular intervals379, 80. Category IB IV.F.4.a. * Use the following principles in developing this policy and procedures: Category II Select play toys that can be easily cleaned and disinfected Do not permit use of stuffed furry toys if they will be shared Clean and disinfect large stationary toys (e.g., climbing quipment) at least weekly and whenever visibly soiled If toys are likely to be mouthed, rinse with water after disinfection; alternatively wash in a dishwasher When a toy requires cleaning and disinfection, do so immediately or store in a designated labeled container separate from toys that are clean and ready for use”

Listed as part of TBPs:

“V.B.5.b. In acute care hospitals and long-term care and other residential settings, use disposable noncritical patient-care equipment (e.g., blood pressure cuffs) or implement patient-dedicated use of such equipment. If common use of equipment for multiple patients is unavoidable, clean and disinfect such equipment before use on another patient 24, 88, 796, 836, 837, 854, 1016. Category IB”

While not included as a graded recommendation it is clearly stated as part of standard precautions that equipment should be “properly clean and disinfect or sterilize reusable equipment before use on another patient”

Assessment of evidence
Limitations: • Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Settings: Healthcare settings **Country:** England **Main findings:** • "Discussions with NHS cleaning service providers indicates that one nationally set of safe cleaning frequencies cannot meet every healthcare organisation's needs and is therefore inappropriate. It would also stifle healthcare organisations' ability to allocate cleaning resources where they are most needed, and potentially compromise the requirement to give clinical teams more control in terms of agreeing where available cleaning services are best deployed. However, the safe cleaning frequencies in Appendix 2 (separate document) are a required baseline for healthcare organisations".

Assessment of evidence

- "If healthcare organisations choose to enhance frequencies or take a blended approach (8.6), they must have a clear written rationale and risk assessment for this, as well as a supporting local safe cleaning schedule. Organisations are also expected during times of pandemic such as the current COVID-19 outbreak to respond accordingly by re-evaluating their cleaning frequencies and keep up to date with any national advice or guidance".
- "Once an organisation has identified its functional area risk categories, it must produce a 'cleaning specification' with more detailed information on how cleaning will be carried out. This specification should include: • cleaning elements – a list of individual items/categories of items that require cleaning • performance parameters – the expected standard of each item (element) after cleaning • cleaning frequencies – how often each item (element) should be cleaned, broken down by FR category." "The frequency of cleaning must be broken down by FR category. In the same way that functional areas need to be categorised according to risk, the frequency with which individual elements need to be cleaned will depend on the risk category they fall in. For instance, a toilet in an A&E department will need to be cleaned more often than one in a low traffic admin area".
- Appendix 2 provides safe cleaning frequencies as an example only. Relevant equipment frequencies from this appendix are provided below. This table is provided to demonstrate routine frequencies not enhanced cleans during an outbreak. This table includes regular cleaning such as per day or week when the item is in use but also regular cleaning such as per day, week, every 2 weeks and monthly when not in use. The frequency depending on the equipment and level of risk.
- "The type and frequency of cleaning spaces require, depends on what activities are carried out in them, and the level of infection risk. Staff should fully understand the cleaning frequencies their work areas require and follow these closely. When room use or priorities change, the cleaning frequencies for the area should be reviewed".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rathore MH, Jackson MA, Committee on Infectious Diseases et al. Infection prevention and control in pediatric ambulatory settings. Pediatrics. 2017; 140(5):e20172857. Reaffirmed December 2022. doi:10.1542/peds.2017-2857. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Paediatric ambulatory settings

Country: USA

Main findings:

It is reported that “All patient care equipment should be cleaned at least daily while in use or when visibly contaminated and should be stored where it will not become contaminated”.

Assessment of evidence
Limitations: • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Gemmell L, Birks R, Radford P, et al. Association of Anaesthetists of Great Britain and Ireland. Infection Control in Anaesthesia. Anaesthesia. 2008; 63:1027-36. https://doi.org/10.1111/j.1365-2044.2008.05657.x Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Settings: Healthcare settings **Country:** United Kingdom **Main findings:** This guidance has a small section related to non-invasive equipment which indicates that detergent should be used once a day or when visibly soiled. “Local policies should be in place to ensure that all equipment that touches intact skin, or does not ordinarily touch the patient at all, is cleaned with a detergent at the end of the day or whenever visibly contaminated. This includes non-invasive blood pressure cuffs and tubing, pulse oximeter probes and cables, stethoscopes, electrocardiographic cables, blood warmers etc., and the exterior of anaesthetic machines and monitors. Items such as temperature probes should be for single patient use”. **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Main findings:

Before a procedure it is recommended to ensure that the transducer has been appropriately reprocessed and any ancillary equipment is clean.

- After a procedure the following is recommended “Immediately clean (e.g., remove any remaining gel, visible soil, or bioburden) and disinfect the transducer if classified as non-critical based on the procedure performed. If the transducer is classified as critical or semi-critical, place it in a transport container (e.g., container with lid, impermeable bag), label container as dirty with a biohazard symbol, and deliver it to the reprocessing area. Clean and disinfect all high-touch surfaces in the procedure area including, but not limited to bed railings and the ultrasound machine’s console and controls (see the manufacturer’s IFU or other guidance). Discard waste (e.g., used gloves, wipes, drapes) in a designated, approved receptacle.”

Assessment of evidence
"Reprocess the transducer and disinfect any ancillary equipment used between each patient use". **Limitations:** • Unclear development process • This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Siegel JD, Rhinehart E, Jackson M et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Updated September 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: The methodology utilised in this document is limited. However, it is stated that for some sections a search on Medline and PubMed were conducted but the dates of this for any updates are unclear. The document is considered as primarily based on CDC expert opinion.

Main findings:

“Noncritical equipment, such as commodes, intravenous pumps, and ventilators, must be thoroughly cleaned and disinfected before use on another patient. All such equipment and devices should be handled in a manner that will prevent HCW and environmental contact with potentially infectious material.” No citations are provided to support this.

“V.B.5.b In acute care hospitals and long-term care and other residential settings, […] clean and disinfect [noncritical shared] equipment before use on another patient. Category IB”

Contact precautions: “V.B.6. Environmental measures Ensure that rooms of patients on Contact Precautions are prioritized for frequent cleaning and disinfection (e.g., at least daily) with a focus on frequently-touched surfaces (e.g., bed rails, overbed table, bedside commode, lavatory surfaces in patient bathrooms, doorknobs) and equipment in the immediate vicinity of the patient. Category IB”

“IV.F.4 In facilities that provide health care to pediatric patients or have waiting areas with child play toys […] disinfecting toys at regular intervals. Category I”

For toys ‘mouthed’ “When a toy requires cleaning and disinfection, do so immediately or store in a designated labelled container separate from toys that are clean and ready for use”.

Limitations:

- Unclear development process

Assessment of evidence
• Not all recommendations are adequately supported by evidence but based on expert opinion.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Nyhsen CM, Humphreys H, Koerner RJ et al. Infection prevention and control in ultrasound-best practice recommendations from the European Society of Radiology Ultrasound Working Group. Insights into imaging. 2017 Dec; 8:523-35. doi:10.1007/s13244-017-0580-3.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Europe

Methods: This guidance document was developed by a working group. It is stated that literature was considered (unclear methods) but that there was an absence of evidence the guidance was formed using the expert opinion of the group. It stated that the working group agreed on the recommendations, but it is unclear if these were assessed externally or by user/patient groups. This guidance is specific to ultrasound equipment.

Main findings:

Recommendations for general principles

“Thorough decontamination of US transducers and any equipment in direct patient contact before and after every patient, to the level required for specific procedures and in compliance with manufacturer specifications to avoid transducer surface damage, should be carried out. This includes regular decontamination of the US keyboard/ console and any cables”.

“Regular deep cleaning of the entire US equipment and the surrounding environment is essential”.

Recommendations for transducer and other equipment

“All US equipment in direct or indirect patient contact must be thoroughly cleaned and disinfected at the start of the examination and after every patient”. “This includes the US transducer with handle, cable and transducer holder (as far as possible) as well as all additional devices which may be used during diagnostic or interventional procedures such as US fusion sensors/ cables, needle guides (if reused), etc”.

Recommendations for non-critical ultrasound examinations: “decontamination steps necessary at the start of the examination and after every patient are as follows”. This includes following manufacturer instructions and use of detergent and disinfection, as appropriate.

Assessment of evidence
Limitations: • Limited development process provided.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. September, 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Health and care settings **Country:** Canada					

Assessment of evidence

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.
- Recommendations were graded according to their strength of evidence and/or “predictive power of the study designs from which that data were obtained” (domains listed are “strength of study design, quality of study, number of studies, consistency of results and directness of evidence”). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

There is a higher risk of transmission when – “Shared patient care equipment without cleaning between episodes of patient care”

There was a lower transmission risk when – “Dedicated equipment or cleaning and disinfection of equipment between uses”

Recommendations within the section prevention of transmission to HCW:

“Used or potentially contaminated items that have had contact with a patient's intact skin should always be cleaned and disinfected before use with another patient.”

Role to reduce exposure/transmission of infective agents:

“Used or potentially contaminated items that have had contact with a patient's intact skin should always be cleaned and disinfected before use with another patient.”

Assessment of evidence

Recommendations for health care workers –

- “Non-critical patient care equipment and other items such as toys and electronic games should be identified and appropriately cleaned and disinfected before use with another patient. [CII]”
- Recommendations within the section for cleaning and disinfecting non-critical patient care equipment as routine.
- “Reusable non-critical equipment that has been in direct contact with a patient or in that patient's environment should be reprocessed with cleaning and low-level disinfection before use in the care of another patient. [AII]”
- “Items such as toys and electronic games that have been in direct contact with a patient or in that patient's environment should be reprocessed with cleaning and low-level disinfection before use by another patient. [AII]”
- “Non-critical patient care equipment dedicated to an individual patient should be cleaned and disinfected according to a regular schedule. [CII]”
- “Bedpans and commodes should be provided for single patient use and labeled appropriately. Bedpans and commodes should be reprocessed with cleaning and low-level disinfection before use by another patient. The use of single-patient-use disposable bedpans is acceptable. [CII]”
- Manufacturer's written instructions should be followed when using products for cleaning and disinfecting.
- Sterile and clean supplies should be stored in a designated and separate clean, dry area protected from dust. Sterile and clean supplies should not be stored under sinks and/or near plumbing, as leaks may occur. [CII]”

Recommendations under additional precautions – contact (and droplet airborne were recommended to follow routine unless contact precautions in place then follow contact as below) precautions.

- “All equipment/supplies should be identified and stored in a manner that prevents use by or for other patients. [CII]”
- “Non-critical patient-care equipment (e.g., thermometers, blood pressure cuff, pulse oximeter) should be dedicated to the use of one patient and cleaned and disinfected as per Routine Practices before reuse with another patient or a single-use device should be used and discarded in garbage after use. [BII]”

Assessment of evidence

- Toys, electronic games or personal effects should not be shared between patients. [CI]"

Recommendations for adaptations for ambulatory care settings –

- "Equipment and surfaces in direct contact with the patient or infective material (e.g., respiratory secretions, stool or skin exudates) should be cleaned and disinfected before the room is used for another patient. Contaminated reusable non-critical patient care equipment should be cleaned and disinfected before use with another patient".
- Between patient decontamination of equipment was also recommended for pre-hospital settings.

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Tacconelli E, Cataldo MA, Dancer SJ et al. ESCMID guidelines for the management of the infection control measures to reduce transmission of multidrug-resistant Gram-negative	Guidelines	AGREE II: Recommend with modifications	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
bacteria in hospitalized patients. Clin Microbiol Infect. 2014;20 Suppl 1:1-55. https://doi.org/10.1111/1469-0691.12427.					

Assessment of evidence

Country: Europe

Setting: Healthcare settings

Methods: An ESCMID produced guidance focusing on preventing and controlling multidrug-resistant gram-negative bacteria (MDR-GNB). The methodology includes a systematic search of relevant literature on MDROs and expert opinion consensus on the recommendations.

“We performed a systematic review of the articles published on this topic to determine the effects of different IPC interventions aimed at minimizing the spread of MDR-GNB and to define the indications for application of IPC measures for specific types of resistant strains in adult hospitalized patients. Our guidelines have been drawn up so as to be useful for a wide range of healthcare professionals, namely specialist physicians and other healthcare workers (infectious diseases, microbiology, surgery, intensive care), public health officers, infection control professionals, administrative personnel in hospitals, and epidemiologists”.

The level of evidence for and strength of each recommendation, were defined according to the GRADE approach.

Assessment of evidence

Main findings:

Recommendations:

“Shared equipment should be disinfected between use on different patients” & “When available, dedicate non-critical medical items for use on individual patients”.

‘Basic recommendation’ for ‘endemic situations’ for the following pathogens:

“ESBL-producing Enterobacteriaceae”,

“MDR-Pseudomonas aeruginosa”,

“MDR-Acinetobacter baumannii”.

Limitations:

- The experience or expertise of the stakeholders involved in consultation is unclear and there is no indication of patient or public representation. There was some lack of clarity on how the guidance may be used by a target audience. Unclear and limited review of the guideline by external stakeholders.
- Studies which applied a bundled approach were included in this guidance, the authors discussed that if a bundle was considered effective then they placed equal weighing to each aspect of the bundle. This may over/under-inflate some results.
- No procedure for updating the guideline and no updates since 2014.
- Unclear benefits/harms or tools on implementation of the guidance.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). NHSScotland national cleaning services specification (SHFN 01-02). Version 5. June 2016. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: This document is aimed to provide guidance on cleaning specification that allows NHS boards to accurately and effectively risk assess specific tasks to determine the frequency of cleaning based upon the risk to the patient and also public perception.

Main findings:

It is stated that “Boards must refer to standard risk assessments for each cleaning task before amending cleaning schedules, the priority being to reduce Healthcare Associated Infections (HAIs) at the same time as providing a safe, clean environment for patients’ recovery”.

Assessment of evidence
It also clarified that “These are not Health and Safety Risk Assessments but assessments of risk relating to prevention and control of HAIs. Therefore, they will be used to inform local frequencies”. This highlights that a one size may not fit all occasions and that the frequency of decontamination should be based on an assessment of the risk of HAI transmission. In ambulatory settings, “clean trolley cot/mattress after every patient use and as part of weekly vehicle clean”. **Limitations:** • Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Hart KM, Stapleton F, Carnet N et al. Optometry Australia's infection control guidelines 2020. Clinical and Experimental Optometry. 2021 Apr 3;104(3):267-84.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
https://doi.org/10.1080/08164622.2021.1887704.					

Assessment of evidence

Settings: Healthcare settings

Country: Australia

Scope: This guidance document provides “current infection control best practice, whilst recognising the practicalities of working in an optometry clinic.” Recommendations cover standard precautions for routine practice and transmission-based precautions based on patient risk targeted at “optometrists and practice staff”.

Main findings:

Australian level 4 guidelines covering “current infection control best practice, whilst recognising the practicalities of working in an optometry clinic.” Recommendations cover standard precautions for routine practice and transmission-based precautions based on patient risk. These guidelines are for optometry settings in Australia and are targeted at “optometrists and practice staff”.

Guidelines update was prompted by the COVID-19 pandemic, and literature of evidence gaps in optometry. Evidence sources include “peer-reviewed journal articles, guidelines from professional societies, government health departments and equipment manufacturers’ instructions”.

Recommendations for decontamination before and after use of specific non-critical devices is found in Appendix A2 (refer for further details):

- Non-critical devices recommended to be decontaminated before and after use: plastic tweezers, “Instrument-patient contact points e.g. forehead rests, chin rests, trigger buttons, patient handles (e.g. OCT, fundus camera)”, lid evertors, ophthalmoscopes, phoropter or refractor heads, trial frames and visual field perimeters.

Assessment of evidence
• Non-critical devices recommended to be decontaminated only after use: “contact lens trial set (storage) cases”, non-contact Fundus lenses, ocular or eye patches. **Limitations:** • Literature review methodology is very brief – does not report search terms, strategy, sources, date range, inclusion and exclusion criteria, selection of evidence, grey literature searches, supplementary searching. • Does not report how or if expert opinion informed guidelines – ‘best practice’ recommendations. • Some recommended decontamination products are based on registration by the ‘Therapeutic Goods Administration’ – an Australian government authority – thus may not be transferable to Scottish health and care settings. • Most relevant content (Appendix A2) references 1995 guidelines which may not reflect current IPC practices.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American College of Emergency Physicians (ACEP). Guideline for ultrasound transducer cleaning and disinfection. June 2018. Updated 2021.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Country: USA

Settings: Healthcare settings

Scope: US level 4 guideline targeted at members of ACEP provides recommendations for "the use of use of ultrasound gels, protective covers, probe cleaning and disinfection". Users are signposted to professional resources for ultrasound programme management for further guidance outside the provided content. No methodology is provided or linked to within the document. An addendum has been added to these guidelines following the COVID-19 pandemic.

Main findings:

"Transducers used externally on intact skin without contamination of blood or bodily fluids should undergo low-level disinfection between each us".

COVID-19 addendum:

"When scanning patients who are at low-risk for COVID-19 or are not in droplet precautions, we recommend disinfecting the probe and surfaces that were touched during the examination (screen, keyboard, cable, etc.) […] between each patient encounter".

"In situations when aerosolization or high-risk procedures can occur, probes and machines should be covered (if possible) and disinfected with low-level disinfection (LLD) after every use".

'Handheld devices' (touchscreen and probe) should be cleaned with low-level disinfectant after each use.

Limitations:

- No methodology provided – not reported how references were obtained.

Assessment of evidence
• Some recommended decontamination products are based on registration by the 'Environmental Protection Agency' – a USA government authority – thus may not be transferable to Scottish health and care settings. • Appendix on process of decontamination is in relation to disinfectant wipes – not included in this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Institute of Ultrasound in Medicine (AIUM). 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. Journal of ultrasound in Medicine, 42(7), E13–E22.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Country: United States of America (USA) **Setting:** Acute healthcare settings **Scope: "**The purpose of the first section of this document is to provide guidance regarding the cleaning and preparation of ultrasound transducers". **Main findings:** "Transducers need to be cleaned after each exam". "Preparation of external transducers between patients requires a low-level disinfection (LLD) process". **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Loveday HP, Wilson JA, Pratt RJ, et al. epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS	Guidelines	AGREE: Recommend with modifications	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
hospitals in England. Journal of Hospital Infection. 2014; 1-70. https://doi.org/10.1016/S0195-6701(13)60012-2.					

Assessment of evidence

Country: United Kingdom

Scope: These guidelines describe clinically effective measures that are used by healthcare workers for preventing infections in hospital and other acute healthcare settings".

Method: Whilst this guideline is based on a systematic literature review, some aspects of its method are not provided, such as the search strategy. The link between recommendations and supporting evidence is also unclear. There are few references regarding equipment decontamination, and it is graded as a good practice point (level D), suggesting it is primarily based on expert opinion. Therefore, although this guideline is graded AGREE: recommend with modifications, the relevant recommendations are expert opinion.

Main findings:

"Shared pieces of equipment used in the delivery of patient care must be cleaned and decontaminated after each use with products recommended by the manufacturer. Class D/GPP"

Limitations:

- Last updated 2014, now 10 years out-of-date.

Assessment of evidence
• Limited rigour of development including a lack of detail regarding the systematic methods used to search evidence as well as for selecting evidence. • The development processes for relevant recommendation is not clear. • Limited references in this section and considered as expert opinion, despite wider grade of the general document.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Settings: Healthcare settings **Country:** USA **Methods:** A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review. **Main findings:** Recommendations: • "Ensure that, at a minimum, noncritical patient-care devices are disinfected when visibly soiled and on a regular basis (such as after use on each patient or once daily or once weekly). Category II." • "If dedicated, disposable devices are not available, disinfect noncritical patient-care equipment after using it on a patient who is on contact precautions before using this equipment on another patient. Category IB" • "Cleaning and decontamination should be done as soon as possible after items have been used" – however this is not a graded recommendation. **Limitations:** • It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Main findings:

At all levels of equipment (high, intermediate, or low) it is stated that cleaning and/or disinfection and/or sterilisation should be conducted after each use/ between patient.

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Medicines and Healthcare Products Regulatory Agency (MHRA). Managing Medical Devices. Guidance for health and social care organisations. April 2014. Updated 25 February 2021. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Scope: This guidance document provides details regarding the management of medical device to align with regulations. “It explains how to develop a safe and efficient approach to managing medical devices, including: purchasing and accessing devices, using devices in practice, maintaining and repairing devices, disposing of devices that are no longer needed”.

Assessment of evidence

Main findings:

Inspection and care should be concluded as per the manufacturer's instructions. It is listed this will include:

"• checking that it is working correctly before use • regular cleaning • specific daily/weekly checks • noting when it has stopped working properly or when obvious damage has occurred, and then discontinuing use • contacting the relevant servicing organisation".

"Decommissioning should include decontamination, making the device safe and unusable. This is to ensure that an inappropriate person does not use the device and expose themselves and / or others to hazards".

"where applicable, devices should be decontaminated before disposal or transfer to a third party, and supplied with a certificate of decontamination".

"Healthcare organisations should keep patients, staff and visitors safe and have policies and systems in place to ensure that all reusable medical devices are properly decontaminated prior to use or maintenance, and that the risks associated with decontamination facilities and processes are well managed".

"Medical devices should be decontaminated and stored in accordance with legislation and best practice requirements, whilst following validated procedures".

"Items subject to inspection, maintenance, repair, or disposal, either on site or at the manufacturer's or agent's premises, should be decontaminated beforehand. Any loaned items being returned to a manufacturer or supplier should also be decontaminated".

"Once decontamination has been completed, the items should be labelled accordingly, and a declaration of contamination status form/label completed (or sent electronically). This should be readily accessible to the recipient of the device".

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland's Health and Social Care Services (SHTN 00-04). Last updated August 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: "This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Assessment of evidence
Main findings: “Organisations have an obligation to ensure any loaned medical devices have been decontaminated and are appropriately processed at time of use”. “Decommissioning should include decontamination. This is to ensure that an inappropriate person does not use the device and expose themselves and / or others to hazards”. “the organisation must ensure that the equipment is used and maintained in accordance with the manufacturer instructions”. **Limitations:** • Unclear development methodology.

Question 10: Who has responsibility for decontaminating non-invasive, reusable, shared care equipment?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Centers for Disease Control and Prevention (CDC). Core infection prevention and control practices for safe healthcare delivery in all settings. 2022. Updated April 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Country: USA **Setting:** Health and care settings					

Assessment of evidence
Methods: CDC healthcare infection control guidelines were reviewed, and recommendations included in more than one guideline were grouped into core infection prevention practice domains (e.g., education and training of HCP on infection prevention, injection and medication safety). Additional CDC materials aimed at providing general infection prevention guidance outside of the acute care setting were also reviewed. HICPAC formed a workgroup led by HICPAC members and including representatives of professional organizations (see Contributors in archives for full list). The workgroup reviewed and discussed all of the practices, further refined the selection and description of the core practices and presented drafts to HICPAC at public meeting and recommendations were approved by the full Committee in July 2014. In October 2022, the Core Practices were reviewed and updated by subject matter experts within the Division of Healthcare Quality Promotion at CDC. **Main findings:** The core principals themselves did not contain a recommendation specific to who should carry out decontamination the additional detail clearly outlines that the person(s) should be adequately trained. “Reprocessing personnel should have training in the reprocessing steps and the correct use of PPE necessary for the task. Competencies of those personnel should be documented initially upon assignment of their duties, whenever new equipment is introduced, and periodically (e.g., annually)”. **Limitations:** • Unclear development process. • The nature of updates and when they are made is unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. Updated 13 December 2022. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: England

Methods: "The previous Health and Social Care Act 2008: Code of Practice document for health and adult social care on the prevention and control of infections and related guidance. The code applies to NHS bodies and providers of independent healthcare and adult social care in England, including primary dental care, independent sector ambulance providers and primary medical care providers". This document sets out how English healthcare providers may adhere to the H&SCA 2008 regulations.

Assessment of evidence

Main findings:

With regards to general IPC: lead for IPC (including cleanliness), Directors of IPC, IPC infrastructure outlined.

With regards to criterion 2 (focused on cleanliness) there were number of responsibilities of the registered provider:

- "a specific individual has responsibility for oversight and management of cleaning, environmental services and decontamination of medical devices and equipment"
- "the designated lead for cleaning is responsible for all aspects of cleaning services, from contract negotiation and service planning to delivery at the care level"
- "there are effective arrangements for the appropriate cleaning of equipment that is used at the point of care, for example hoists, beds and commodes – these should be incorporated within appropriate cleaning, disinfection and decontamination policies"

"2.4 The designated decontamination lead should have responsibility for ensuring that policies are implemented and that they take account of best practice and national guidance" - many responsibilities are outlined including the repurposing of reusable medical device.

- "the decontamination of non-invasive service user equipment is enforced, for example beds, commodes, mattresses, hoists and slings, examination couches, trolleys and stretchers"

"2.5 The reusable medical devices and equipment decontamination policy should demonstrate that:

- it complies with national guidance by establishing essential quality requirements, and that a plan is in place for progression to best practice
- procedures for the acquisition, maintenance and validation of decontamination equipment follow national guidance
- staff are trained in cleaning and decontamination processes and the safe use of decontamination equipment, and hold appropriate competences for their roles

Assessment of evidence
• a record-keeping system is in place to ensure that decontamination processes are fit for purpose and use the required quality systems • decontamination of reusable medical devices takes place in compliant facilities that are designed for the purpose of decontaminating medical devices through validated processing systems and controlled environmental conditions. This is to ensure that all potential environmental, cross-infection, handling and medical device usage risks are minimised" Other relevant statements: • "for all healthcare settings, there are effective arrangements for the appropriate cleaning of equipment that is used at the point of care and which are based on the National Standards for Healthcare cleanliness responsibilities framework or equivalent standards and cleanliness charters. These should be incorporated within appropriate cleaning, disinfection and decontamination policies" • "The designated decontamination lead should have responsibility for ensuring that policies are implemented and that they take account of best practice and national guidance" and there are listed points that should be covered which includes the following: "the decontamination of non-invasive service user equipment is enforced, for example beds, commodes, mattresses, hoists and slings, examination couches, trolleys and stretchers" • "all staff receive suitable and sufficient IPC information, training and supervision relevant to their roles throughout their employment, to minimise the risks of IPC relevant principles of antimicrobial stewardship, risk assessment and how to escalate concerns" In terms of the staff who should be involved in cleaning the document states "staff are trained in cleaning and decontamination processes and the safe use of decontamination equipment, and hold appropriate competences for their roles", "In health and social care, all clinical and non-clinical staff have personal responsibility and accountability for maintaining a safe and clean care environment", "the person in charge of any area has direct responsibility for ensuring that cleanliness standards are consistently maintained".

Assessment of evidence
For primary dental care: “There should be a designated lead for cleaning and decontamination of the environment and equipment, who may be the same person as the lead for IPC, and who can access appropriate expert advice”. **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHS England. National Standards of Healthcare Cleanliness 2025. February 2025. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Settings: Healthcare settings **Country:** England **Main findings:** Within the executive summary of this document, it states that cleanliness is the responsibility of many people. “Focus on the need for a collaborative approach. Different staff groups, both clinical and non-clinical, will be responsible for cleaning different elements within an area; they need to work together to meet the cleanliness standard for the whole area. Published ratings					

Assessment of evidence
will reflect the cleanliness score for whole areas, not the performance of individual parties responsible for cleaning certain elements. Taking this approach makes it clearer to patients, staff, and visitors how clean an area is and encourages collective responsibility which ultimately inspires people to work together to achieve high standards". • Section three states that the responsibilities will "vary depending on the size of healthcare establishments and the clinical and non-clinical equipment they house". • "Assigning responsibility for specific cleaning functions is a significant and essential task. Cleaning professionals' experience suggests items such as patient-related equipment can easily 'fall through the gaps'. To capture all items that require cleaning, clinical and non-clinical teams must be consulted when agreeing local cleaning responsibility frameworks." • "Healthcare establishments must produce a local schedule of cleaning responsibilities detailing all items to be cleaned and who is responsible for cleaning each one. This must allow enough time to complete specific training tasks, and training to do this, regardless of the team member assigned to the task". • Two appendices are provided to support cleaning responsibilities 1 (cleaning framework example) and 2 (50 elements of cleaning clinical and nonclinical items). **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Services Scotland, Health Facilities Scotland. Health Facilities Scotland (HFS). Scottish Health Technical Memorandum (SHTM) 2030 Parts 1, 2 and 3: Washer-Disinfectors. Version 2. October 2001. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Healthcare settings

Scope: This document is aimed to provide guidance to Scottish hospitals, laboratories and healthcare facilities regarding the choice, specification, purchase, installation, validation, periodic testing, operation and maintenance of washer-disinfectors.

Assessment of evidence

Main findings:

The SHTM 2030 Part 2 states that it provides guidance to Scottish hospitals, laboratories and healthcare facilities regarding the operational management of washer-disinfectors. It is stated that management should be responsible for ensuring washing and disinfection is carried out in compliance with the law; to assure all staff involved in washing and disinfection are suitably qualified and trained for their responsibilities; other responsibilities were related to purchasing, installation, documentation about installation and about maintenance, quality control and procedural requirements. Reference is also made to legislative requirements of employers including regarding the health and safety at work act 1974, the management of health and safety at work regulations 1992, provision and use of work equipment regulations 1998, COSHH, PPER, consumer protection act 1987.

- "User 4.14 The user is defined as the person designated by management to be responsible for the management of a WD. 4.15 In a hospital the user could be a sterile services manager, theatre manager, endoscopy clinic manager, ward manager or laboratory manager; in primary care he/she could be a general practitioner, dentist or other health professional. When a WD is used to process equipment or containers for use in the preparation of medicinal products the user is normally the production manager in charge of the manufacturing process. The principal responsibilities of the user are as follows: a. to certify that the WD is fit for use; b. to hold all documentation relating to the WD; c. to ensure that the WD is subject to periodic testing and maintenance; d. to appoint operators where required and ensure that they are adequately trained; e. to maintain production records".

Other roles related to maintenance and etc are also provided but outside of the scope of this review.

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland's Health and Social Care Services (SHTN 00-04). Last updated August 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: **"**This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Assessment of evidence

Main findings:

Reference is made to the Provision and use of work equipment regulations 1998. This document suggests the following to adhere to this regulation “The employing organisation is responsible for ensuring their staff are trained and refreshed appropriately in the use of the equipment they provide them with”.

- User responsibilities - “ensuring they have been appropriately trained about the equipment they use, in accordance with the requirements of their employer; checking equipment prior to its use, including, as applicable, that the device is within its shelf life, its physical condition is acceptable, any necessary calibration or maintenance has been performed and they have access to any necessary instructions for use; performing any necessary day-to-day maintenance of that equipment prior to its use; identifying and reporting faulty equipment and usability issues promptly; managing infection prevention and control issues connected with the equipment they use in accordance with national and local policy; ensuring safe storage to protect from environmental contamination” – this suggests that the user may be responsible for IPC requirements in accordance with local and national policy.
- “An individual healthcare professional that uses the device in a way not intended, or against the instructions of the manufacturer, may be personally liable for any consequences. Users are reminded that such use would constitute ‘off-label’ use of the device” – this highlights the importance of adherence to manufactures instructions.
- Managements role is in overall accountability – the chief executive “has overall accountability for ensuring the organisation has robust and effective systems and controls in place to meet standards and regulatory requirements for the management of medical devices and equipment including appropriate systems of training”…“It is essential they designate a senior individual e.g. a director or board member, to have specific and all-inclusive responsibility for the management of medical devices and equipment.”
- In addition to a managerial accountability local accountability is also described “Within the organisation it is essential to have frontline operational managers and staff who also have a formal responsibility (not necessarily a full-time commitment) for medical devices and equipment.” “Part of the role would be to monitor and ensure that the system for

Assessment of evidence

managing medical devices and equipment is functioning as it should and critically to encourage and support the reporting of adverse incidents to IRIC and other appropriate official agencies".

- Departmental managers are outlined to have responsibility to "ensure" medical equipment "within their area of control is used in a safe manner".
- Other roles and responsibilities are also outlined including technical specialists and others. This document contains a clear list and indication of roles and responsibilities and may be linked to. It is also clear that those involved in managing medical equipment should be appropriately skilled/trained.

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
World Health Organization (WHO). Decontamination and reprocessing of medical devices for health-care facilities. 2016. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Setting: Healthcare settings **Country:** International **Methods:** The development processed utilised for this document is not clear. Authors claim the guidance was peer reviewed and the persons who conducted this are listed, the members of the working group are also provided. However, it is not clear what capacity the group and reviewers had in developing the guidance. **Main findings:** For staff involved in sterilisation and other aspects of decontamination, this document recommends that staff should be appropriately trained and should be certified for the grade of work they will be carrying out. This WHO document does not provide country specific certification or training requirements however curriculum suggestions are provided. **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Medicines and Healthcare Products Regulatory Agency (MHRA). Managing Medical Devices. Guidance for health and	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
social care organisations. April 2014. Updated 25 February 2021. Last accessed 16/06/2025.					

Assessment of evidence

Settings: Healthcare settings

Country: UK

Scope: This guidance document provides details regarding the management of medical device to align with regulations. “It explains how to develop a safe and efficient approach to managing medical devices, including: purchasing and accessing devices, using devices in practice, maintaining and repairing devices, disposing of devices that are no longer needed”.

Main findings:

Management - “The management structure for medical devices should have clear lines of accountability up to board level”. “These lines of accountability should be extended, where appropriate, to include general practitioners, residential and care homes, community-based services, independent hospitals providing services for NHS patients, managed care providers, Private Finance Initiative (PFI) organisations and other independent contractors. It is important to establish who is accountable, and where there is a need for joint accountability arrangements”.

A medical devices management group is recommended to develop and implement policies and procedure across the organisation with IPC representation as part of this group. “Healthcare organisations should keep patients, staff and visitors safe

Assessment of evidence

and have policies and systems in place to ensure that all reusable medical devices are properly decontaminated prior to use or maintenance, and that the risks associated with decontamination facilities and processes are well managed".

Other responsibilities - once a device is deployed to a department it is considered that "individuals working in the department generally have primary responsibility for the way they treat the device and the state in which it is left. These responsibilities can also include performance checks before use and routine maintenance, such as charging batteries. It is essential that all individuals are aware of the medical device management system and the part that they play within the system to ensure that medical devices are managed correctly".

Other persons with responsibilities are also listed. There is no specific IPC responsibility reported in this document.

"Clear responsibilities should exist for ensuring that the manufacturer's instructions are passed on to all users and, where appropriate, carers. The manufacturer's instructions may need to be supplemented with training. When manufacturers update their information, healthcare organisations should have a protocol for keeping track of all sets of instructions they hold or have issued to users to enable replacement of existing instructions with revised versions. Consideration should be made to updating the content of relevant training. Any shortcomings in the instructions should be reported to the MHRA as an adverse incident".

"All necessary information on storage, pre-use checks, use, maintenance, and cleaning should be passed on to the end user, including when the device is issued to a second or subsequent user. A failure to pass on to the end user the manufacturer's original instructions may compromise the end user's ability to use the device safely and may lay the healthcare organisation open to legal liability under: The Consumer Protection Act 1987 (in the case of a medical device), The General Product Safety Regulations 2005 (in the case of a consumer product not covered by other specific legislation), The Common Law of Negligence".

It is reported on page 34 that this applies to information on decontamination.

"Medical devices should be decontaminated and stored in accordance with legislation and best practice requirements, whilst following validated procedures".

Assessment of evidence
Limitations: • Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). NHSScotland national cleaning services specification (SHFN 01-02). Version 5. June 2016. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Country: Scotland **Settings:** Health and care settings **Scope:** This document is aimed to provide guidance on cleaning specification that allows NHS boards to accurately and effectively risk assess specific tasks to determine the frequency of cleaning based upon the risk to the patient and also public perception.

Assessment of evidence

Main findings:

This document is focused on cleaning of the environment; however, this specification may have some applicability to equipment cleaning. It is stated that “Locally, within each Board, the responsible person will be the Board Lead for Domestic Services”.

Other responsible persons:

Domestic assistant - “responsible for ensuring the environment is clean” through following standard operating procedures which detail duties and routines as well as reporting exceptions (where an area could not be cleaned).

Domestic supervisor – responsible for multiple activities including “day-to-day supervision of domestic assistants within an area or site”, auditing regularly, general supervision daily, regularly reviewing areas of responsibility and risk assessments, developing work schedules,. Reviewing exception reports.

Domestic manager – “responsible for overseeing the implementation and effective use of the NCSS” (this publication). Responsibilities listed include providing advice and support with issues, developing and reviewing work schedules (2-yearly sign off required) with domestic supervisors and reviewing processes, allocation of resources.

“Work schedules require to be signed off every two years by the Domestic Manager, Infection Prevention and Control Team and the Charge Nurse/Head of Department for each clinical area”.

In the event of an outbreak escalation to the domestic manager is described as preferred with them able to then liaise with those involved and them able to assure the correct staffing levels and that any required temporary adjustments to work schedules are made. – A flow chart is provided to detail best practice for this interaction.

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Loveday HP, Wilson JA, Pratt RJ, et al. epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection. 2014; 1-70. https://doi.org/10.1016/S0195-6701(13)60012-2.	Guidelines	AGREE: Recommend with modifications	N/A	N/A	N/A

Assessment of evidence

Country: United Kingdom

Scope: These guidelines describe clinically effective measures that are used by healthcare workers for preventing infections in hospital and other acute healthcare settings".

Assessment of evidence
Method: Whilst this guideline is based on a systematic literature review, some aspects of its method are not provided, such as the search strategy. The link between recommendations and supporting evidence is also unclear. There are few references regarding equipment decontamination, and it is graded as a good practice point (level D), suggesting it is primarily based on expert opinion. Therefore, although this guideline is graded AGREE: recommend with modifications, the relevant recommendations are expert opinion. **Main findings:** "All healthcare workers need to be educated about the importance of maintaining a clean and safe care environment for patients. Every healthcare worker needs to know their specific responsibilities for cleaning and decontaminating the clinical environment and the equipment used in patient care. Class D/GPP" **Limitations:** • Last updated 2014, now 10 years out-of-date. • Limited rigour of development including a lack of detail regarding the systematic methods used to search evidence as well as for selecting evidence. • The development processes for relevant recommendation is not clear. • Limited references in this section and considered as expert opinion, despite wider grade of the general document.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Royal College of Nursing (RCN). Essential practice for infection prevention and control. Guidance for nursing staff. 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: UK

Main findings:

"Every health and social care provider (hospital, GP surgery, clinic, or nursing home) should have in place clear systems for identifying which staff are responsible for cleaning which equipment (for example, nurses, cleaners or dedicated equipment cleaning teams). All staff should be aware and comply with local policies for decontamination of equipment".

Limitations:

- No methodology is provided for its formation, it is noted that it was compiled of professional sources, but that its accuracy cannot be guaranteed.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Scottish Executive Health Department. HDL(2005)7. Infection control and cleaning: nursing issues. 18 March 2005. Last accessed 16/06/2025.	Directorate letter	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Scope: "This Letter reinforces and clarifies nursing responsibilities in relation to the prevention and control of healthcare associated infection (HAI) and environmental cleanliness".

Main findings:

"Cleaning 9. Sisters/Charge Nurses are responsible for ensuring safe working conditions within their clinical areas. This includes all aspects of environmental cleanliness. Chief Executives should ensure that Sisters/Charge Nurses have the authority to require local cleaning services to act on any problems identified".

"10. If patients, visitors or staff have concerns over cleaning in healthcare premises, the Sister/Charge Nurse should be their first point of contact. If concerns remain, the hospital's formal complaints procedure should be used, and the Chief Executive will be responsible for investigating and resolving the issue. The public should be made aware of this through posters (Visitors – help us to fight infection was recently distributed by SEHD – see www.scotland.gov.uk/hai), and this information should be included in any appropriate locally produced patient information leaflets".

Question 11: Where should non-invasive, reusable, shared care equipment be stored following decontamination?

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
American Institute of Ultrasound in Medicine (AIUM). 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. Journal of ultrasound in Medicine, 42(7), E13–E22.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Country: United States of America (USA) **Setting:** Acute healthcare settings **Scope: "**The purpose of the first section of this document is to provide guidance regarding the cleaning and preparation of ultrasound transducers". **Main findings:** "Storing—Transducers need to be stored in accordance with their disinfection level". **Limitations:** • Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Australasian Society for Ultrasound in Medicine (ASUM) and the Australasian College for Infection Prevention and Control (ACIPC). Guidelines for reprocessing	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017;20(1):30-40. https://doi.org/10.1002/ajum.12042					

Assessment of evidence

Country: Australasia

Setting: Acute healthcare settings

Main findings:

"After cleaning, all transducers must be stored in an appropriate environment to protect from environmental contamination (AS/NZS4187:2014, Table 5.1).

It is recommended that a specific cabinet is used, but if this is not available the minimum standard recommended is a clean disposable cover applied to the transducer to mitigate risks from environmental contaminants".

Limitations:

- Unclear development process.
- Developed for Australasian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NSS Health Facilities Scotland (HFS). Scottish Health Technical Memorandum 01-01. Decontamination of medical devices in a central decontamination unit. Part A: Management. September 2018. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Country: Scotland **Setting:** Acute healthcare settings **Scope:** "SHTM 01-01 Part A content includes quality management, the decontamination process, general validation of equipment, health and safety, infection control precautions, regulatory framework, reporting incidents outbreaks and distribution of safety alerts, repair, refurbishment and quarantine of medical devices, functional roles and responsibilities, permit-to-work					

Assessment of evidence
system, medical devices potentially contaminated with Transmissible Spongiform Encephalopathy (TSE) infectivity, disposal and metal recycling and procurement". "The European Union (EU) Regulation 2017/745 on medical devices and standard EN 17664: 2017 'Processing of health care products - information to be provided by the medical device manufacturer for the processing of medical devices' are also considered in Part A". **Main findings:** "Sterile medical devices should be stored in a manner that will not compromise their quality including their sterility status. Refer to Scottish Health Planning Note (SHPN) 13 Part 1: 2011 for sterile medical devices stored within a CDU and for sterile medical devices stored in a clinical setting refer to GUID 5010: 2014 – 'Management of reusable surgical instruments during transportation, storage and after clinical use'." **Limitations:** • Unclear development process. • It may not be fully applicable as it is primarily focused on medical equipment that required sterilisation (such as surgical instruments) most of which would not be considered as relevant to this review which focuses on non-invasive care equipment only.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Centers for Disease Control and Prevention (CDC). Core infection prevention and control practices for safe healthcare delivery in all settings. 2022. Updated April 2024. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A
Assessment of evidence					
Country: USA **Setting:** Health and care settings **Methods:** CDC healthcare infection control guidelines were reviewed, and recommendations included in more than one guideline were grouped into core infection prevention practice domains (e.g., education and training of HCP on infection prevention, injection and medication safety). Additional CDC materials aimed at providing general infection prevention guidance outside of the acute care setting were also reviewed. HICPAC formed a workgroup led by HICPAC members and including representatives of professional organizations (see Contributors in archives for full list). The workgroup reviewed and discussed all of the					

Assessment of evidence
practices, further refined the selection and description of the core practices and presented drafts to HICPAC at public meeting and recommendations were approved by the full Committee in July 2014. In October 2022, the Core Practices were reviewed and updated by subject matter experts within the Division of Healthcare Quality Promotion at CDC. **Main findings:** Relevant core practices included in the list are as follows: 2.“Maintain separation between clean and soiled equipment to prevent cross contamination”. **Limitations:** • Unclear development process. • The nature of updates and when they are made is unclear.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Department of Health and Social Care (DHSC). Infection prevention and control: resource for adult social care. 31 March 2022. Updated 01 March 2024.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Last accessed 16/06/2025.					

Assessment of evidence

Settings: Health and care settings

Country: England

Main findings:

“Care equipment should be standardised wherever possible and be stored to ensure it does not become contaminated, including during transport between people’s homes. It is easier for staff to clean and safely use equipment they are familiar with”.

This indicates that storage of equipment should prevent its contamination. Though it is not specific on what this storage area may look like nor does it provide any clarity on where may not be unsuitable.

Limitations:

- Unclear development process.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. Updated June 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief methodology is provided but it is too short to appraise effectively. This document considered surfaces and equipment, however, only equipment is relevant for this review as environmental surfaces will be considered in the environment review.

Assessment of evidence
Main findings: Recommendations: “Ensure the sterile storage area is a well-ventilated area that provides protection against dust, moisture, insects, and temperature and humidity extremes. Category II” **Limitations:** • It is mentioned that a Medline search was conducted to consider references until 2006. The terms are not provided, and abstract only publications were also considered but reported as not used to form recommendations.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
NHSScotland Assure. Guidance on Safe Management of Medical Devices and Equipment in Scotland’s Health and Social Care Services (SHTN 00-04). Last updated August 2024. Last accessed 24/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Country: Scotland

Settings: Health and care settings

Scope: "This document is aimed to provide public sector health and care organisations (NHS Boards and Local Authorities (LA) with a one-stop compendium of published guidance, legislation, standards, and policy in Scotland relating to health technology, medical devices and equipment. Recognition is given to relevant guidance documents from across all political regions of the UK".

Main findings:

It is stated that this SHTN applies so medical equipment and device which includes hoists and wheelchairs.

Storage of equipment is briefly covered generally (not specific to post-decontamination) within this document.

- "Storage issues should also be considered within the department/ward or location the equipment is intended for and should be clean and in a good state of repair".
- "Consideration should be given to security to avoid theft or damage from environmental hazards".
- "Equipment should be adequately protected to avoid damage, whether crated or not. Consideration should be given to any periodic cleaning requirements of the storage location or of the equipment being stored in line with policy and guidance".

Limitations:

- Unclear development methodology.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Society of Diagnostic Medical Sonography. Sonographer best practices for infection prevention and control: Reprocessing the ultrasound transducer. Updated 20 October 2020. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: USA

Methods: A brief development process provided states that an expert task force developed the guidance with external consultation described however participation within the task force or consultation is not clearly described.

Main findings:

“Proper storage reduces the risk of re-contamination of the transducer from environmental contaminants or accidental contamination. Storage practices, including maximum storage duration should be consistent with the transducer’s intended use,

Assessment of evidence
manufacturer's IFU, and facility's policies. Suitable options for transducer storage include storage covers, boxes, or cabinets (e.g., HEPA filtered, ventilated or non-ventilated). Clearly label the container holding the transducer with disinfection level, storage date, and maximum storage duration. Maintain distinct separation of clean and dirty transducers. Dirty transducers should not be placed in the same cabinet as clean transducers". **Limitations:** • Unclear development process • This guidance is specific to the decontamination of ultrasound transducers, some of which are considered as invasive and out-with the scope of this review.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Hart KM, Stapleton F, Carnet N et al. Optometry Australia's infection control guidelines 2020. Clinical and Experimental Optometry. 2021 Apr 3;104(3):267-84.	Guidance	Level 4	N/A	N/A	N/A

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
https://doi.org/10.1080/08164622.2021.1887704.					

Assessment of evidence

Settings: Healthcare settings

Country: Australia

Scope: This guidance document provides “current infection control best practice, whilst recognising the practicalities of working in an optometry clinic.” Recommendations cover standard precautions for routine practice and transmission-based precautions based on patient risk targeted at “optometrists and practice staff”.

Main findings:

Recommendations for storage of non-critical optometry devices is found in Appendix A2 (refer for further details):

- Clean, covered container: plastic tweezers, non-contact Fundus lenses, lid evertors (if metal), oculars or eye patches, ophthalmoscopes, phoropter or refractor heads, trial frames.

“Cover instrument with dust cover at end of each day or when not in use”: “instrument-patient contact points e.g., forehead rests, chin rests, trigger buttons, patient handles (e.g., OCT, fundus camera)”, non-contact tonometer’s, visual field perimeters.

Limitations:

- Literature review methodology is very brief – does not report search terms, strategy, sources, date range, inclusion and exclusion criteria, selection of evidence, grey literature searches, supplementary searching.
- Does not report how or if expert opinion informed guidelines – ‘best practice’ recommendations.

Assessment of evidence
• Some recommended decontamination products are based on registration by the 'Therapeutic Goods Administration' – an Australian government authority – thus may not be transferable to Scottish health and care settings. • Most relevant content (Appendix A2) references 1995 guidelines which may not reflect current IPC practices.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
National Health and Medical Research Council (NHMRC). Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia. 2019. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence
Country: Australia **Setting:** Health and care settings **Methods:** Authors state that the evidence base is formed of an amalgamation of “international IPC guidelines, systematic literature reviews, horizon scans, work on HAI prevention from the Australian Commission on Safety and Quality in Health Care (ACSQHC), national discipline-based infection control guidelines, and Australian Standards”. **Main findings:** “All items must be stored in a way that maintains their level of reprocessing (e.g. sterile, high level disinfected). Dry, sterile, packaged instruments and equipment should be stored in a clean, dry environment and be protected from sharp objects that may damage the packaging”. **Limitations:** • No references provided for this statement. • Unclear evidence (if any) was utilised to form this section of the guidance. Other sections are underpinned by literature reviews, but it is not clear what if any primary evidence was used to formulate these guidelines. • Developed for Australian settings.

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Public Health Agency of Canada (PHAC). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. September 2017. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Health and care settings

Country: Canada

Methods: A guideline created through a working group (membership listed). “Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care.”

- A literature search from the year 1999 was conducted, but details of this search, including systematic methods if any, are only available on request, thus this document was graded SIGN50 level 4.

Assessment of evidence

- Recommendations were graded according to their strength of evidence and/or "predictive power of the study designs from which that data were obtained" (domains listed are "strength of study design, quality of study, number of studies, consistency of results and directness of evidence"). Evidence gaps were stated to be supplemented by expert opinion. Authors report that consensus was reached for all content included. Following its development, the guidance was subject to external stakeholder review.
- Equipment decontamination overlaps with the environmental decontamination recommendations. It is not clear if those only referring to equipment are relevant or if more general environmental details are also relevant. To be certain only those details specifically related to equipment have been pulled out.

Main findings:

This document described that HCW should consider point-of-care risk assessment to assist in deciding the level of control measures required. Increasing to cleaning and disinfection of care equipment (from cleaning only) is reported as necessary to consider where transmission risks are higher.

"Sterile and clean supplies should be stored in a designated and separate clean, dry area protected from dust. Sterile and clean supplies should not be stored under sinks and/or near plumbing, as leaks may occur. [CII]" (CII = studies of low quality, contradictory results, or expert opinion)

"All equipment/supplies should be identified and stored in a manner that prevents use by or for other patients. [CII]" (CII = studies of low quality, contradictory results, or expert opinion)

Limitations:

- Unclear development process

Study	Study Type	Evidence Level	Intervention	Comparison	Outcome measure
Health Facilities Scotland (HFS). SHFN 30. Part A: Manual. Information for design teams, construction teams, estates & facilities and infection prevention & control teams. October 2014. Last accessed 16/06/2025.	Guidance	Level 4	N/A	N/A	N/A

Assessment of evidence

Settings: Healthcare settings

Country: Scotland

Scope: This guidance provides Built Environment Infection Prevention and Control information for Design Teams, Construction Teams, Infection Prevention and Control Teams and Estates & Facilities Teams.

Assessment of evidence

Main findings:

A clear methodology for development is not provided though input from a steering group and pilot study group is indicated within the acknowledgement section. A Scottish technical guidance for use across health and care settings with a focus on the build environment.

“Equipment storage (SHPN 04-01, SHPN 36, and SHTM 63)

5.49 Storage areas need to be appropriate for the operational requirements of each clinical area.

5.50 The need for sufficient secure storage should not be underestimated. Many briefs start with sufficient storage, but this space is often lost to other areas during the design process. This can have implications for both clinical practice and infection prevention and control.

5.51 Storage away from areas of clinical activity is required for both small and bulky items of equipment to minimise clutter, enabling efficient environmental cleaning.

5.52 All healthcare premises need a storage area for large pieces of equipment such as beds, mattresses, hoists, wheelchairs and trolleys that are not currently in use. The use of equipment libraries can be an effective way of storing, maintaining and decontaminating large or electrical equipment.

5.53 Cleaning equipment, laundry and healthcare (including clinical) waste need to be stored in separate purpose-built areas to prevent cross-contamination.

5.54 Sufficient and appropriate storage will protect equipment from damage, contamination and dust, which may potentially carry microorganisms, but should also allow free access to floors and shelves for cleaning.”

Limitations:

- Unclear development process

Assessment of evidence
• Authors state that this is to “ensure that there are facilities in place to help fulfil the mandatory requirements outlined in the National Infection Prevention and Control Manual”. Hence, there’s a risk of duplication and bias.