NHS National Services Scotland

Safe Management of the Care Environment (Environmental Decontamination and Management of Blood and Body Fluid Spillages)

Considered Judgement Form

Version 1.0

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

Version history

Version	Date	Summary of changes
V1.0	March 2026	New document

Approvals

Version	Date Approved	Group/Individual
V1.0	March 2026	ARHAI Scotland National Policy, Guidance and Evidence (NPGE) Working Group

Contents

Research Question 1: What is the risk of healthcare associated infection (HAI) from the care environment?

A: Quality of evidence

1.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Two studies were included for this research question: • One outbreak study graded SIGN 50 level 3[1] • One prospective cohort study graded SIGN 50 level 2+[2] The SIGN 50 level 3 study has methodological limitations, including a small sample size. The SIGN 50 level 2+ prospective cohort study was graded as such due to lack of detail on participant dropout rate, blinding, and potential confounding variables.	1 x SIGN 50 level 2+ 1 x SIGN 50 level 3

1.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

The evidence was unable to be directly compared given the heterogeneity between the studies. Both studies used genetic methods to confirm strain matches (whole genome sequencing[1] and pulsed field gel electrophoresis[2]) and demonstrated plausible environment to case link despite environmental decontamination procedures in place (routine daily cleaning and terminal decontamination between patients with chlorine dioxide[1] or quaternary ammonium[2]). Mode of transmission in both studies is unclear:

- A SIGN 50 level 3 outbreak study by Cheng *et al.* (2019) demonstrated a temporal link between an environmental source (window bench) and a patient cluster of community-associated methicillin-resistant *Staphylococcus aureus* (MRSA).[1]
- A SIGN 50 level 2+ prospective cohort study by Chen *et al.* (2019) demonstrated acquisition of *Clostridioides difficile* infection (CDI) from the environment (rooms whose prior occupant was on contact precautions).[2]

1.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments

The country or countries in which the studies were conducted are as follows:

- USA[2] (n=1)
- Hong Kong[1] (n=1)

The infection prevention and control (IPC) practices in non-UK settings (Hong Kong and the US) presented in the primary literature may not be fully applicable to Scottish health and care settings and are likely only applicable to the population and setting included in the study at that time point. However, this is difficult to determine accurately as studies lacked detail in these areas. This includes environmental decontamination products and methods. This variation reduces the applicability of these studies to Scottish health and care setting.

1.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
The included outbreak report is specific to the described population in a neonatal unit.[1] Meanwhile, in the included prospective cohort study, most patients were based in general medicine or oncology and haematology wards (79%).[2] Therefore, the findings may not be generalisable out-with these specific patient cohorts. Sample sizes of both these studies were small, with risk of HAI from the environment only being demonstrated by three[1] and two[2] patients in each study, further limiting generalisability. However, outbreak studies are uncontrolled and observational therefore aspects such as sample size and methods of sample selection are not relevant.

1.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results (and thus a risk that results from published studies are systematically different from unpublished evidence).

Comments
A formal assessment of publication bias was not conducted. The research question is subject to publication bias as not all outbreaks or incidents related to the environment are published in scientific journals. The two included primary studies reported on common hospital infectious agents (multi-drug-resistant organisms), so bias of over reporting of unusual organisms is not evident for this question.

B: Evidence to decision

1.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP1.1 The care environment should be considered a potential source for transmission of healthcare-associated infections.	Good practice point

1.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond infection prevention and control.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP1.1 Consideration of the care environment as a potential source of transmission of healthcare-associated infections supports regular decontamination practices and audit, supporting a safe environment for patients, service users, staff and visitors. GPP1.1 Consideration of the care environment as a potential source of transmission of healthcare-associated infections may support investigation and management of incidents and outbreaks in health and care settings.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP1.1 No risks or harms anticipated.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the individual service user, staff or visitor perspective, the societal perspective, or both. Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events (or vice versa).

Benefit-Harm assessment
GPP1.1 Only benefits identified.

1.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs

- material or human resource requirements
- facility needs
- sustainability issues
- human factors

and any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP1.1 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support consideration of the care environment as a potential source for transmission of HAIs.

1.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP1.1 The evidence regarding HAI risk from the environment was insufficient in terms of demonstrating a clear transmission event, but it is the expert opinion of ARHAI Scotland and its stakeholders that other factors support there being a risk including knowledge that the environment can become contaminated and infectious agents may remain viable on surfaces.

1.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP1.1 No value judgements to note.

1.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality, anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP1.1 No intentional vagueness to note.

1.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP11.1 No exceptions to note.

1.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research

The evidence regarding risk of healthcare associated infection from the care environment is limited and inconsistent. More rigorous primary studies demonstrating temporal link between the care environment and patient cases would be a beneficial addition to the evidence base. However, it is acknowledged that this type of research might be difficult to obtain due to ethical issues and other difficulties associated with conducting and reporting epidemiological studies in health and care settings.

Research Question 2: What is environmental decontamination?

A Quality of Evidence

2.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Thirteen pieces of evidence were included for this research question: • One guideline (UK epic3) graded AGREE II 'recommend with modifications'[3] • 12 guidance documents graded SIGN 50 level 4 expert opinion.[4-15] SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. The epic3 guideline carried out a systematic review of primary evidence, however aspects of the methodology such as the search strategy was not provided. Consequently it was graded AGREE II 'recommend with modifications'.[3] No primary research was identified for this question, which is expected based on the question topic and scope.	1 x AGREE II 'recommend with modifications' 12 x SIGN 50 level 4

2.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

Environmental Decontamination

Five SIGN 50 level 4 guidance and one AGREE 'recommend with modifications' guideline define environmental decontamination as the use of physical or chemical methods to remove, inactivate, or destroy microorganisms (including infectious agents) on a surface or item so that it is no longer capable of cross transmission 3, 4, 6, 8, 12, 16

Cleaning

- Six SIGN 50 level 4 guidance and one AGREE II 'recommend with modifications' guideline consistently define cleaning as physical removal of contamination[8] (including soil, dirt, dust, blood, secretions, excretions and some microorganisms) from surfaces,[3] using friction as a means of removal.[3, 5-7, 9, 10] Only one SIGN 50 level 4 guidance specifies that cleaning does not necessarily destroy all microorganisms.[8]
- Six SIGN 50 level 4 guidance consistently mention the use of manual or mechanical methods for cleaning[4-7, 12, 16] and eight SIGN 50 level 4 guidance documents advise that detergents and water[4-8, 10, 12, 16] or surfactants are used.[10] Three SIGN 50 level 4 guidance refer to the term 'cleaning' but do not define the product that should be used for this.[13-15]

Four SIGN 50 level 4 guidance and one AGREE 'recommend with modifications' guideline advise that cleaning should be carried out before disinfection[3, 5, 10, 12] or sterilisation.[8]

- Disinfection is consistently defined in four SIGN 50 level 4 guidance and one AGREE II 'recommend with modifications' guideline as the use of chemical or physical methods to reduce the number of viable microorganisms on surfaces to a level that is unlikely to cause infection, which can kill most microorganisms but may not kill all bacterial spores and viruses. [5, 7, 8, 12, 16]
- Sterilisation is consistently defined in five SIGN 50 level 4 guidance as the destruction of all forms of microorganisms.[6-8, 10, 12] Two SIGN 50 level 4

Comments
guidance specify that sterilisation often uses physical or chemical methods.[6, 12]

2.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries in which the guidance and guideline apply to are as follows: • UK (n=3)[3, 8, 9] • US (n=5)[10, 12-15] • Canada (n=2)[7, 16] • Australia (n=1)[6] • Asia Pacific region (n=1)[5] • International (n=1)[4] Of the thirteen included documents, two were published for UK health and care settings.[3, 9] Guidance from the HSE is not specific to health and care settings however, the guidance is for general health and safety in the workplace and the principles in this are applicable to Scottish health and care settings.[8] The remaining ten expert opinion guidance documents are applicable to health and care settings,[4-7, 10, 12-16] including one guidance which was specifically developed for 'emergency medical vehicles and equipment', however the same principles of environmental decontamination apply,[7] and one guidance for operating rooms.[15] Differences in health and care systems, national legislations and IPC practices may impact applicability to Scottish health and care settings.

2.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were identified for this research question.

2.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
No primary evidence was identified for this research question therefore risk of publication bias is not applicable.

B: Evidence to Decision

2.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP2.1 Environmental decontamination should be defined as a process which removes, inactivates or destroys micro-organisms (including infectious agents) on a surface or item so that it is no longer capable of cross-transmission. Environmental decontamination is an umbrella term, encompassing cleaning, disinfection and sterilisation as required and according to the infection risk.	Good practice point

2.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP2.1 Defining environmental decontamination supports regular decontamination practices and audit, and a safe environment for patients, service users, staff and visitors. GPP2.1 Using standardised terminology promotes consistency, safety and clarity across NHSScotland health and care settings.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP2.1 No risks or harms anticipated.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP2.1 Only benefits identified.

2.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP2.1 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support application of terminology ‘environmental decontamination’.

2.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP2.1 ARHAI Scotland and its’ stakeholders are in agreement with five SIGN 50 expert opinion and one AGREE II ‘recommend with modifications’ guidance which define environmental decontamination as physical or chemical methods to remove, inactivate or destroy microorganisms on a surface or item so that it is no longer capable of cross-transmission.[3, 4, 6, 8, 12, 16]

2.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP2.1 No value judgements to note.

2.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP2.1 No intentional vagueness to note.

2.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP2.1 No exceptions to note.

2.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
No recommendations for research to note.

Research Question 3: For the purpose of environmental decontamination what is the care environment, including patient zones?

A Quality of Evidence

3.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Five pieces of evidence were included for this research question:[4-6, 17, 18] Five guidance documents graded SIGN 50 level 4 expert opinion. SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. For example, guidance from Australia followed a GRADE methodology (Grading of Recommendations, Assessment, Development and Evaluations) however, for this question there were no graded recommendations. The NHSScotland National Cleaning Specification (NCSS) guidance from NHS Scotland Assure has minimal reference to the evidence base and instead was developed by an 'expert task force' which could introduce bias. No primary evidence was identified for this research question, which is expected based on the question topic and scope.	5 x SIGN 50 level 4

3.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

The evidence base is consistent regarding the following:

- Four SIGN 50 level 4 guidance divide the health and care environment by how frequently surfaces are touched[4-6, 18] for the purpose of environmental decontamination.
- Two SIGN 50 level 4 guidance, including the NHSScotland National Cleaning Service Specification (NCSS) Scottish Health Facilities Note (SHFN) 01-02, discuss determining risk rating based on the care environment.[5, 17]
- Two SIGN 50 level 4 guidance consistently describe the patient's immediate surroundings,[6, 18] and three SIGN 50 level 4 guidance consistently describe frequently touched surfaces (by the patient or HCW) or surfaces in direct physical contact with the patient.[5, 6, 18]

The evidence base is inconsistent regarding the following:

- One SIGN 50 level 4 guidance document, the NCSS SHFN 01-02 describes the environment as clinical and non-clinical areas.[17]
- Guidance from Australia describes 'patient areas' and surroundings which could be described as 'zones' however this highlights inconsistency in terminology.[6]

3.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries to which the guidance applies are as follows: • Scotland, UK (n=1)[17] • Australia (n=1)[6] • Asia Pacific region (n=1)[5] • International (n=2)[4, 18] All included guidance was developed for health and care settings, including surgical settings.[4] Guidance from NHS Scotland Assure was developed for Scottish health and care settings, accounting for relevant logistical considerations, practices and policies and is highly applicable.[17] Guidance from Australia could be considered less applicable due to differences in health and care systems and national legislations, however similar infection prevention and control practices may enhance the applicability.[6] All other included guidance[4, 5, 18] are applicable internationally to settings with differing levels of resource, which may limit direct applicability to Scottish settings.

3.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were identified for this question.

3.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
No primary evidence was identified for this research question therefore risk of publication bias is not applicable.

B: Evidence to Decision

3.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP3.1 For the purpose of environmental decontamination, the care environment should be defined as the physical space where care is provided and includes clinical and non-clinical areas.	Good practice point
The evidence base regarding patient zones is limited, and so no precise definition could be provided.	Not applicable

3.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP3.1 Defining the health and care environment can determine risk and focus for undertaking effective environmental decontamination and therefore reducing the risk of HAI from the environment.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP3.1 No risks or harms anticipated.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP3.1 Only benefits identified.

3.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP3.1 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support application of the 'care environment' in health and care settings.

3.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP3.1 It is the expert opinion of ARHAI Scotland and its stakeholders that for the purposes of environmental decontamination, the care environment is the physical space where care is provided. Furthermore, it is the expert opinion of ARHAI Scotland and its stakeholders that this includes clinical and non-clinical areas, as per the NCSS (SHFN 01-02).[17] This definition of the care environment may mean

Expert opinion
that some areas where patient and service user care is not provided will also require resource for routine cleaning and decontamination, including corridors, entrance areas and lifts.

3.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP3.1 No value judgements to note.

3.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP3.1 The definition of the care environment is intentionally vague to support applicability to a wide range of health and care settings.

3.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP3.1 No exceptions to note.

3.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
No recommendations for research to note.

Research Question 4: What different types of environmental decontamination are undertaken in health and care settings and why are they required?

A Quality of Evidence

4.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Seven pieces of evidence were included for this research question: • One guideline graded AGREE II 'recommend with modifications'[3] • Six guidance documents[5-7, 10, 16, 17] graded SIGN 50 level 4 expert opinion. SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. For this research question, the included evidence was not derived from specific recommendations within guidance documents but included in the guidance as definitions or free text. The epic3 guideline carried out a systematic review of primary evidence, however aspects of the methodology such as the search strategy were not provided. Consequently it was graded AGREE II 'recommend with modifications'.[3]	1 x AGREE II 'recommend with modifications' 6 x SIGN 50 level 4

Comments	Evidence level
No primary evidence was identified for this research question.	

4.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments
The evidence consistently defines the following types of environmental decontamination and is consistent regarding the following: • Routine cleaning is consistently defined as regular or scheduled cleaning (three SIGN 50 level 4)[6, 7, 16] to reduce risk of cross contamination and to remove dust, soil, stains and residue (two SIGN 50 level 4).[7, 16] The NCSS[17] and HICPAC[10] use this terminology but do not provide a definition (two SIGN 50 level 4). Other terminology used to describe this process in two SIGN 50 level 4 guidance include 'routine practice' and 'hotel clean'.[5, 16] • Terminal decontamination is consistently defined as decontamination following patient transfer or discharge (three SIGN 50 level 4 and one AGREE II 'recommend with modifications').[3, 6, 16, 17] Guidance from APSIC and HICPAC refer to terminal cleaning or disinfection throughout the guidance but do not define this (two SIGN 50 level 4).[5, 10] Consistency could not be assessed given that only one piece of evidence defined the following: • Check cleaning is defined as a visual check for cleanliness such as spots, spillages and/ or general debris frequently throughout the day which may prompt additional cleaning (one SIGN 50 level 4).[17] • Discharge cleaning is not consistently defined in the evidence (one SIGN 50 level 4),[17] but the terminology is used interchangeably with 'terminal cleaning' in one guidance (SIGN 50 level 4).[6] • Enhanced decontamination is defined as "cleaning methods in addition to standard cleaning specifications" such as "increased cleaning frequency for all or some surfaces, or the use of additional cleaning equipment", which may be applied in specific circumstances such as colonised patient transfer

Comments

or discharge. This definition was only described in the UK epic3 guideline (one AGREE II 'recommend with modifications').[3]

- Source isolation cleaning is defined as decontamination where patients with known or suspected alert organism or communicable disease are cared for with minimal contact with other patients (one SIGN 50 level 4).[17]

All seven evidence sources consistently refer to the term 'cleaning' to describe the different types of environmental decontamination undertaken in health and care settings which is technically incorrect, as 'cleaning' refers to only implementing that specific level of decontamination and does not account for situations where disinfection or sterilisation would occur.

4.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments

The country or countries to which the guidance and guideline apply are as follows:

- UK (n=2)[3, 17]
- Australia (n=1)[6]
- Canada (n=2)[7, 16]
- US (n=1)[10]
- Asia Pacific region (n=1)[5]

All guidance and guidelines are applicable to health and care settings, apart from one guidance which was specifically developed for emergency vehicle settings,[7] however the general principles on types of environmental decontamination available in health and care settings can be applied. The NCSS was specifically developed for NHSScotland health and care settings and is highly applicable, accounting for logistics, IPC practices and policies across NHS boards and organisations in Scotland.[17] Similarly, the epic3 guideline[3] (for NHS England hospitals) is directly applicable to Scottish health and care settings.

Comments
Regarding guidance published out with the UK, variation in IPC practices and policies, and differing levels of resource may impact applicability to NHSScotland health and care settings.[5-7, 10, 16]

4.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included.

4.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
No primary evidence was included for this research question therefore risk of publication bias is not applicable.

B: Evidence to Decision

4.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP4.1 Routine environmental cleaning should be carried out on a scheduled basis and is part of usual practice to remove dust, soiling, stains and residue.	Good practice point
GPP4.2 Enhanced decontamination describes increased decontamination frequency for selected surfaces and areas, in addition to routine cleaning, and should be carried out during outbreaks and when a patient or service user has known or suspected infectious status.	Good practice point
GPP4.3 Terminal decontamination is the decontamination (including cleaning and disinfection) of an entire room or area during or after use and should be carried out for patients or service users with known or suspected infectious status and upon the cessation of an outbreak.	Good practice point

4.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP4.1, GPP4.2 and GPP4.3 Using standardised terminology promotes consistency, safety and clarity across NHSScotland health and care settings.
GPP4.1 Implementation of routine cleaning on a scheduled basis reduces the risk of cross-contamination, and therefore the risk of HAI from the environment.
GPP4.1 Routine cleaning may support staff confidence regarding safety of the area they are working in.
GPP4.2 Enhanced decontamination supports increased environmental decontamination where required without the same disruption to services as terminal decontamination.
GPP4.3 Implementation of terminal decontamination in a room during or after use ensures a safe environment for the next patient, service user, staff and visitors who will enter that room.
GPP4.3 Terminal decontamination may increase staff confidence regarding safety of the area they are working in.
GPP4.3 Terminal decontamination of a room may increase patient and service user confidence that the area that they are in is clean and safe.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP4.1 No risks or harms anticipated. GPP4.2 and GPP4.3 Unfamiliar terminology (“enhanced decontamination” and “terminal decontamination”) may lead to confusion among those carrying out enhanced and terminal decontamination.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP4.1 Only benefits identified. GPP4.2 and GPP4.3 It is expected that the benefit of applying more accurate terminology to describe these processes will outweigh the harms.

4.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues

- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP4.1, GPP4.2 and GPP4.3 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support compliance with undertaking the appropriate type of decontamination within health and care settings. However, for most settings these practices are already established. GPP4.2 and GPP4.3 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support use of correct terminology within health and care settings.

4.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP4.1 ARHAI Scotland and its stakeholders are in agreement with extant guidance which defines routine environmental cleaning as regular cleaning which is carried out on a regular basis (three SIGN 50 level 4),[6, 7, 16] implemented to reduce the risk of cross-contamination (one SIGN 50 level 4)[16] and to remove dust, soil, stains and residue (one SIGN 50 level 4).[7] GPP4.2 ARHAI Scotland and its stakeholders support the definition of enhanced decontamination as per epic3 guidelines (graded AGREE II ‘recommend with modifications’).[3] However, it is acknowledged that this definition is provided within the Glossary of this guideline so supporting evidence is not clear. Although this definition describes enhanced decontamination being applied for patient transfer and discharge, it is the expert opinion of ARHAI Scotland and its stakeholders that enhanced decontamination applies during outbreaks and when a patient or service user has known or suspected infectious status. GPP4.3 While terminal decontamination is defined as decontamination of an area following transfer or discharge of a patient (one AGREE II ‘recommend with

Expert opinion
modifications guideline and three SIGN 50 level 4 guidance)[3, 6, 16, 17] or service user, it is the expert opinion of ARHAI Scotland and its stakeholders that terminal decontamination is not only carried out upon transfer or discharge. For example, other indications for terminal decontamination include significant environmental contamination and when a patient or service user was once infectious but has now been deemed non-infectious. Moreover, guidance by the CDC and HICPAC refer to terminal cleaning and terminal disinfection,[10] and it is the expert opinion of ARHAI Scotland and its stakeholders that 'terminal decontamination' accurately captures the process of both cleaning and disinfecting care areas.

4.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP4.1, GPP4.2 and GPP4.3 No value judgements to note.

4.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state "none". Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons

- ethical or religious reasons

Intentional vagueness
GPP4.1, GPP4.2 and GPP4.3 No intentional vagueness to note.

4.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP4.1, GPP4.2 and GPP4.3 No exceptions to note.

4.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
No recommendations for research to note.

Research Question 5: Are there any legislative requirements or standards that should be adhered to when undertaking environmental decontamination?

A Quality of Evidence

5.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Eighteen pieces of evidence were included for this research question: • Five pieces of 'mandatory' graded legislation[19-23] • Four guidance documents graded SIGN 50 level 4 expert opinion,[9, 17, 24, 25] Nine standards,[26-34] graded SIGN50 level 4 expert opinion. SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. The predominance of legislation and standards over primary research is expected and appropriate for this research question.	5 x 'mandatory' legislation 13 x SIGN50 level 4

5.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

Legislation

Two of the included guidance graded SIGN 50 level 4 consistently recommend that mandatory COSHH legislation is adhered to when undertaking environmental decontamination.[9, 17] Guidance from the HSE (one SIGN 50 level 4) supports implementation of legislation including for the COSHH and the biocidal regulations, the consistency of which has not been assessed.[25]

Due to the nature of the evidence, consistency amongst the legislation included for this research question could not be evaluated. Legislation relevant to environmental decontamination includes:

- The Public Health etc. (Scotland) Act 2008, which ”makes provisions for the protection of public health in Scotland”, including the prevention and control of infectious diseases.[21]
- The Control of Substances Hazardous to Health (Amendment) Regulations 2004 (COSHH), which describe requirements to protect employees from substances hazardous to their health within the workplace.[22]
- The Health and Safety at Work etc Act 1974 is the generic health and safety legislation relating to occupation health at work.[20]
- The Detergents (Amendment) (EU Exit) Regulations 2020 applies to the biodegradability of surfactants used in detergents and is therefore applicable to environmental decontamination.[19]

The Personal Protective Equipment at Work Regulations 1992 regulate PPE use.[23]

Standards

- BS EN Standard 14885:2022 can be considered a master document containing relevant standards for surface disinfectants used in the medical setting.[26] Each of the eight included standards within this master document provide minimum laboratory tests that a product must pass to claim the intended microbiological outcome.[27-34]

Comments
• BS EN standards follow consistent methodology in that they comprise of two phases – in vitro testing and simulation of practical conditions with and without mechanical action. • However, there is some variation in the test microorganism utilised which differs depending on activity being investigated, including bactericidal[28, 29, 33] and yeasticidal[29, 33, 34] activity, with additional considerations given to mycobactericidal,[27] virucidal,[30, 32] sporicidal[31] and/or fungicidal.[33, 34]

5.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
All included guidance, standards and legislation applies to the UK (n=18).[9, 17, 19-22, 24-26] Two of the included guidance is applicable to UK health and care settings.[9, 17] Although legislation included is directly applicable to Scotland,[19-23] none of the legislation is specific to health and care settings. Similarly, guidance from the HSE is applicable as this is a national (UK) regulatory body for health and safety in the workplace but is not specific for health and care settings.[24, 25] The included BS EN standards include specifications for 'surface disinfectants used in medical areas' however applicability to Scottish health and care settings may be limited by laboratory methods used which may not be encountered in real-world clinical settings.[26-34]

5.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as there were no primary research studies included for this question.

5.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
Risk of publication bias is not applicable due to the type of evidence identified for this research question.

B: Evidence to Decision

5.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
R5.1 The following legislation must be adhered to when undertaking environmental decontamination in Scottish health and care settings: • The Public Health etc. (Scotland) Act 2008 • The Health and Safety at Work etc. Act 1974 • The Control of Substances Hazardous to Health (COSHH) Regulations 2002 • Detergents (Amendment) (EU Exit) Regulations 2020 • The Personal Protective Equipment at Work (Amendment) Regulations 2022	Recommendation
GPP5.1 Surface disinfectants intended for environmental decontamination in health and care settings should have broad-spectrum antimicrobial activity (for example bactericidal, virucidal, yeasticidal, fungicidal and sporicidal) and meet the relevant	Good practice point

Recommendation	Grading
standards for antimicrobial activity as detailed in Appendix 5 of the literature review.	

5.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
R5.1 Adhering to current legislation and regulations supports compliance with associated corporate and social governance responsibilities, including the legal requirements of the applicable health and safety management policy. GPP5.1 Ensuring surface disinfectants for environmental decontamination meet industry standards will allow for standardisation when purchasing disinfectant products. GPP5.1 Ensuring surface disinfectants have broad-spectrum antimicrobial activity provides assurance that common HAI organisms will be eliminated during environmental decontamination and therefore the environment will be safe. GPP5.1 Procurement of products which meet relevant standards supports compliance with regulations, for example by providing accurate information regarding product hazards, supporting comprehensive COSHH risk assessments by employers. GPP5.1 Ensuring surface disinfectants for environmental decontamination meet industry standards supports standardisation of available products made for use. GPP5.1 Procurement of products which meet relevant industry standards may result in increased decontamination efficacy and therefore user confidence when using the products.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
R5.1 and GPP5.1 No risks or harms anticipated.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
R5.1 and GPP5.1 Only benefits identified.

5.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues

- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
R5.1 No additional resource or feasibility issues are expected because of adhering to relevant legislation and standards. GPP5.1 There may be financial implications relating to the procurement of suitable, compliant products. GPP5.1 There may be resource implications for those procuring products, as they will be required to check that disinfection products meet the relevant standards for broad-spectrum antimicrobial activity.

5.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
R5.1 The evidence is sufficient to support this recommendation as it is based solely on legislation. There is no additional expert opinion to note. GPP5.1 Nine BS EN standards informed this GPP (graded SIGN 50 level 4, expert opinion).[26-34] Despite their low quality due to limited detail on methodology and laboratory study-focus, British, European and International standards are considered best practice in UK industry settings. Therefore, it is the expert opinion of ARHAI Scotland and its stakeholders that disinfectant products used in health and care settings should meet the provisions of the relevant standards to ensure consistency and reliability, and demonstrate broad-spectrum antimicrobial activity to support effective environmental decontamination.

5.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action

often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
R5.1 and GPP5.1 No value judgements to note.

5.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
R5.1 and GPP5.1 No intentional vagueness to note.

5.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
R5.1 and GPP5.1 No exceptions to note.

5.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
Published research investigating product efficacy against specific pathogens using BS EN standards methodology would support transparency and comparison due to comparable methods and findings relating to active ingredient. Furthermore, BS EN standards methodologies which investigate product efficacy in real-world clinical settings may strengthen the evidence base for effectiveness in clinical environments and therefore support assessment of applicability to Scottish health and care settings.

Research Question 6: What methods and techniques are recommended for decontamination of the health and care environment?

A Quality of Evidence

6.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Twelve pieces of evidence were included for this topic: • One laboratory study graded SIGN 50 level 3[35] • 11 guidance documents graded SIGN 50 level 4 expert opinion.[4-7, 9, 10, 12, 13, 16, 17, 36] SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. The SIGN 50 level 3 evidence is limited by the controlled laboratory study design, unlikely representative of environmental contamination and cleaning methods and techniques in real world clinical settings.[35] The lack of high-quality research is a limitation for this research question.	1 x SIGN 50 level 3 11 x SIGN 50 level 4

6.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

Consistency could not be assessed as there was only one primary study included to answer this research question:

- A laboratory study (SIGN 50 level 3) found that *C. difficile* contamination was significantly reduced following mechanical wiping when compared with use of the product on its' own without mechanical wiping.[35]

The available guidance consistently recommends that:

- Decontamination should be undertaken from cleanest or least soiled to the dirtiest or most soiled areas (four SIGN 50 level 4).[5, 7, 17, 36]
- Risk assessments should be undertaken related to environmental decontamination methods and techniques (four SIGN 50 level 4).[6, 9, 13, 17]
- Dusting methods that disperse dust should be avoided in immunocompromised patient areas[10] and surgical settings (two SIGN 50 level 4).[4]
- For horizontal surfaces, wet dusting may be carried out with a clean cloth soaked in detergent or disinfectant in settings with immunocompromised patients[10] and in health and care settings in general[12] (two SIGN 50 level 4).
- Regarding terminal decontamination, items should be removed prior to room or area decontamination (two SIGN 50 level 4).[5, 16]

Consistency of standard operating procedures (SOPs) in the NCSS (SHFN 01-02)[17] and Safe Management of the Care Environment (SHFN 01-05) for care homes[36] was not assessed as SOPs are not evidence-based, are high-level and do not provide detailed methods and techniques as defined in this research question.

6.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments

Applicability of the included primary study to real-world settings is limited by the controlled laboratory settings in which it was set. The study was UK-based so findings are likely applicable to Scottish health and care settings due to the products under investigation.[35]

The country or countries to which the guidance and guideline apply are as follows:

- UK (n=3)[9, 17, 36]
- Canada (n=2)[7, 16]
- Australia (n=1)[6]
- Asia Pacific (n=1)[5]
- US (n=3)[10, 12, 13]
- Internationally (n=1)[4]

All guidance is applicable to health and care settings, apart from two guidance documents which were specifically developed for 'emergency vehicle settings'[7] and surgical settings,[4] however the general principles of environmental decontamination methods (techniques) can be applied to all health and care settings.

The NCSS[17] and care homes NCSS[36] were specifically developed for NHSScotland health and care settings and are highly applicable, accounting for logistics, IPC practices and policies across NHS boards and organisations in Scotland. Similarly, other UK RCN guidance is directly applicable to Scottish health and care settings.[9]

Regarding guidance documents published out-with the UK (n=6), [5-7, 10, 13, 16] variation in IPC practices and policies, and differing levels of resource may impact applicability to NHSScotland health and care settings. Moreover, one guidance from the WHO is applicable internationally to settings with differing levels of resource,[4] which may limit direct applicability to Scottish settings.

6.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

6.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
A formal assessment of publication bias was not conducted. There is a risk of publication bias with the laboratory study included, as studies that did not show efficacy of different methods or techniques for environmental decontamination may not have been published. Risk of publication bias is not applicable for the remainder of the evidence in this research question due to the type of evidence identified.

B: Evidence to Decision

6.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP6.1 The NHSScotland National Cleaning Services Specifications (SHFN 01-02 for healthcare settings and SHFN 01-05 for care homes) outlines decontamination methods for each location in the health and care environment which should be followed by health and care staff.	Good practice point
GPP6.2 Before carrying out a terminal decontamination of a room or care area, any bed screens, curtains, bedding, and the patient or service user's belongings should be removed. If patient or service user belongings are present, they should be securely stored before the environmental decontamination process begins.	Good practice point
GPP6.3 Environmental decontamination in all circumstances should be undertaken from high to low, and cleanest or least soiled to the dirtiest or most soiled areas.	Good practice point

Recommendation	Grading
GPP6.4 Damp dusting methods should be undertaken in health and care settings to reduce dispersal of micro-organisms.	Good practice point

6.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP6.1 Following national guidance (NCSS, SHFN 01-02) for environmental decontamination in health and care settings supports standardisation of practice, patient and service user safety and workforce efficiency.
GPP6.1 Compliance with national guidance (NCSS, SHFN 01-02) for environmental decontamination may increase staff and service user confidence and efficacy in the organisation's arrangements for maintaining environmental cleanliness.
GPP6.1 Compliance with national guidance (NCSS, SHFN 01-02) for environmental decontamination may increase the likelihood that cleaning and disinfection tasks are reliably and consistently carried out, therefore reducing the risk of HAIs.
GPP6.2 Removing bed screens, curtains, bedding and patient and service user's belongings before carrying out terminal clean reduces the likelihood of cross-contamination of these items during environmental decontamination, therefore reducing the risk of HAI.
GPP6.3 Carrying out environmental decontamination from cleanest or least soiled to dirtiest or most soiled areas reduces the likelihood of cross-contamination of clean areas from highly contaminated areas, therefore reducing the risk of HAI.

Benefits
GPP6.4 Damp dusting methods may reduce the risk of environmental contamination via dust dispersal and therefore reduce the risk of HAI.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP6.1, GPP6.2, GPP6.3 and GPP6.4 No risks or harms anticipated.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP6.1, GPP6.2, GPP6.3 and GPP6.4 Only benefits identified

6.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs

- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP6.1, GPP6.2, GPP6.3 and GPP6.4 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support staff to carry out appropriate methods and techniques for environmental decontamination within health and care settings. However, for most settings these practices are already well established. GPP6.2 Storage capacity will be required to hold bed screens, curtains, bedding and patient and service user's belongings during terminal decontamination. However, for most settings these practices are already established GPP6.4 There may be financial implications relating to the procurement of equipment to support damp dusting. However, it is understood that this is already established practice.

6.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP6.1 ARHAI Scotland and its stakeholders support use of SOPs in SHFN 01-02 and SHFN 01-05 which describe decontamination methods by location in the health and care environment.[17, 36] GPP6.2 ARHAI Scotland and its stakeholders support removal of items prior to terminal decontamination, including patient and service user belongings, bed

screens, curtains and bedding as well as contaminated, disposable and used items, as per two SIGN 50 level 4 expert opinion guidance.[5, 16]

GPP6.3 This GPP is informed by four SIGN 50 level 4 guidance that advise that decontamination should be undertaken from cleanest or least soiled to the dirtiest or most soiled.[5, 7, 17, 36] It is also the expert opinion of ARHAI Scotland and its stakeholders that environmental decontamination should be undertaken from high to low.

GPP6.4 Although two SIGN 50 level 4 expert opinion guidance were included that advise against dusting methods that disperse dust, these guidance documents refer to areas with immunocompromised patients or service users and surgical settings.[4, 10] The CDC recommend wet-dusting methods as an alternative for immunocompromised patients[10] and for cleaning and disinfecting surfaces in health and care settings in general[12] (two SIGN 50 level 4). These recommendations are made based on primary research.[10, 12] Although "wet-dusting" is described in these guidance documents, this terminology is understood to mean damp dusting. It is the expert opinion of ARHAI Scotland and its stakeholders that this applies to all care settings, as at-risk patients may be present across the healthcare estate.

6.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP6.1, GPP6.2, GPP6.3 and GPP6.4 No value judgements to note.

6.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state "none". Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence

- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP6.1, GPP6.2, GPP6.3 and GPP6.4 No intentional vagueness to note.

6.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP6.1 While the NHSScotland National Cleaning Services Specifications (SHFN 01-02 for healthcare settings and SHFN 01-05 for care homes) define the minimum national standards for environmental decontamination across all patient and resident areas, it is recognised that individual Boards or organisations may identify specific local risks or operational factors that warrant deviation or enhancement beyond these. In such cases, a documented local risk assessment should be undertaken to support any variation. This must consider the specific needs of the care setting, patient or service user population, infection risks, and available resources, and should be approved through appropriate governance structures to ensure safety, accountability, and alignment with overarching IPC principles. GPP6.2 It is recognised that it may not always be possible to fully vacate patient rooms for terminal decontamination (for example, due to bed occupancy). Therefore, individual Boards or organisations should have SOPs for terminal decontamination of areas which cannot be fully vacated. GPP6.3 and GPP6.4 No exceptions to note.

6.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
While one primary study was included which assessed mechanical wiping in a controlled laboratory setting,[35] further research into the efficacy of specific methods and techniques for environmental decontamination may be beneficial.

Research Question 7: When and how should different products be used for decontamination of the health and care environment?

A Quality of Evidence

7.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Sixteen pieces of evidence were included for this topic: • One guideline graded AGREE II 'recommend with modifications'[3] • 15 guidance documents graded SIGN 50 level 4 expert opinion[4-8, 11-17, 36-38] SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. The epic3 guideline followed a systematic review process and weighs higher in quality that the expert opinion-based guidance, however this does have limitations including a lack of search strategy and issues with rigour of development.[3] No relevant primary evidence was identified for this research question. The lack of high-quality research is a limitation for this research.	1 x AGREE II 'recommend with modifications' 15 x SIGN50 Level 4

7.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

Detergent

- Three SIGN 50 level 4 guidance consistently describe the physical action of cleaning with a detergent diluted with water,[5-7] two of which also describe the removal or break down of organic material, microorganisms, grease and dirt from surfaces.[5, 7]
- One SIGN 50 level 4 guidance states that detergents do not have antimicrobial claims.[12] This is consistent with the findings of research question 5 wherein the British Standards do not require detergents used as cleaning agents to demonstrate antimicrobial effectiveness.

When to use a detergent product for environmental decontamination

- Five SIGN 50 level 4 guidance documents are consistent in stating that detergents should be used for routine cleaning.[4-6, 12, 36]
- Two SIGN 50 level 4 guidance are consistent in advising to clean (with detergent) general surfaces and fittings when visibly soiled and immediately after spillage.[6, 12]
- Four SIGN 50 level 4 guidance are consistent in advising that a detergent should be applied before using a disinfectant.[4-6, 13]
- Four SIGN 50 level 4 guidance advise that detergent should always be applied in a combined detergent and disinfectant product[4-6, 16]

Disinfectant

- One SIGN 50 level 4 expert opinion guidance states that disinfectants are not general cleaning agents and are used for disinfection.[5]
- Two SIGN 50 level 4 guidance listed the following active ingredients often used as disinfectants: chlorine, phenolics, iodophors and alcohols.[5, 8]
- Five SIGN 50 level 4 guidance are consistent in advising that disinfectants should be ‘hospital grade’ for health and care settings.[5-8, 16]

Comments

When to use a disinfectant product for environmental decontamination

There is some consistency in the literature regarding use of disinfectant for:

- routine disinfection of high-touch surfaces in 'emergency medical vehicles and equipment' (one SIGN 50 level 4)[7] and high-touch surfaces in cases of respiratory viral infections (SIGN 50 level 4)[11] and in areas housing patients on contact or isolation precautions (one SIGN 50 level 4)[13]
- where there is uncertainty about the nature of soiling on surfaces (one SIGN 50 level 4),[6] or when surfaces come into contact with blood or body fluids (one SIGN 50 level 4).[4]
- outbreak situations (two SIGN 50 level 4)[6, 16]
- the presence of norovirus, (two SIGN 50 level 4)[6, 16] and MDROs (two SIGN 50 level 4)[6, 14] including *C. difficile* (three SIGN 50 level 4)[5, 6, 16] and carbapenem-resistant gram-negative *Bacilli* colonisation or infection (one SIGN 50 level 4).[37]

Consistency could not be assessed given that only one piece of evidence referred to disinfection for the following:

- Routine disinfection of sanitary fixtures and fittings, specifically using a chlorine releasing agent at 1,000ppm (care homes NCSS) (one SIGN 50 level 4)[36]
- For cases of infection or colonisation with an infectious agent that is known to survive in the environment, (one AGREE II 'recommend with modifications' guideline)[3]
- When undertaking isolation or terminal decontamination (one SIGN 50 level 4).[17]
- Between patients in dental settings[12]
- How to use a detergent and/ or disinfectant product for environmental decontamination

There was consistency regarding the following:

- Seven SIGN 50 level 4 guidance are consistent in specifying that the method for using a detergent and/ or disinfectant depends on different factors which should be specified in the manufacturer's instructions[5, 7, 12, 13, 15, 16, 38] or by 'facility policy'.[12]

Comments

- One SIGN 50 level 4 guidance by HSE states that this should include concentration, contact time, dose, surface type and pathogen-specific information.[8]

Consistency could not be assessed given that only one piece of evidence referred to use of detergent or disinfectant for the following:

- The care homes NCSS suggests using a fresh solution of general-purpose neutral detergent in warm water (one SIGN 50 level 4).[17]
- Cleaning or disinfection solution should be changed every 15 minutes, when moving onto a new location, as per manufacturer's instructions (one SIGN 50 level 4).[17]
- Cloths should not be 'double dipped' into disinfectant solutions, which should be changed regularly (one SIGN 50 level 4).[12]

7.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments

The country or countries to which the guidance applies are as follows:

- UK (n=4)[3, 8, 17, 36]
- Europe (n=1)[11]
- Australia (n=1)[6]
- Canada (n=3)[7, 16, 37]
- USA (n=5)[15 12-14, 38]
- Asia Pacific region (n=1)[5]
- Internationally (n=1)[4]

All guidance is applicable to health and care settings, apart from three guidance documents one of which was developed for 'emergency vehicle settings'[7] and two for surgical settings,[4, 15] however the general principles of when and how to use detergents and disinfectants can be applied to all health and care settings. The

Comments
NCSS[17] and care homes NCSS[36] were specifically developed for NHSScotland health and care settings and are highly applicable, accounting for logistics, IPC practices and policies across NHS boards and organisations in Scotland. Similarly, other UK developed guidance is directly applicable to Scottish health and care settings.[3] Guidance from the UK HSE is not specific to health and care settings however, the guidance is for general health and safety in the workplace and the principles in this are applicable to Scottish health and care settings.[8] Eleven SIGN50 level 4 guidance documents were published out with the UK.[5-7, 11-16, 37, 38] Variation in IPC practices and policies may impact applicability to NHSScotland health and care settings. One guidance from the WHO is applicable internationally to settings with differing levels of resource,[4] which may limit direct applicability to Scottish settings.

7.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

7.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
A formal assessment of publication bias was not conducted. Efficacy of certain detergents and disinfectants for decontamination in health and care settings may be published by manufacturers and not be available in the scientific evidence base which may pose an element of publication bias. Assessing manufacturers product details is out-with the scope of this systematic literature review.

B: Evidence to Decision

7.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP7.1 Detergents should be used for routine environmental cleaning.	Good practice point
GPP7.2 A detergent should be used prior to a disinfectant, unless a combined detergent and disinfectant product is used.	Good practice point
GPP7.3 Disinfectants (including a combined detergent and disinfectant) should be used for decontamination of the environment where a patient or service user has a known or suspected transmissible infection and/ or where there is environmental contamination with blood and body fluids.	Good practice point
GPP7.4 Disinfectants should be used for decontamination of all sanitary fittings. Sanitary fittings include toilets, sinks, basins, baths, taps and fixtures.	Good practice point
GPP7.5 Manufacturer's instructions should be followed regarding how a detergent, disinfectant or combined detergent and disinfectant product should be used.	Good practice point

Recommendation	Grading
In addition, local policies and guidelines should be adhered to where applicable.	
GPP7.6 Detergent and disinfectant solutions should be changed as per manufacturer's instructions and decontamination equipment (for example, disposable cloths) should not be double dipped (re-submersed) into solutions.	Good practice point

7.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP7.1, GPP7.3 and GPP7.4 Using detergents, disinfectants and combined detergent and disinfectant products for environmental decontamination in health and care settings may reduce the risk of HAI from the environment, supporting patient and service user safety. GPP7.1 Using detergent for routine environmental cleaning reduces the risk of harsh chemicals degrading surfaces within the environment, which may lead to a higher risk of environmental contamination. GPP7.2 Using a detergent prior to a disinfectant or a combined detergent and disinfectant product ensures removal of organic matter, supporting effective disinfection. GPP71 and GPP7.3 Avoidance of inappropriate use of disinfectants for routine cleaning reduces the risk of organisms becoming resistant. GPP7.3 and GPP7.4 Using a disinfectant rather than a detergent ensures microorganisms are killed, supporting environmental decontamination.

Benefits
GPP7.5 and GPP7.6 Adherence with manufacturer's instructions ensures products work as intended and deliver their tested efficacy. GPP7.5 Adherence with manufacturer's instructions supports compliance with regulations such as COSHH. GPP7.5 Following local policies and guidelines ensures a consistent approach to environmental decontamination where manufacturer's instructions may lack detail. GPP7.1, GPP7.3, GPP7.4 and GPP7.5 Using the correct products and following manufacturer's instructions for use may help prevent surface material damage and maintain decontamination equipment in good working order. GPP7.6 Avoiding double dipping used cloths into detergent and disinfectant solutions reduces the risk of contaminating the solution with environmental contaminants.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP7.1, GPP7.2, GPP7.5 and GPP7.6 Only benefits identified. GPP7.3 and GPP7.4 Frequent use of disinfectants may lead to damage, corrosion and discolouration of environmental surfaces. GPP7.3 and GPP7.4 Use of disinfectants in health and care settings may contribute to antimicrobial resistance. However, this is an unknown risk, which cannot be quantified based on the evidence from the current literature review.

Benefit-Harm assessment

Classify as "benefit outweighs harm" (or vice versa) or a "balance of benefit and harm." Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP7.1, GPP7.2, GPP7.5 and GPP7.6 Only benefits identified. GPP7.3 and GPP7.4 The requirement to decontaminate environmental surfaces with disinfectants to eliminate micro-organisms and reduce the risk of HAI from the environment outweighs the risk of these products damaging these surfaces. Adherence with manufacturer's instructions (as per GPP7.5 and GPP7.6) may reduce this risk. A benefit harm assessment could not be made as the review did not assess the risk of antimicrobial resistance and this remains an area of uncertainty. However, as there are clear IPC benefits of using chemical disinfectant for decontamination, including prevention of onward transmission of infectious agents, these products should continue to be used until an evidence-based assessment of the risks can be made.

7.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP7.1, GPP7.3, GPP7.4 and GPP7.5 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required, and to support staff to determine the appropriate product for cleaning or decontamination within health and care settings. However, for most settings these practices are already established. GPP7.1, GPP7.2, GPP7.3, GPP7.4 and GPP7.6 There may be financial implications related to procurement of detergents, disinfectants and combined detergent and disinfectant products for environmental cleaning and decontamination. GPP7.5 and GPP7.6 Human resource for education, training and audit (inclusive of acknowledging human factors) may be required to support adherence with manufacturer's instructions in health and care settings. However, for most settings these practices are already established. GPP7.5 Human resource may be required to develop and support local policy provision. GPP7.6 Avoidance of double-dipping single-use cloths or disposable paper towels into detergent or disinfectant solutions may contribute to higher volumes of waste and have sustainability implications.

7.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP7.1 ARHAI Scotland and its stakeholders support the five SIGN 50 level 4 expert opinion guidance which consistently advise the use of detergents for routine environmental cleaning. [4-6, 12, 36] No additional expert opinion to note. GPP7.2 This GPP was informed by four SIGN 50 level 4 guidance which advise that a detergent should be used before a disinfectant product.[4-6, 13] No additional expert opinion to note. GPP7.3 The evidence base consists of one guideline and nine guidance documents that advise that disinfectants should be used during outbreaks (two

Expert opinion

SIGN 50 level 4),[6, 16] for cases of infection or colonisation with an infectious agent known to survive in the environment (one AGREE II 'recommend with modifications' guideline),[3] in the presence of specific pathogens (five SIGN 50 level 4),[5, 6, 14, 16, 37] and when undertaking isolation or terminal decontamination (one SIGN 50 level 4).[17] In addition, two SIGN 50 level 4 guidance advise that disinfectants should be used for surfaces that have come into contact with blood and body fluids[4] or when there's uncertainty regarding the nature of soiling.[12] Therefore, it is the expert opinion of ARHAI Scotland and its stakeholders that disinfectants should be used if a patient or service user is known or suspected to have an infection, or if there is contamination with blood and body fluids.

GPP7.4 This GPP was informed by the care homes NCSS (SHFN 01-05) which state that sanitary fixtures and fittings should be routinely disinfected (one SIGN 50 level 4).[36] ARHAI Scotland and its stakeholders support routine disinfection of sanitary fixtures and fittings because these are environmental surfaces that are likely to be contaminated with blood and body fluids and therefore pose a transmission risk.

GPP7.5 ARHAI Scotland and its stakeholders are in agreement with the seven SIGN 50 level 4 guidance documents which consistently state that methods in manufacturer's instructions should be followed when using a detergent and/ or disinfectant product.[5, 7, 12, 13, 15, 16, 38] It is also the expert opinion guidance of ARHAI Scotland and its stakeholders that manufacturer's instructions may vary depending on the target micro-organism, and local policies and guidelines should be adhered to where applicable.

GPP7.6 This GPP is informed by two SIGN 50 level 4 guidance which recommend changing detergent and disinfectant solutions regularly.[12, 17] The CDC specify this in relation to disinfectant solutions,[12] whereas the NCSS refer to changing cleaning and disinfectant solutions every 15 minutes, when moving into a new location and as per manufacturer's instructions.[17] It is the expert opinion of ARHAI Scotland and its stakeholders that detergent and disinfectant solutions should be changed as per manufacturer's instructions. Although avoidance of double dipping is only described in relation to disinfectant solutions in one SIGN 50 level 4 guidance,[12] it is the expert opinion of ARHAI Scotland and its stakeholders that avoidance of double dipping applies to both detergent and disinfectant solutions.

7.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP7.1, GPP7.2, GPP7.3, GPP7.4, GPP7.5 and GPP7.6 No value judgements to note.

7.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP7.1, GPP7.2, GPP7.3, GPP7.4, GPP7.5 and GPP7.6 No intentional vagueness to note.

7.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP7.1, GPP7.2, GPP7.3, GPP7.4, GPP7.5 and GPP7.6 No exceptions to note.

7.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
Further research into efficacy of products using validated methodology as per BS EN standards may be beneficial. This evidence would support comparison across the evidence base.

Research Question 8: How should blood and body fluid spillages be managed?

A Quality of Evidence

8.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Ten pieces of evidence were included for this topic: • Nine guidance documents graded SIGN 50 level 4 expert opinion.[4-6, 8-10, 12, 13, 38] • One safety action notice (SAN) graded SIGN 50 level 4 expert opinion.[39] SIGN 50 level 4 evidence is considered low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. For example, guidance from Australia followed a GRADE methodology however, for this question there was one recommendation graded as 'weak', and the evidence supporting this was unclear. Other guidance also contained graded recommendations related to blood and body fluid spills management, however the scientific evidence underpinning these was poor quality, including research from pre-2000 which may not be up to date with the most recent scientific developments and practices. Three guidance from the HSE, RCN and WHO had no graded recommendations for this topic.	10 x SIGN 50 level 4

Comments	Evidence level
The lack of high-quality research is a limitation for this research question.	

8.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments
The evidence is consistent in the following areas related to management of blood and body fluids: • Spills and visibly soiled areas should be prioritised for decontamination (five SIGN 50 level 4)[5, 6, 10, 12, 13] • Spills of potentially infectious materials should be promptly decontaminated (seven SIGN 50 level 4)[4-6, 9, 10, 12, 38] **Local policy** • The evidence is consistent regarding requirements of local policy: • Local policies should be followed [9, 10] which should specify recommended procedures including product (dependent on infectious material), volume and surface material (four SIGN 50 level 4).[6, 8, 9] **Products** The evidence was consistent regarding which products should be used in spills management: • Use of chlorine-based products (three SIGN 50 level 4).[5, 8, 10] • Consistency could not be assessed regarding the following: • Use of products with specific label claims for human immunodeficiency viruses or hepatitis B (one SIGN 50 level 4).[10] **Use of personal protective equipment (PPE)** The evidence is consistent regarding the use of PPE:

Comments

- Appropriate PPE should be worn for blood and body fluid spill management, accounting for risk of spill (five SIGN 50 level 4).[5, 6, 8, 10, 12]

Waste management

The evidence is consistent regarding the following:

- Appropriate waste management of contaminated materials (four SIGN 50 level 4).[5, 6, 8, 10]

Spills management according to size

The evidence is consistent regarding the following:

- Method according to spill size (five SIGN 50 level 4).[5, 6, 8, 10, 12]
- Use of absorbent materials for large spills (three SIGN 50 level 4).[6, 10, 12]

The evidence is inconsistent in the following areas related to management of blood and body fluids:

- Although small spills are defined in two guidance documents, this definition differs (two SIGN 50 level 4).[6, 12]
- Larger spills are only defined in one guidance document (one SIGN 50 level 4).[6]
- The specific methods for decontamination of blood and body fluids, particularly the order and use of detergent and disinfectants including concentration of chlorine-based products (four SIGN 50 level 4).[5, 6, 8, 10]
- There is inconsistency on specific methods for the decontamination of urine (two SIGN 50 level 4).[5, 8]

Due to the nature of the evidence, consistency could not be assessed for the following:

- Safety issues relating to use of superabsorbent polymer gel granules in clinical settings (one SIGN 50 level 4).[39]

Overall, the available evidence is consistent in the high-level principles pertaining to management of blood and body fluid spillages, however there is lack of consistency in definitions and the detailed specific methods. Therefore it was not possible to conclude a specific process for management of blood and bodily fluids, including product use, from the evidence base.

8.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments

The country or countries where the research was conducted, or to which the guidance applies are as follows:

- UK (n=3)[8, 9, 39]
- Australia (n=1)[6]
- US (n=4)[10, 12, 13, 38]
- Asia Pacific region (n=1)[5]
- Internationally (n=1)[4]

All guidance is applicable to health and care settings, apart from one guidance document which was specifically developed for surgical settings,[4] however the general principles of blood and body fluids can be applied to all health and care settings. The NHS National Services Scotland SAN is highly applicable to NHSScotland health and care settings.[39] UK developed guidance from the RCN is directly applicable to Scottish health and care settings.[9] Guidance from the UK HSE is not specific to health and care settings however, the guidance is for general health and safety in the workplace and the principles are applicable to Scottish health and care settings.[8]

Eight guidance documents were published out-with the UK[4-6, 10, 12, 13, 16, 38] and variation in IPC practices and policies may impact applicability to NHSScotland health and care settings.

8.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

8.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
A formal assessment of publication bias was not conducted. Efficacy of certain detergents and disinfectant and methods for blood and body fluid spillages may be published by manufacturers and not be available in the scientific evidence base which may pose an element of publication bias. Assessing manufacturers product details is out-with the scope of this systematic literature review.

B: Evidence to Decision

8.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP8.1 Spills of blood and body fluids should be decontaminated as soon as reasonably practicable. If the area cannot be decontaminated immediately, it should be made safe.	Good practice point
GPP8.2 Products (including detergent and disinfectant solutions and granules) for decontamination of blood and body fluid spillages should always be prepared and used in accordance with manufacturer's instructions, including correct dilution, type of spillage and contact time.	Good practice point
GPP8.3 Health Boards and organisations should have local policies that clearly state the procedures to be followed for decontamination of blood and body fluid spillages, including the type of product to use dependent on type of spillage, volume and surface material.	Good practice point
GPP8.4 The use of superabsorbent polymer gel granules (including sachets, mats and loose powder) to reduce or solidify spillage is restricted (refer to NHS	Good practice point

Recommendation	Grading
National Service Scotland Safety Action Notice SAN(SC)19/03 for further information). Health Boards and organisations should ensure that any polymer gel used for environmental decontamination is stored securely and kept away from patients and service users. If granules are not available, disposable paper towels should be placed over the spillage to absorb and contain it before cleaning and disinfecting the area.	
GPP8.5 Suitable PPE should be worn based on the level of perceived risk or anticipated exposure. For example, eye and face protection may be required if the spill is extensive or splashing is likely to occur.	Good practice point
GPP8.6 Materials used to decontaminate blood and body fluid spillages should be disposed of as infectious clinical waste.	Good practice point

8.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP8.1 Decontaminating spills of blood and body fluid as soon as reasonably practicable may reduce the risk of patient, service user, staff and visitor exposure to potentially infectious or harmful agents and reduces the risk of slips, trips and falls. GPP8.1 Ensuring the area is made safe after a blood and body fluid spill which cannot be decontaminated immediately may reduce the risk of patient, service user, staff and visitor exposure to potentially infectious or harmful agents and reduces the risk of slips, trips and falls.

Benefits
GPP8.1 Prompt spillage management allows staff to prioritise patient and service user care and determine how the spill will be decontaminated as per GPP8.2 and GPP8.3. GPP8.2 Adherence with manufacturer's instructions supports safe use of products and promotes safe and consistent practice. GPP8.3 Local policies containing recommended procedures for decontaminating blood and body fluid spills promotes safe and consistent practice. GPP8.4 Safe storage of absorbent polymer gel granules used for environmental decontamination helps prevent accidental exposure of patients, service users, staff and visitors to potentially harmful substances, thereby supporting a safer care environment. GPP8.4 Safe storage of absorbent polymer gel granules used for environmental decontamination supports compliance with regulations such as COSHH. GPP8.5 Wearing PPE when decontaminating blood or body fluid spills may minimise the risk of staff uniform contamination and exposure to potentially infectious agents. GPP8.6 Disposal of spilled material and absorbent materials used as infectious clinical waste helps prevent cross-contamination, ensures that items potentially contaminated with infectious agents are disposed of in the appropriate waste stream, supports safe waste segregation and reduces the risk of infection to patients, service users, staff and visitors.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP8.1 Prioritisation of patient and service user care over decontaminating spills may increase the risk of slips, trips and falls. GPP8.1 Prioritisation of patient and service user care over decontaminating spills may lead to increased risk of HAI from the environment. GPP8.2, GPP8.3, GPP8.4, GPP8.5 and GPP8.6 No risks or harms identified.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP8.1 Although there are risks associated with prioritising patient and service user care over decontaminating spills, the benefit of prioritising patient and service user care outweighs the risks. GPP8.2, GPP8.3, GPP8.4, GPP8.5 and GPP8.6 Only benefits identified.

8.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP8.1, GPP8.2, GPP8.3, GPP8.4, GPP8.5 and GPP8.6 Human resource for education, training and audit will be required to support the implementation of safe decontamination of blood and body fluid skills in health and care settings. However, for most settings this is already established practice. GPP8.1 The ability of staff to decontaminate blood and body fluid spills promptly may be constrained by workforce availability and access to the required equipment and materials at the time of the incident. GPP8.2, GPP8.3, GPP8.4 and GPP8.5 There may be financial implications relating to the procurement of suitable items for decontaminating spills, including products and PPE. However, for most settings this is already established practice. GPP8.4 Facilities will be required within health and care settings for safe storage of granules. However, for most settings this is already established practice. GPP8.6 There may be financial implications when disposing of items involved in a spill as infectious waste. However, for most settings this is already established practice.

8.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP8.1 This GPP is informed by extant guidance advising prioritisation of spills and visible soilage for decontamination (five SIGN 50 level 4 expert opinion)[5, 6, 10, 12, 13] and immediate decontamination of spills of potentially infectious materials such as blood (seven SIGN 50 level 4).[4-6, 9, 10, 12, 38] It is the expert opinion of ARHAI Scotland and its stakeholders that, although spillages should be decontaminated promptly, appropriate planning should take place so that spills are decontaminated as soon as reasonably practicable, but this should not compromise patient and service user care. GPP8.2 Extant guidance (three SIGN 50 level 4 expert opinion) advises the use of chlorine-based products are preferred for decontaminating blood and body fluid spills.[5, 8, 10] However, it is the expert opinion of ARHAI Scotland and its stakeholders that any disinfectant product may be used as long as the product

Expert opinion
complies with the appropriate standards (as per GPP5.1) and manufacturer's instructions are followed for use (as per GPP7.5). GPP8.3 This GPP is informed by expert opinion guidance which states that local policies should capture recommended procedures (four SIGN 50 level 4 guidance)[6, 8-10] including product type, which considers type of spillage, volume and surface material (three SIGN 50 level 4).[6, 8, 9]. No further expert opinion from ARHAI Scotland and its stakeholders to note. GPP8.4 Guidance on decontaminating small (four SIGN 50 level 4)[5, 6, 8, 12] and larger spills (five SIGN 50 level 4)[5, 6, 8, 10, 12] consistently recommends the use of absorbent materials. However, it is the expert opinion of ARHAI Scotland and its stakeholders that absorbent materials should be used for any size of spill, and that disposable paper towels may be used when granules are not available. GPP8.5 ARHAI Scotland and its stakeholders are in agreement with extant guidance (five SIGN 50 level 4) that advises appropriate PPE be worn when decontaminating blood and body fluid spills.[5, 6, 8, 10, 12] GPP8.6 ARHAI Scotland and its stakeholders are in agreement with extant guidance which advises disposal of contaminated materials after blood and body fluid spill decontamination in an appropriate healthcare waste stream (four SIGN 50 level 4).[5, 6, 8, 10]

8.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP8.1, GPP8.2, GPP8.3, GPP8.4, GPP8.5 and GPP8.6 No value judgements to note.

8.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP8.1 The definition of ‘safe’ is not provided to support applicability of this GPP to a wide range of health and care settings. GPP8.2, GPP8.4, GPP8.5 and GPP8.6 No intentional vagueness to note. GPP8.3 Specific parameters of local policy have not been specified here as this will depend on available products and the area being decontaminated.

8.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP8.1, GPP8.2, GPP8.3, GPP8.4, GPP8.5 and GPP8.6 No exceptions to note.

8.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
Recommendations made in extant guidance on decontaminating spills do not seem to be based on primary evidence. However, these methods may differ depending on specific product manufacturer's instructions. Therefore, published research evidencing efficacy of these methods against common HAI pathogens in real-world clinical settings would support transparency and comparison of findings relating to active ingredient.

Research Question 9: What is the recommended frequency for environmental decontamination?

A Quality of Evidence

9.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Fifteen pieces of evidence were included for this topic: • One guideline graded AGREE II 'recommend with modifications'[3] • 14 guidance documents graded SIGN 50 level 4 expert opinion[4-6, 9-17, 36, 38] SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. The epic3 guideline followed a systematic review process however this does have some limitations such as lack of search strategy and rigour of development.[3] No primary evidence was included for this research question. The lack of high-quality research is a limitation for this research question .	1 x 'AGREE II Recommend with Modifications' 14 x SIGN 50 Level 4

9.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

The evidence is consistent in the following areas related to frequency of environmental decontamination:

- Frequency of environmental decontamination should be based on local risk assessment (four SIGN 50 level 4)[5, 6, 17, 36] for example by utilising the alphanumeric coding system in the NCSS.[17]
- Floors should be cleaned regularly (three SIGN 50 level 4).[10-12]
- Decontamination frequency should be increased for frequently touched surfaces (ten SIGN 50 level 4).[4-6, 10, 13-17, 38]
- The patient zone requires frequent decontamination (four SIGN 50 level 4).[13, 14, 16, 38]
- Areas where patients that are high-risk for HAIs are cared for require frequent decontamination (two SIGN 50 level 4 guidance)[5, 15] including operating rooms.[15]
- More frequent decontamination is required when there is contamination, soiling and spillage (seven SIGN 50 level 4)[4-6, 10, 12, 13, 38] and during outbreaks, cases of MDRO's and 'special pathogens' (four SIGN 50 level 4).[6, 10, 14, 16]
- Scheduled decontamination should be undertaken as well as terminal and discharge decontamination upon patient transfer or discharge (two SIGN 50 level 4 guidance and one AGREE II 'recommend with modifications' guideline).[3, 16, 17]

The guidance was inconsistent in:

- Advising "site analysis" and adjusting cleaning schedule according to requirement for "acceptable quality output" (one SIGN 50 level 4).[36]
- Four SIGN 50 level 4 guidance do not recommend routine disinfection of the health and care environment.[5, 6, 17, 36] whereas one SIGN 50 level 4 CDC guidance advises routine disinfection.[12]

Comments
The degree of detail provided on frequency - only three SIGN50 level 4 guidance provided detailed decontamination schedules.[6, 17, 36] Specific frequencies for isolation room decontamination was provided in one guidance.[17] Overall, the guidance demonstrated consistency in the high-level principles related to frequency of environmental decontamination, although the guidance lacked specific detail. This is to be expected due to significant variation in health and care setting policies and practice and the reliance on local risk assessment. There is also a degree of uncertainty in decontamination frequency due to dependency on specific situations such as outbreaks and isolation rooms, which will be different for every ward or area at different times.

9.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries to which the guidance and guideline apply are as follows: • UK (n=4)[3, 9, 17, 36] • Europe (n=1)[11] • Australia (n=1)[6] • Canada (n=1)[16] • US (n=6)[10, 12-15, 38] • Asia Pacific region (n=1)[5] • Internationally (n=1)[4] All guidance is applicable to all health and care settings, apart from one guidance document which was specifically developed for 'emergency vehicle settings',[7] and another specific to surgical settings.[15] However the general principles of environmental decontamination can be applied to all health and care settings. The NCSS[17] and care homes NCSS[36] were specifically developed for NHSScotland health and care settings and are highly applicable, accounting for logistics, IPC

Comments
practices and policies across NHS Boards and organisations in Scotland. Similarly, Other UK developed guidance is directly applicable to Scottish health and care settings.[3, 9] Guidance published by the ECDC[11] applies to the European Union (EU) and European Economic Area (EEA) and is directly applicable to Scottish health and care settings. Nine guidance documents were published out with the UK and variation in IPC practices and policies may impact applicability to NHSScotland health and care settings.[5, 6, 10, 12-16, 38] One guidance from the WHO is applicable internationally to settings with differing levels of resource, which may limit direct applicability to Scottish settings.[4]

9.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

9.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
Not applicable.

B: Evidence to Decision

9.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP9.1 Frequency of environmental decontamination should be determined by local risk assessment and application of the coding system to calculate a risk rating. This risk rating should be based on the type of care environment and level of contamination, as per the NCSS (SHFN 01-02).	Good practice point
GPP9.2 Deviation from frequency of environmental decontamination determined based on risk assessment should be documented.	Good practice point
GPP9.3 Decontamination frequency should be increased at times of potentially high environmental contamination (for example, as a result of highly symptomatic individuals with known or suspected infection or colonisation or HAI incidents and outbreaks of infection or colonisation).	Good practice point
GPP9.4 Sites of increased contamination such as frequently touched surfaces should be more frequently	Good practice point

Recommendation	Grading
decontaminated than other sites in the healthcare setting.	
GPP9.5 Patient isolation and cohort rooms and areas should be decontaminated at least daily.	Good practice point

9.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP9.1 Local risk assessment to determine appropriate frequency of environmental decontamination as per the NCSS (SHFN 01-02) allows for the consideration of specific requirements within health and care settings, supporting environmental decontamination at appropriate intervals, therefore reducing risk of HAI from the environment. GPP9.1 Undertaking risk assessment to determine frequency of decontamination supports maintaining a specific standard of cleanliness within the health and care setting and ensures decontamination efforts are proportionate to actual risk. GPP9.1 Undertaking risk assessment to determine frequency of decontamination required supports consistent application of infection prevention practices and ensures resource allocation is sufficient and appropriate. GPP9.2 Documenting risk assessments informing deviation from recommended frequency of environmental decontamination supports transparency and audit. GPP9.2 Documented risk assessments would support investigation into an adverse event linked to environmental contamination. GPP9.3 Increased frequency of decontamination at times of potentially high environmental contamination reduces microbial load, therefore breaking the chain

Benefits
of infection and reducing the risk of patients, service users, staff and visitors contracting a HAI. GPP9.4 Increased frequency of decontamination of frequently touched surfaces reduces microbial load, therefore breaking the chain of infection and reducing the risk of patients, service users, staff and visitors contracting a HAI. GPP9.5 Daily decontamination of patient isolation and cohort rooms and areas reduces microbial load, therefore breaking the chain of infection and reducing the risk of patients, service users, staff and visitors contracting a HAI. GPP9.1, GPP9.3, GPP9.4 and GPP9.5 Frequent decontamination of the environment may increase public perception and confidence in the service.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP9.1, GPP9.2, GPP9.3, GPP9.4 and GPP9.5 No risks or harms identified.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP9.1, GPP9.2, GPP9.3, GPP9.4 and GPP9.5 Only benefits identified.

9.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP9.1 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support risk assessment to determine required frequency of decontamination within health and care settings. However, for most settings these practices are already established. GPP9.2 Additional resource (human and materials) may be required to maintain a system for recording risk assessments and records of deviation from recommended frequency. GPP9.3 Additional resource (human and materials) may be required when increased environmental decontamination is required. GPP9.4 Additional resource (human and materials) may be required for increased decontamination of frequently touched surfaces. GPP9.5 Additional resource (human and materials) may be required to support daily decontamination of patient isolation and cohort rooms or areas. However, for most settings these practices are already established.

9.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP9.1 ARHAI Scotland and its stakeholders are in agreement with extant guidance (four SIGN 50 level 4 expert opinion guidance, including the NCSS, SHFN 01-02, and care homes NCSS, SHFN 01-05)[5, 6, 17, 36] advising the use of local risk assessment to determine frequency of environmental decontamination. In Scottish health and care settings, the coding system in the NCSS should be used to calculate a risk rating.[17] GPP9.2 This GPP is informed by the expert opinion of ARHAI Scotland and its stakeholders, specifically that: documenting a deviation from the pre-determined, recommended frequency of environmental decontamination is good practice as it may support decision-making and provide future information where it is required during look-back activities. GPP9.3 The evidence base states that increased frequency of environmental decontamination is required in contaminated or soiled areas (seven SIGN 50 level 4)[4-6, 10, 12, 13, 38] and during outbreaks, cases of MDRO’s and ‘special pathogens’ (four SIGN 50 level 4).[6, 10, 14, 16] Consistent with this evidence, it is the expert opinion of ARHAI Scotland and its stakeholders that decontamination frequency should be increased when environmental contamination is potentially higher, for example when those with suspected or confirmed communicable diseases are highly symptomatic. GPP9.4 ARHAI Scotland and its stakeholders are in agreement with extant guidance which advises that decontamination frequency should be increased for frequently touched surfaces (ten SIGN 50 level 4).[4-6, 10, 13-17, 38] GPP9.5 It is the expert opinion of ARHAI Scotland and its stakeholders that patient isolation rooms and areas should be decontaminated at least daily as a preventative measure, as decontamination supports reduction of infection risk. Decontamination frequency may be increased based on risk assessments undertaken by local infection prevention and control teams and/ or health protection teams.

9.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP9.1, GPP9.2, GPP9.3 and GPP9.4 No value judgements to note.

9.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP9.1, GPP9.2, GPP9.3 and GPP9.4 No intentional vagueness to note.

9.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP9.1, GPP9.2, GPP9.3 and GPP9.4 No exceptions to note. GPP9.5 When an isolation or cohort room or area is not in use, decontamination frequency should be locally agreed.

9.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
The current evidence base predominantly consists of expert opinion regarding risk assessment to determine frequency of decontamination and increased frequency at times of potentially high environmental contamination and for frequently touched surfaces. It may be beneficial to assess optimal decontamination frequency in health and care settings by controlled studies (for example, cluster randomised control trials or interrupted time series), considering patient outcomes such as HAI rate or surface contamination. However, confounding variables may impact applicability and generalisability of these findings, including the specific environmental decontamination products used, IPC measures in place (such as enhanced decontamination protocols during outbreaks or periods of increased environmental contamination), and baseline burden of HAIs,

Research Question 10: Are there specific requirements for the decontamination of soft furnishings?

A Quality of Evidence

10.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Five SIGN 50 level 4 expert opinion guidance documents were included for this topic.[6, 8, 10, 17, 36] SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. For example, guidance from Australia followed a GRADE methodology however, for this question there were no graded recommendations. Guidance from HICPAC has graded recommendations, however the scientific evidence underpinning this is limited and predominantly from pre-2000 so may not be up to date with the most recent scientific developments. Furthermore, there was limited information on how the recommendations were formulated. The NCSS, published by NHS Scotland Assure, and care homes NCSS, published by Health Facilities Scotland have minimal reference to the evidence base and instead were developed by an 'expert task force'. The lack of high-quality research is a limitation for this research question.	5 x SIGN 50 level 4

10.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

Soft furnishings are consistently defined in two SIGN 50 level 4 guidance as carpets, upholstered furniture and furnishing.[10, 36] The care homes NCSS provides further detail on specific types (one SIGN 50 level 4). [36]

Guidance was consistent in advising the following regarding carpet decontamination:

- Use of vacuum or suction cleaning (four SIGN 50 level 4).[6, 10, 17, 36]
- Use of wet vacuuming or carpet cleaning kits for effective decontamination (three SIGN 50 level 4).[6, 8, 36]

Guidance was consistent in advising the following regarding spillages on soft furnishings:

- Two SIGN 50 level 4 guidance recommend avoiding the placement of upholstered furniture and furnishings and carpets in areas with increased body fluid spillages.[8, 10]
- Removal of soft furnishings when decontamination is not possible (two SIGN 50 level 4) due to contamination risk[12] particularly if a spill of suspected infectious materials has occurred.[8]

The guidance was inconsistent in:

- The type of product (detergent, disinfectant or steam) used for decontamination of soft furnishings and level of detail provided for decontamination of soft furnishings, with only two SIGN 50 level 4 guidance detailing standard operating procedures, including the NCSS.[6, 17]
- It was not possible to conclude specific requirements for environmental decontamination of all soft furnishings in health and care settings from the available evidence base.

10.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries to which the guidance applies are as follows: • UK (n=3)[8, 17, 36] • USA (n=1)[10] • Australia (n=1)[6] All included guidance is applicable to health and care settings apart from UK HSE guidance which is not specific to health and care settings however, the guidance is for general health and safety in the workplace and the principles are applicable to Scottish health and care settings.[8] The NCSS[17] and care homes NCSS[36] were specifically developed for NHSScotland health and care settings and are highly applicable, accounting for logistics, IPC practices and policies across NHS Boards and organisations in Scotland. Two SIGN50 level 4 guidance documents were published out with the UK and variation in IPC practices and policies may impact applicability to NHSScotland health and care settings.[6, 10]

10.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

10.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
The lack of primary evidence referred to across all five guidance documents relevant to this question does not allow for assessment of publication bias.

B: Evidence to Decision

10.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP10.1 Soft furnishings (for example, upholstered chairs, carpets, fabric sofas) should not be used within care areas where there is a high risk of contamination with blood or other potentially infectious body fluids.	Good practice point
GPP10.2 When blood and body fluid spills occur on soft furnishings, if decontamination is not immediately possible, the item should be removed from use. If an item is incapable of being adequately decontaminated, then it should be disposed of.	Good practice point
GPP10.3 Manufacturer's instructions should be followed when decontamination of carpets and soft furnishings in health and care settings is required. Where these instructions are not specific, the NCSS (SHFN 01-02) and care homes NCSS (SHFN 01-05) should be followed.	Good practice point

10.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP10.1 Avoidance of soft furnishings in health and care environments where possible reduces the risk of a soft furnishing becoming a reservoir for microorganisms and therefore reduces the risk of cross-contamination. GPP10.2 Removal and/ or disposal of contaminated soft furnishings when blood and/ or body fluid spills have occurred prevents exposure of service users, staff and visitors to potentially infectious spills and supports maintaining a safe environment. GPP10.3 Adherence with manufacturer's instructions supports effective decontamination of soft furnishings. GPP10.3 Adherence with manufacturer's instructions supports consistency and standardisation of practice which supports audit, monitoring and quality improvement. GPP10.3 Adherence with national guidance (NCSS, SHFN 01-02 and the care homes NCSS, SHFN 01-05) where manufacturer's instructions are not specific supports standardisation of practice, patient and service user safety and workforce efficiency.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP10.1 Patients and service users may find hard furnishings uncomfortable, making it difficult for them to feel at ease. GPP10.2 There may be temporary disruption to the care environment where soft furnishings have to be removed and/ or disposed of. GPP10.3 Soft furnishings may be damaged by use of cleaning products, including the potential risk of mould growth.

Benefit-Harm assessment

Classify as “benefit outweighs harm” (or vice versa) or a “balance of benefit and harm.” Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP10.1 The benefit of avoiding soft furnishings in care areas with high risk of contamination of these soft furnishings, and therefore increased risk of HAI, outweighs the risk of negatively impacting comfort. GPP10.2 The benefit of removing and/ or disposing of contaminated soft furnishings to reduce the risk of HAI outweighs the risk of disruption to the care environment. GPP10.3 Although there is a risk of damage to soft furnishings as a result of decontamination, the benefits (reduced risk of HAI) outweigh this harm. Adherence to manufacturer’s instructions for decontamination may further reduce the risk.

10.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP10.1 There may be financial implications to support provision of impervious, wipeable furnishings in clinical areas. GPP10.2 There may be financial and sustainability implications relating to removal and disposal of soft furnishings and replacing these items. GPP10.3 Human resource for education, training and audit (inclusive of acknowledging human factors) will be required to support decontamination of soft furnishings within health and care settings. However, for most settings these practices are already established. GPP10.3 There may be financial implications relating to the procurement of suitable equipment and products for cleaning carpets and soft furnishings.

10.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP10.1 This GPP was informed by two SIGN 50 expert opinion guidance which advise against use of soft furnishings in areas where blood and body fluid spills are common.[8, 10] No further expert opinion from ARHAI Scotland and its stakeholders to note, noting exceptions listed in section 10.12. GPP10.2 ARHAI Scotland and its stakeholders are in agreement with two SIGN 50 level 4 expert opinion which advise the removal of soft furnishings following a blood or body fluid spill.[8, 12] In addition to this, it is the expert opinion of ARHAI Scotland and its stakeholders that soft furnishings that cannot be adequately decontaminated following blood or body fluid spills should be disposed of. GPP10.3 It is the expert opinion of ARHAI Scotland and its stakeholders that manufacturer's instructions should be followed for decontamination of soft furnishings, due to variation of soft furnishings and products across health and care settings. Moreover, it is the expert opinion of ARHAI Scotland and its stakeholders that manufacturer's instructions should be followed for decontamination of carpets, and standard operating procedures within the NCSS (SHFN 01-02) and care homes NCSS (SHFN 01-05) should also be followed. For example, consistent with the evidence base (two SIGN 50 level 4 guidance),[6, 10] the NCSS (SHFN 01-02) and care homes NCSS (SHFN 01-05) recommend vacuum or suction cleaning of carpets.[17, 36] Where these documents do not provide specific detail, local risk assessment should be undertaken to determine appropriate method of decontamination.

10.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state "none". Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP10.1, GPP10.2 and GPP10.3 No value judgements to note.

10.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP10.1 and GPP10.2 No intentional vagueness to note. GPP10.3 Intentionally vague regarding local risk assessment in the case that manufacturer’s instructions are not specific, as appropriate methods for decontaminating soft furnishings will vary depending on type of material.

10.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP 10.1 Soft-furnishings may be acceptable where there is a clear clinical or therapeutic need - for example, in low-risk environments such as certain areas of care homes or hearing clinics, soft furnishings may be used provided that: • The environment is assessed as low risk for blood or body fluid contamination. • Furnishings are maintained in good condition, with no damage that could harbour pathogens.

Exceptions
• There is a documented decontamination and maintenance schedule, including the ability to decontaminate or replace items promptly if contamination occurs. GPP10.2 and GPP10.3 Local risk assessment should be carried out to determine appropriate decontamination and/ or disposal method when the soft furnishing belongs to a patient or service user.

10.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
Extant guidance does not seem to be based on primary evidence and does not provide specific recommendations for decontamination of soft furnishings, which may in part be due to variation of equipment in health and care settings. Therefore, published research evidencing efficacy of these methods against common HAI pathogens in real-world clinical settings may support transparency and more detailed and consistent guidance.

Research Question 11: Who has responsibility for ensuring the care environment is decontaminated appropriately?

A Quality of Evidence

11.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Five pieces of evidence were included for this topic, all graded SIGN50 level 4 expert opinion: • Four guidance documents[9, 17, 36, 40] • One letter from the Scottish Government Health Department (HDL(2005)7).[41] HDL(2005)7[41] establishes policy and is not informed by an evidence base. All other included guidance lacks systematic methodology, evidence underpinning recommendations and detail on how expert opinion decisions were formulated. The lack of primary evidence related to this research question may be due to the variation in health and care setting management and roles; this is not a question that may be answered from primary research studies alone.	5 x SIGN 50 level 4

11.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments

There is inconsistency in the evidence regarding responsibility for environmental decontamination:

- HDL(2005)07 states that Senior Charge Nurses are responsible for ensuring safe working conditions in their clinical areas including environmental cleanliness, and it is the responsibility of staff, visitors, patients and the public to report concerns about environmental cleanliness (one SIGN 50 level 4).[41]
- RCN guidance advises responsibility lies with the ward or department manager (one SIGN 50 level 4).[9]
- The NCSS advises responsibilities of roles within domestic services, emphasising the importance of communication between domestic, nursing and IPC teams, especially during outbreaks (one SIGN 50 level 4).[17]
- The care homes NCSS advises that care home managers have responsibility for ensuring appropriate environmental decontamination (one SIGN 50 level 4).[36]
- There was variation in the degree of detail in each guidance document, including terminology for those responsible and the setting this applies to, due to the variation in the health and care settings the different guidance applies to.
- It was consistently emphasised in five SIGN 50 level 4 documents, including the NCSS and care homes NCSS, that all staff are trained and supported accordingly in relation to environmental decontamination.[9, 12, 36, 40, 41]

11.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries to which the guidance applies are as follows: • UK (n=5)[9, 17, 36, 40, 41] All included guidance is applicable to health and care settings. HDL(2005)7,[41] NCSS[17] and care homes NCSS[36] were specifically developed for NHSScotland health and care settings and are highly applicable, accounting for logistics, IPC practices and policies across NHS boards and organisations in Scotland. Similarly, other UK developed guidance is directly applicable to Scottish health and care settings.[9, 40]

11.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
Not applicable as no primary research studies were included for this question.

11.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
The lack of primary evidence referred to across all five documents relevant to this question does not allow for assessment of publication bias.

B: Evidence to Decision

11.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP11.1 As per HDL(2005)07, a named person or persons, for example Senior Charge Nurses or nurse in charge, should be responsible for ensuring safe working conditions within their clinical area. This includes all aspects of environmental cleanliness. The named person or persons have the authority to require local cleaning services to act on any problems identified.	Good practice point
GPP11.2 All health and care staff should be aware of their roles and responsibilities related to environmental decontamination and follow correct policies and guidance, including HDL(2005)07, NCSS (SHFN 01-02) and care homes NCSS (SHFN 01-05) for NHSScotland health and care settings. The division of decontamination tasks should be clearly defined and communicated, in line with local or organisational policy.	Good practice point

11.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP11.1 and GPP11.2 Clarity on roles ensures all staff are aware of their requirement and responsibilities to carry out environmental decontamination, providing assurance that these tasks will be carried out, therefore supporting staff and service user confidence in the organisation's arrangements for maintaining environmental cleanliness. GPP11.1 and GPP11.2 Clear roles and responsibilities supports consistency and standardisation of practice which supports audit, monitoring and quality improvement. GPP11.1 and GPP11.2 Defined roles ensure staff are properly trained for the tasks they are responsible for and promotes accountability.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP11.1 and GPP11.2 There may be variability in local policy which might be dependent on human resource, leading to confusion regarding clarity of roles and overlap of responsibilities.

Benefit-Harm assessment

Classify as "benefit outweighs harm" (or vice versa) or a "balance of benefit and harm." Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP11.1 and GPP11.2 The benefits of establishing clear roles and responsibilities on supporting effective environmental decontamination and provision of training should outweigh risk of confusion regarding these roles.

11.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP11.1 and GPP11.2 Human resource for education, training and audit will be required to support the appropriate roles used for environmental decontamination.

11.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP11.1 and GPP11.2 ARHAI Scotland and its stakeholders are in agreement with extant expert opinion guidance and HDL(2005)07 that require an allocated person to be responsible for ensuring environmental cleanliness, and the requirement for all staff to follow local policies and procedures (six SIGN 50 level 4).[9, 12, 17, 36, 40, 41]

11.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP11.1 and GPP11.2 No value judgements to note.

11.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality

- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP11.1 and GPP11.2 No intentional vagueness to note.

11.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP11.1 and GPP11.2 No exceptions to note.

11.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research
No recommendations for research to note.

Research Question 12: How should environmental decontamination equipment be managed and stored?

A Quality of Evidence

12.1 How reliable is the body of evidence?

(see SIGN 50, section 5.3.1, 5.3.4)

Comment here on the quantity of evidence available on this topic and its methodological quality. Please include citations and evidence levels.

If there is insufficient evidence to answer the key question, go to section B.

Comments	Evidence level
Six pieces of evidence were included for this topic: • One experimental study graded SIGN 50 level 3,[42] • One outbreak study graded SIGN 50 level 3,[43] • Four guidance documents graded SIGN 50 level 4 expert opinion.[6, 9, 17, 36] The SIGN 50 level 3 experimental study is limited by the controlled experimental study design, which may not be representative of contamination of equipment used for environmental decontamination in real-world clinical settings. Although the SIGN 50 level 3 outbreak study reports findings from a real-world clinical setting, it is limited by small sample size, and unclear transmission route between hypothesised outbreak source and patient cases. SIGN 50 level 4 evidence is low quality as a potential risk of bias exists with this class of evidence because of a lack of supporting evidence and the unclear methodology with which these documents are formulated. For example, guidance from Australia followed a GRADE methodology however, for this question there were no graded	2 x SIGN 50 level 3 4 x SIGN 50 level 4

Comments	Evidence level
recommendations. All other included guidance lacks demonstration of a systematic methodology, reference to evidence underpinning recommendations and detail on how expert opinion decisions were formulated. The lack of high-quality research is a limitation for this research question.	

12.2 Is the evidence consistent in its conclusions?

(see SIGN 50, section 5.3.2)

Comment here on the degree of consistency demonstrated by the evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence.

Comments
The primary evidence was unable to be directly compared given the heterogeneity between the studies. The evidence can be summarised as follows: • Tembo *et al.* demonstrated contamination of an automated floor cleaner following floor decontamination. The wastewater showed the highest contamination, and equipment contamination was higher when neutral cleaner was used compared to disinfectant products.[42] • Benbow *et al.* demonstrated contamination of an electric floor scrubber and mop fibres during a multi-site outbreak in a real-world clinical setting, with PFGE analysis indicating that contamination was with the same outbreak strain as patient cases. This study suggests that floor cleaning equipment may act as a reservoir for carbapenemase-producing Enterobacterales, however definitive conclusions regarding transmission route could not be drawn.[43] The remaining evidence is consistent for the management and storage of environmental decontamination equipment in the following: • Two SIGN 50 level 4 guidance state that mop heads should be changed at the beginning of the day or according to local policy.[10, 12] • Two SIGN 50 level 4 guidance stipulate that decontamination equipment and products be stored in locked facilities.[6, 36]

Comments
Four SIGN 50 level 4 guidance state that all equipment should be stored in appropriate dedicated facilities, including the NCSS and care homes NCSS.[6, 9, 17, 36] Two SIGN 50 level 4 guidance state that storage spaces and equipment should be maintained to appropriate standards of cleanliness.[6, 9] Two SIGN 50 level 4 guidance, the NCSS and care homes NCSS, advise that a colour coding system should be used for the management and storage of reusable cleaning materials.[17, 36] Consistency could not be assessed regarding decontamination of equipment for environmental decontamination with detergent and disinfectant when MDRO's are present (one SIGN 50 level 4).[6]

12.3 Is the evidence applicable to Scottish health and care settings?

(see SIGN 50, section 5.3.3)

For example, do the studies include interventions, comparators or outcomes that are common to Scottish health and care settings?

Comments
The country or countries where the research was conducted, or to which the guidance applies are as follows: • UK (n=4)[9, 17, 36, 43] • Australia (n=1)[6] • US (n=1)[42] Of the three expert opinion documents published in the UK, all are applicable to health and care settings.[9, 17, 36] Two guidance were specifically developed for NHSScotland health and care settings, accounting for relevant logistical considerations, practices and policies.[17, 36] One SIGN 50 level 4 guidance document was published out with the UK and variation in IPC practices and policies may impact applicability to NHSScotland health and care settings.[6] The products investigated and specific automated floor cleaner investigated in the US-based primary study[42] may not be available for use in Scottish health and care settings. Furthermore, as only one specific test strain of *S. aureus* was

Comments
investigated,[42] the findings of the primary study may not be generalisable to all other strains which may be present in a Scottish health or care setting. The findings from the UK-based outbreak study are likely generalisable to Scottish health and care settings. However, little detail is provided regarding make or model of contaminated electric floor scrubber or mops, so it is not possible to deduce if the same floor cleaning equipment is used in Scottish hospitals.[43]

12.4 Are the studies generalisable to the target population?

Comment here on sample size and methods of sample selection. Is the sample representative of the specific population or group of interest? Generalisability is only relevant to primary research studies.

Comments
The included outbreak report is specific to the described population in the two hospitals which are part of a 1,600 bed hospital organisation. Outbreak studies are uncontrolled and observational therefore aspects such as sample size and methods of sample selection are not relevant Generalisability is not applicable to the experimental study included in this research question, as there was not a patient or population sample.

12.5 Are there concerns about publication bias?

(see SIGN 50, section 5.3.5)

Comment here on whether there is a risk in the evidence base that studies have been selectively published based on their results and thus a risk that results from published studies are systematically different from unpublished evidence.

Comments
A formal assessment of publication bias was not conducted. There is a risk of publication bias with the experimental study included, as studies that did not show efficacy of particular methods of storing or managing equipment used for environmental decontamination may not have been published. There is also a risk

Comments
of publication bias with the outbreak study included, as not all outbreaks and infection incidents are published in scientific journals. Risk of publication bias is not applicable for the remainder of the evidence in this research question due to the type of evidence identified.

B: Evidence to Decision

12.6 Recommendations

What Recommendations or Good Practice Points are appropriate based on this evidence?

Note the following terminology:

- **"must"** implies that the health and care setting must implement the recommended approach and is used where a recommendation has been directly lifted from legislation or mandatory guidance
- **"should"** implies that the health and care setting "should" implement the recommended approach unless a clear and compelling rationale for an alternative approach is present
- **"should consider"** implies that the health and care setting should consider implementing the recommended approach

Recommendation	Grading
GPP12.1 Re-usable cleaning materials and equipment should be colour coded in accordance with the coding scheme outlined in the NCSS (SHFN 01-02) and care homes NCSS (SHFN 01-05). Environmental decontamination equipment should only be used in the area indicated by the colour scheme.	Good practice point
GPP12.2 Disposable decontamination equipment should be discarded in accordance with local waste management policy. Non-disposable decontamination equipment which is no longer fit for purpose should be discarded in accordance with local waste management policy.	Good practice point
GPP12.3 Separate purpose-built Domestic Services Rooms (DSRs) should be used for storage of decontamination equipment. These areas should have sufficient space and facilities to enable equipment to be thoroughly cleaned and decontaminated following use and for the disposal of detergent and disinfectant	Good practice point

Recommendation	Grading
solutions and be kept to an appropriate standard of cleanliness.	
GPP12.4 Equipment for environmental decontamination should be managed according to manufacturer's instructions and stored according to local policy.	Good practice point

12.7 Balancing benefits and harms

Comment here on the potential impact of the Recommendation or Good Practice Point on service users, visitors and staff. Benefits and harms include considerations beyond IPC.

Benefits

List the favourable changes in outcome that would likely occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about benefits.

Benefits
GPP12.1 Use of the colour coding system complies with that agreed for use by NHSScotland, and as per the NCSS (SHFN 01-02) which is best practice guidance.
GPP12.1 Colour-coded equipment for environmental decontamination ensures that only specific equipment is used in high-risk areas (for example, the colour red is used for bathrooms, toilets and showers),[17] and therefore minimises the risk of cross-infection.
GPP12.2 Disposal of environmental decontamination equipment as per local policy ensures that items are disposed of safely.
GPP12.2 Disposal of equipment that is no longer fit for purpose reduces the risk of equipment being used which is ineffective.
GPP12.3 Organised and safe storage for environmental decontamination equipment may support timely identification of required equipment, supporting efficient and timely decontamination.
GPP12.3 Safe storage of equipment for environmental decontamination may prevent accidents as a result of improper handling.

Benefits
GPP12.3 Dedicated DSRs for equipment for environmental decontamination provides a safe place for storage, decontamination and drying of the equipment. GPP12.3 Safe storage of equipment for environmental decontamination supports compliance with local and national guidance (the NCSS, SHFN 01-02), which supports standardisation of practice, patient and service user safety and workforce efficiency. GPP12.3 If decontamination products are not returned to their designated secure storage area, in line with local policy, after use in the care environment, there may be risk of unintended exposure of patients, service users, staff and visitors to chemicals or contaminated decontamination equipment, which could result in harm. GPP12.4 Following manufacturer's instructions supports safe management and storage of equipment for environmental decontamination and may reduce the risk of decontamination equipment becoming contaminated and ineffective for use. GPP12.4 Following manufacturer's instructions may reduce the risk of damage and extend the lifespan of equipment and ensuring it can be effectively cleaned, therefore reducing the risk of cross contamination.

Risks and harms

List the adverse events or other unfavourable outcomes that may occur if the Recommendation or Good Practice Point were followed correctly. Be explicit and clear about risks and harms.

Risks and harms
GPP12.1, GPP 12.2, GPP12.3 and GPP12.4 No risks or harms identified.

Benefit-Harm assessment

Classify as "benefit outweighs harm" (or vice versa) or a "balance of benefit and harm." Description of this balance can be from the:

- individual service user, staff or visitor perspective
- the societal perspective
- or both of the above

Recommendations or Good Practice Points are possible when clear benefit is not offset by important harms, costs or adverse events or vice versa.

Benefit-Harm assessment
GPP12.1, GPP12.2, GPP12.3 and GPP12.4 Only benefits identified.

12.8 Feasibility

Is the Recommendation or Good Practice Point implementable in the Scottish context?

Describe (if applicable):

- financial implications
- opportunity costs
- material or human resource requirements
- facility needs
- sustainability issues
- human factors

or any other issues that may be associated with following a Recommendation or Good Practice Point. State clearly if information on feasibility is lacking.

Feasibility
GPP12.1, GPP12.2 and GPP12.4 Human resource for education, training and audit will be required to support the implementation of safe storage and management of equipment used for environmental decontamination. However, for most settings this is already established practice. GPP12.2 Specific procedures will depend on local policy and resource. GPP12.3 Sufficient storage space will be required to manage and store equipment for environmental decontamination. However, it is understood that most estates will have DSRs already. GPP12.3 Storage for equipment for environmental decontamination would require consideration during design for construction or refurbishment.

12.9 Expert opinion

Summarise the expert opinion used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves expert opinion where evidence is insufficient. Clearly outlining that expert opinion helps users understand their influence on interpreting objective evidence. Expert opinion may also be required where there is no evidence available.

Expert opinion
GPP12.1 ARHAI Scotland and its stakeholders support the use of the colour-coding system for equipment management, as per the NCSS (SHFN 01-02),[17] as categorising decontamination equipment according to risk reduces the likelihood of cross-contamination of equipment and the environment. GPP12.2 It is the expert opinion of ARHAI Scotland and its stakeholders that local waste management policy should be followed for disposal of equipment for environmental decontamination. GPP12.3 This GPP was informed by four SIGN 50 level 4 expert opinion which advise the use of dedicated facilities for storage of equipment,[6, 9, 17, 36] and two SIGN 50 level 4 expert opinion which advise that these storage spaces should be maintained to an appropriate standard of cleanliness.[6, 9] No further expert opinion from ARHAI Scotland and its stakeholders to note. GPP12.4 It is the expert opinion of ARHAI Scotland and its stakeholders that there is a wide range of equipment used across health and care settings that requires specific management and storage; this detail cannot be covered by high-level guidance and therefore manufacturer’s instructions and local guidance should be followed.

12.10 Value judgements

Summarise value judgements used in creating the Recommendation or Good Practice Point. If none were involved, state “none”. Translating evidence into action often involves value judgements, which include guiding principles, ethical considerations, or other beliefs and priorities. Clearly outlining value judgements helps users understand their influence on interpreting objective evidence.

Value judgements
GPP12.1, GPP12.2, GPP12.3 and GPP12.4 No value judgements to note.

12.11 Intentional vagueness

State reasons for any intentional vagueness in the Recommendation or Good Practice Point. If none was intended, state “none”. Recommendations or Good Practice Points should be clear and specific, but if there is a decision to be vague, acknowledging the reasoning clearly promotes transparency. Reasons for vagueness may include:

- inadequate evidence
- inability to achieve consensus regarding evidence quality
- anticipated benefits or harms, or interpretation of evidence
- legal considerations
- economic reasons
- ethical or religious reasons

Intentional vagueness
GPP12.1, GPP12.2, GPP12.3 and GPP12.4 No intentional vagueness to note.

12.12 Exceptions

List situations or circumstances in which the Recommendation or Good Practice Point should not be applied.

Exceptions
GPP12.1, GPP12.2 and GPP12.4 No exceptions to note. GPP12.3 It is acknowledged that some areas may experience challenges with space for storing equipment, in which case local policies should be in place.

12.13 Recommendations for research

List any aspects of the question that require further research.

Recommendations for research

Recommendations made in extant guidance on managing and storing decontamination equipment do not seem to be based on primary evidence. Although one outbreak study suggested decontamination equipment (an electric floor scrubber) may act as a reservoir for HAI,[43] transmission route was not clear. Further outbreak reports evidencing a strong link between poorly managed or stored equipment and patient infection and/ or environmental contamination would be beneficial. However, specific requirements for decontamination equipment management and storage may differ depending on manufacturer's instructions, which may limit generalisability of the findings from primary research.

References

1. Cheng VCC, Wong SC, Cao H, et al. Whole-genome sequencing data-based modeling for the investigation of an outbreak of community-associated methicillin-resistant Staphylococcus aureus in a neonatal intensive care unit in Hong Kong. European Journal of Clinical Microbiology and Infectious Diseases 2019; 38: 563-573.
2. Chen LF, Knelson LP, Gergen MF, et al. A prospective study of transmission of Multidrug-Resistant Organisms (MDROs) between environmental sites and hospitalized patients-the TransFER study. Infection control and hospital epidemiology 2019; 40: 47-52.
3. Loveday HP WJ, Pratt RJ, Golsorkhi M, Tingle A, Bak A, et al. epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection 2014; 86: 1-70.
4. World Health Organization. Global guidelines for the prevention of surgical site infection, second edition, (2018, accessed 01 September 2024).
5. Asia Pacific Society of Infection Control (APSIC). APSIC Guidelines for Environmental Decontamination, (2013, accessed 12 August 2024).
6. National Health and Medical Research Council Australia. Guidelines for the Prevention and Control of Infection in Healthcare, (2019, accessed 24 August 2024).
7. Infection Prevention and Control Canada. Environmental Cleaning and Disinfection for Emergency Medical Vehicles and Equipment, (2022, accessed 24 August 2024).
8. Health and Safety Executive. Methods of decontamination, (accessed 16 August 2024).
9. Royal College of Nursing. Essential Practice for Infection Prevention and Control Guidance for nursing staff, (2017, accessed 18 August 2024).
10. Centers for Disease Control and Prevention (CDC) and Healthcare Infection Control Practices Advisory Committee (HICPAC). Guidelines for

Environmental Infection Control in Health-Care Facilities, (2003, Updated 2019, accessed 16 August 2024).

11. European Centre for Disease Prevention and Control. Considerations for infection prevention and control practices in relation to respiratory viral infections in healthcare settings, (2023, accessed 15 August 2024).
12. Centers for Disease Control and Prevention. Guideline for Disinfection and Sterilization in Healthcare Facilities, (2008, accessed 13 August 2024).
13. Centers for Disease Control and Prevention. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, (2007, accessed 13 August 2024).
14. Centers for Disease Control and Prevention. Management of Multidrug-Resistant Organisms in Healthcare Settings, (2006, accessed 13 August 2024).
15. The Society for Healthcare Epidemiology of America. Infection Prevention in the Operating Room Anesthesia Work Area, (2018, accessed 11 August 2024).
16. Public Health Agency of Canada. Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings, (2017, accessed 01 September 2024).
17. NHS Scotland Assure. The NHSScotland National Cleaning Services Specification Scottish Health Facilities Note 01-02, (2025, accessed 30 September 2025).
18. World Health Organization. WHO guidelines on hand hygiene in health care, (2009, accessed 03 September 2024).
19. The Detergents (Amendment) (EU Exit) Regulations 2020. (2020).
20. Health and Safety at Work etc. Act 1974. (1974).
21. Public Health etc (Scotland) Act 2008. (2008).
22. The Control of Substances Hazardous to Health Regulations 2002 (as amended). 2002.

23. The Personal Protective Equipment at Work Regulations 1992, No. 2966. (1992).

24. Health and Safety Executive. Detergents regulation in Great Britain (GB) and Northern Ireland (NI).

25. Health and Safety Executive. The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance, (2013, accessed 15 August 2024).

26. British Standards Institution. BS EN 14885:2022 Chemical disinfectants and antiseptics. Application of European Standards for chemical disinfectants and antiseptics. 2022.

27. British Standards Institution. 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. 2005.

28. British Standards Institution. BS EN 13727:2012+A2:2015 Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of bactericidal activity in the medical area. 2015.

29. British Standards Institution. 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). 2015.

30. British Standards Institution. 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. 2018.

31. British Standards Institution. BS EN 17126:2018 Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of sporicidal activity of chemical disinfectants in the medical area. 2018.

32. British Standards Institution. BS EN 14476:2013+A2:2019 Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of virucidal activity in the medical area. 2019.

33. British Standards Institution. 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. 2021.

34. British Standards Institution. BS EN 13624:2021 Chemical disinfectants and antiseptics. Quantiative suspension test for the evaluation of fungicidal or yeasticidal activity in the medical area. 2022.

35. Ungurs M, Wand M, Vassey M, et al. The effectiveness of sodium dichloroisocyanurate treatments against Clostridium difficile spores contaminating stainless steel. American Journal of Infection Control 2011; 39: 199-205.

36. Health Facilities Scotland. Scottish Health Facilities Note (SHFN) 01-05. Safe Management of the Care Environment. Cleaning Specification for Care Homes, (2023, accessed 05 August 2024).

37. Public Health Agency of Canada. Guidance: Infection Prevention and Control Measures for Healthcare Workers in All Healthcare Settings. Carbapenem-resistant Gram-negative Bacilli, (2012).

38. Centers for Disease Control and Prevention. Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings, (2024, accessed 13 August 2024).

39. NHS National Services Scotland. SAN(SC)19/03 Risk of death and severe harm from ingesting superabsorbent polymer gel granules. 2019.

40. UK Department of Health and Social Care. Infection prevention and control: resource for adult social care, (2024, accessed 05 August 2024).

41. Scottish Executive Health Department. NHS HDL(2005)7 Infection control and cleaning: nursing issues, (2005).

42. Tembo GM, Chaggar GK, Li X, et al. Evaluation of automated floor cleaning, disinfection, and application methods against Staphylococcus aureus. American Journal of Infection Control 2023; 51: 380-387.

43. Benbow A, Clarke M, Yates C, et al. Hospital wide healthcare associated carbapenemase-producing Enterobacterales outbreak: risks of electric floor

scrubbers in catering facilities and kitchens. The Journal of hospital infection 2024.

Appendix 1 - Definitions

Term used	Description	Evidence
Recommendation	In general, 'Recommendations' should be supported by high- to moderate-quality evidence. In some circumstances, however, 'Recommendations' may be made based on lower quality evidence when high-quality evidence is impossible to obtain, and the anticipated benefits strongly outweigh the harms or when the Recommendation is required by Legislation or Mandatory Guidance.	Sufficient evidence (SIGN 50 level 1++, 1+, 2++, 2+, 3, 4* AGREE Recommend AGREE Recommend (with Modifications)) Legislation, or mandatory guidance
Good Practice Point	Insufficient evidence or a lack of evidence to make a recommendation but identified best practice based on the clinical/technical experience (expert opinion) of the Working Group, with a clear balance between benefits and harms.	Insufficient evidence + Working Group expert opinion OR No evidence + Working Group expert opinion
No Recommendation	Both a lack of pertinent evidence and an unclear balance between benefits and harms.	No evidence

* A Recommendation cannot be developed when there is only SIGN 50 level 4 evidence available.

The considered judgement form and recommendation system are adapted from the following three sources:

- Update to the Centers for Disease Control and Prevention and the Healthcare Infection Control Practices Advisory Committee Recommendation Categorization Scheme for Infection Control and Prevention Guideline Recommendations. (2019)
- Scottish Intercollegiate Guidelines Network (SIGN). A guideline developer's handbook. (2019)
- Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Handbook. (2013)