An Roinn Sláinte
Department of Health

# Infection Prevention and Control (IPC)

## National Clinical Guideline No. 30

**May 2023**

Volume 2

NATIONAL CLINICAL EFFECTIVENESS COMMITTEE

This National Clinical Guideline has been developed by the Infection and Prevention Infection Prevention and Control Guideline Development Group (GDG).

## Using this National Clinical Guideline

This National Clinical Guideline applies to all health and social care workers because the control of healthcare associated infection is everyone's responsibility. It is particularly relevant to Infection Prevention and Control (IPC) Practitioners. IPC Practitioners are those health and social care workers with specific training and expertise in the prevention and control of infection and who provide training, guidance and leadership to others on IPC. Please note: that reference to a document as a source of additional information does not represent an endorsement of the entire document cited as a part of this National Clinical Guideline. Due to size, this full version guideline is presented in two volumes. Both should be cross-referenced as needed. A summary version is also available.

## Disclaimer

NCEC National Clinical Guidelines do not replace professional judgment on particular cases or particular circumstances, whereby the clinician or health professional decides that individual guideline recommendations are not appropriate in the circumstances presented. It may also happen that an individual patient declines a recommendation as a course of action in their care or treatment plan. In these circumstances the decision not to follow a recommendation should be appropriately recorded in the patient's healthcare record (individual patient) or elsewhere if the issue is not related to a specific patient.

Users of NCEC National Clinical Guidelines must ensure they have the current version (hardcopy or softcopy) by checking the relevant section in the National Patient Safety Office section of the Department of Health website:
www.gov.ie/clinicalguidelines

Whilst every care has been taken to ensure that all information contained in this publication is correct, the Department of Health cannot accept responsibility for any errors or omissions which may have occurred.

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## Membership of the Guideline Development Group (GDG)

The GDG was chaired by Professor Martin Cormican, Professor of Bacteriology, University of Galway, formerly Clinical Lead HSE, Antimicrobial Resistance and Infection Control Team (until 30th April 2022).

Membership nominations were sought from a variety of clinical and non-clinical backgrounds. This was to ensure the group was as representative as possible of key stakeholders.

**Table 1** Guideline Development Group membership

| Name | Job title and affiliation |
|---|---|
| Professor Martin Cormican (Chairperson) | Professor of Bacteriology, School of Medicine, University of Galway (former National Clinical Lead Antimicrobial Resistance and Infection Control (AMRIC)) |
| Dr Eimear Brannigan | Consultant in Infectious Diseases and National Clinical Lead, HSE Antimicrobial Resistance and Infection Control Team (AMRIC) |
| Shirley Keane | Head of Service, AMRIC |
| Dr Anne Sheahan | Area Director of Public Health, Area D |
| Dr Caroline Fielding | Representative from Faculty of Pathology, Royal College of Physicians in Ireland (RCPI) |
| Bernie O'Reilly | Voluntary member of Patients For Patient Safety Ireland (PFPSI), and patient representative |
| Josephine Galway | Director of Nursing, AMRIC |
| Therese Dalchan | Head of Service, HSE Acute Operations |
| Helen Murphy | Infection Prevention and Control Lead Nurse Advisor Manager AMR HCAI Health Protection Infection, HPSC |
| Carmel Hooton | Surveillance Scientist, SSAI representative |
| Lenora Leonard | Infection Prevention and Control Nurse, IPCI representative |
| Margo Leddy | Health and Safety representative |
| Niamh Galvin | HSE National Oral Health Office, Dental representative |
| Dr Bernard Murphy | Dental Council representative |
| Shane Keane | Principal Environmental Health Officer, Environmental Health representative |
| Dr Nuala O'Connor (until Oct 2021) | HCAI/AMR GP Lead, Irish College of General Practitioners (ICGP) representative |
| Dr Edel Doorley (from Oct 2021) | General Practitioner Advisor, AMRIC |

| | |
|---|---|
| Marie Philbin | Chief Antimicrobial Pharmacist, AMRIC |
| Ann Marie Howard | Occupational Health representative |
| Kathryn Hanly | Inspector, Health Information Quality Authority (HIQA) representative |
| Dr Jerome Fennell | Consultant Microbiologist, Irish Society Clinical Microbiology (ISCM) representative |
| Dr Rob Cunney | Consultant Microbiologist, HSE, HPSC representative |
| Marie Cregan | Representative for Patients For Patient Safety Ireland (PFPSI) and Féileacáin |
| Marguerite Kelly (until 2021) | IPC Ireland Community representative |
| Dorothy Kealy (from Juanry 2022 | IPC Ireland Community representative |
| Caroline Conneely | Quality Improvement Division, National Decontamination Safety Programme representative |
| Cornelia Stuart (until Oct 2021) | Assistant National Director, HSE Quality & Patient Safety representative |
| Mary Mc Kenna (until Oct 2021) | Assistant Director of Nursing (ADON), AMRIC |
| Emer O'Donovan (from Oct 2021) | Assistant Director of Nursing, AMRIC |
| Gwen Regan (from Oct 2021) | Director of Nursing, IPC Community Healthcare, Quality & Patient Safety Representative |
| Margaret Culliton (from Oct 2021) | Project Manager, AMRIC |

## Credits

The role of the NCEC is to prioritise, quality assure and recommend clinical guidelines to the Chief Medical Officer for endorsement by the Minister for Health. It is intended through Ministerial endorsement that full implementation of the guideline will occur through the relevant service plans.

The NCEC and the Department of Health acknowledge and recognise the Chair and members of the Guideline Development Group (GDG) for development of the guideline; and the external reviewers for their contribution. The NCEC and Department of Health wish to express thanks and sincere gratitude to all persons contributing to this National Clinical Guideline; especially those that gave their time on a voluntary basis.

## Acknowledgments

The Chair of the GDG wishes to acknowledge the following for their particular contribution to the development of this guideline:

- The members of the GDG for their commitment through the development of this particularly important and complex guideline
- The National Health and Medical Research Council of Australia for permission to use and adapt the Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019) to support development of this guideline. This guideline differs in a number of points from the Australian Guidelines (2019). The Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019) was updated in 2021 and is available at the following link: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/australian-guidelines-prevention-and-control-infection-healthcare
- The HSE Antimicrobial Resistance and Infection Control team for their outstanding support for the work of the GDG throughout the process and in particular for work on the Budget Impact Analysis and the Implementation Plan
- The Health Protection Surveillance Centre for access to facilities and support
- Health Research Board - Collaboration in Ireland for Clinical Effectiveness Reviews (HRB-CICER) for work on Evidence Review, Budget Impact Analysis and the Implementation Plan
- Those who contributed formal feedback through the public consultation process
- The great many IPC practitioners and other healthcare workers who have informed the development of this guideline through sharing their vast practical experience with the Chair and members of the GDG through questions, conversations and email.

## External review acknowledgement

**The following are acknowledged for providing an external review of the guideline:**

- Prof. Charles Van der Henst, PhD. Professor. VIB-VUB Group Leader-Microbial Resistance and Drug Discovery Group, Flanders Institute for Biotechnology (VIB), Vrije Universiteit Brussels (VUB)
- Louis Palen, Multi-Site Director, Infection Prevention & Control, Advocate Christ Medical Center, South Suburban Hospital, Trinity Hospital, 4440 W. 95th Street, Oak Lawn, IL 60453. USA
- Dr. Susanne Surman Lee, BSc, PhD, C Biol, FRSB, FRSPH, FIHEEM, FWMSoc. Director. Legionella Ltd.

Signed by the Chair(s) Date: 6/5/2023

*Prof. Martin Cormican*

## National Clinical Guidelines

Providing standardised clinical care to patients in healthcare is challenging. This is due to a number of factors, among them diversity in environments of care and complex patient presentations. It is self-evident that safe, effective care and treatment are important in ensuring that patients get the best outcomes from their care.

The Department of Health is of the view that supporting evidence-based practice, through the clinical effectiveness framework, is a critical element of the health service to deliver safe and high quality care. The National Clinical Effectiveness Committee (NCEC) is a Ministerial committee set up in 2010 as a key recommendation of the report of the Commission on Patient Safety and Quality Assurance (2008). The establishment of this Commission was prompted by an increasing awareness of patient safety issues in general and high profile health service system failures at home and abroad.

The NCEC on behalf of the Department of Health has embarked on a quality assured National Clinical Guideline development process linked to service delivery priorities. Furthermore, implementing National Clinical Guidelines sets a standard nationally, to enable healthcare professionals to deliver safe and effective care and treatment while monitoring their individual, team and organisation's performance.

The aim of these National Clinical Guidelines is to reduce unnecessary variations in practice and provide an evidence base for the most appropriate healthcare in particular circumstances. As a consequence of Ministerial mandate, it is expected that NCEC National Clinical Guidelines are implemented across all relevant services in the Irish healthcare setting.

The NCEC is a partnership between key stakeholders in patient safety. NCEC's mission is to provide a framework for national endorsement of clinical guidelines and clinical audit to optimise patient and service user care. The NCEC has a remit to establish and implement processes for the prioritisation and quality assurance of clinical guidelines and clinical audit so as to recommend them to the Minister for Health to become part of a suite of National Clinical Guidelines and National Clinical Audit. The aim of the suite of National Clinical Guidelines is to provide guidance and standards for improving the quality, safety and cost-effectiveness of healthcare in Ireland. The implementation of these National Clinical Guidelines will support the provision of evidence-based and consistent care across Irish healthcare services.

### NCEC Terms of reference

1. Provide strategic leadership for the national clinical effectiveness agenda.
2. Contribute to national patient safety and quality improvement agendas.
3. Publish standards for clinical practice guidance.
4. Publish guidance for National Clinical Guidelines and National Clinical Audit.
5. Prioritise and quality assure National Clinical Guidelines and National Clinical Audit.
6. Commission National Clinical Guidelines and National Clinical Audit.
7. Align National Clinical Guidelines and National Clinical Audit with implementation levers.
8. Report periodically on the implementation and impact of National Clinical Guidelines and the performance of National Clinical Audit.
9. Establish sub-committees for NCEC work streams.
10. Publish an annual report.

## Table of Contents

### Volume 1

## Volume 2

**List of Tables**

**List of Figures**



**List of Annex**

## Volume 2

Note that Volume 2 is designed to be read following on from Volume 1. Hence the pagination starts at page 206.

# 4 Appendices

## Appendix 1: Guideline Development Group terms of reference

**GDG Terms of Reference: To develop a national evidence-based clinical guideline for the management of IPC**

**IPC (2022) NCG No. 30 Guideline Development Group**

**Terms of Reference for the National Clinical Effectiveness Committee (NCEC) Healthcare Associated Infection (HCAI) Guideline Development Group (agreed 05.09.2018)**

**Introduction**

The NCEC has identified a requirement for a National Guideline on HCAI.
Professor Martin Cormican, HSE National Lead for Antimicrobial Resistance and Infection Control has agreed to act as Chair of a HCAI Guideline Development Group and had convened this group.

Membership is guided by NCEC guidance on membership of Guideline Development Groups.

**Terms of Reference**

- The Guideline Development Group will work in accordance with the processes approved by the NCEC.
- The Guideline Development Group will work in an open and collegiate manner. In general members of the Group should feel free to discuss the issues under consideration by the Guideline Development Group with peers so as to bring the benefit of other perspectives to the group.
- Minutes of the Guideline Development Group Meetings will be concise and focused on decisions and actions.
- A deputy chair will be nominated by the Chair subject to approval by the Guideline Development Group.
- The Guideline Development Group will work to develop a practical guideline for the prevention and control of healthcare associated infection in Ireland.
- Antimicrobial Stewardship is acknowledged as playing a key role in the prevention and control of infection. Antimicrobial Stewardship will be referred to in the Guideline as appropriate.
- Where appropriate existing relevant authoritative guidance documents will be endorsed (with or without qualification as appropriate) as part of this document.
- For the purpose of this Guideline the definition of healthcare associated infection used in HIQA standard is accepted with a minor clarification as below.
- Healthcare Associated Infections are " infections that are acquired after contact with a healthcare service" and are related to that contact. [The text in italics and within quotation marks constitutes the HIQA definition]HIQA standards on healthcare associated infection are a key reference point for the development of this Guideline.

- The Guideline Development Group will consider existing NCEC Guidelines on “Prevention and Control Meticillin-Resistant Staphylococcus aureus” and “Surveillance, Diagnosis and Management of Clostridium difficile Infection in Ireland”. This Guideline Development Group will not develop new versions of these documents as the intention is to develop an overarching Guideline that will supersede organism specific Guidelines.

**External Reviewers**

Charles Van der Henst, PhD. Professor. VIB-VUB Group Leader-Microbial Resistance and Drug Discovery Group, Flanders Institute for Biotechnology (VIB), Vrije Universiteit Brussels (VUB)

Louis Palen, Multi-Site Director, Infection Prevention & Control, Advocate Christ Medical Center, South Suburban Hospital, Trinity Hospital, 4440 W. 95th Stree, Oak Lawn, IL 60453. USA

Susanne Surman Lee, BSc, PhD, C Biol, FRSB, FRSPH, FIHEEM, FWMSoc. Director. Legionella Lt.

**Conflict of interest declarations**

There were no conflict of interests stated.

# Appendix 2: Literature search strategy

Recommendation 21 is based on a systematic review performed by HRB-CICER to support development of this guideline.

The research question was as follows:

- In acute hospital in-patients, does the use of all single room accommodation compared with use of mixed single rooms and/or multi-bed rooms result in reduced incidence of healthcare-associated infection?

The issue of effective strategies to promote hand hygiene was also identified as a key research question for the guideline. Although the conclusion of this systematic review did not inform a new recommendation it provides important support for guideline content in section 3.8.1 regarding effective educational strategies.

The research question was as follows:

- In relation to healthcare workers in hospitals, nursing homes, long-term care facilities or community healthcare settings, are there specific interventions to promote hand hygiene compared with other interventions to promote hand hygiene that improve hand hygiene adherence among healthcare workers?

The PICOS for questions 1 and 2 are presented below as tables 32 and 33. The databases searched for each question are summarised also in table 34. The clinical evidence for review questions 1 and 2 are summarised respectively in tables 35 and 36. *The methodology, search results and findings for both systematic reviews can be found in Annex A. Research question 1 updated the searches (19.10.16 to 08.07.19) of an existing Cochrane review by Gould et al. 2017 with the addition of a new search strategy for economic evidence (01.07.09 – 08.07.19). This review was not updated prior to finalisation of the guideline in 2023, as a large number of RCTs had been identified in the review and additional literature was unlikely to affect either the findings of the review nor section 3.8.1 of the guideline which this review supported. Full details can be found in Annex A.*

In addition to the literature searched for the systematic reviews, a review of the literature cited in the "National Health and Medical Research Council (Australia), Australian Guideline for the Prevention and Control of Infection in Healthcare. 2019" was performed. This was because the Australian guideline was used as a starting point for this guideline. All but one (recommendation 21) of the recommendations in this guideline are based on recommendations in that guideline. Those recommendations are supported by the reviews performed in the development of that guideline. The evidence tables are presented in that document. The relevant literature reviews in addition to the guideline itself are available at https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019#block-views-block-file-attachments-content-block-1. Review of literature cited in that guideline for relevance and appropriateness to this guideline for Ireland formed a key part of the literature research strategy.

In addition to the above the Chair and members of the GDG performed ad-hoc literature searches using PubMed as required through the guideline development process to ensure that key new publications were identified. Reference lists in identified papers were reviewed to identify additional relevant references. In addition to database searches the broad membership of the Guideline Development Groups and the extensive consultation process ensure that research publications as well as documents on policies, procedures, standards and regulatory requirements specifically relevant to the Irish context, as distinct from the Australian context, were identified and are reflected in the document.

**Table 32** Methods: PICOS for review question one – interventions to improve adherence to hand hygiene recommendations

| | |
|---|---|
| **Population** | Included:<br>• Healthcare workers (for example, nurses, doctors and other healthcare workers) in any hospital, nursing home, long-term care facility or community healthcare setting, in any country.<br>Excluded:<br>• Studies focused on non-healthcare workers (for example, hospital visitors, homecare assistants, catering or cleaning staff). |
| **Intervention** | Included:<br>• Any intervention intended to improve adherence with hand hygiene using soap and water or alcohol-based products (for example, education, audit with performance feedback, health promotion, or variations in availability and type of products used for hand hygiene)<br>• Bundles (multimodal management strategies) as long as the data relating to hand hygiene adherence was presented separately.<br>Excluded:<br>• Studies based outside clinical settings (for example, simulation or artificial settings)<br>• Studies looking at surgical hand disinfection in theatre settings and surgical scrubbing. |
| **Comparator** | No intervention or another intervention. |
| **Outcome** | Primary:<br>• Hand hygiene adherence, measured through direct observation (for example use of soap or alcohol-based products, or adherence with hand hygiene measured by an automated monitoring device) or a proxy indicator (for example, increased use of hand hygiene products).<br>Secondary:<br>• Reduction in HCAI rates (see section 1.1 for definition)<br>• Reduction in colonisation rates by clinically significant nosocomial pathogens. As per the Cochrane review (24) data on all reported pathogens was included. Any relevant measures of costs and benefits which are applicable to the Irish setting.<br>Excluded:<br>• Studies that assessed adherence using self-reported measurements. |
| **Study design** | Included:<br>• RCTs<br>• Economic evaluations and systematic reviews<br>Excluded:<br>• nRCTs, ITS, before-after studies, cohort studies<br>• Observational studies. |
| **Search period** | For clinical effectiveness studies: 19.10.16 – 08.07.19<br>For cost-effectiveness studies 01.07.09 – 08.07.19 |

**Key: HCAI – healthcare-associated infection; ITS – interrupted time series; nRCT – non randomised controlled trial; RCT – randomised controlled trial.**

**Table 33** Methods: PICOS for review question two – effectiveness of single patient rooms in reducing HCAI infection rates

| | |
|---|---|
| **Population** | Included:<br>• Adult patients based in inpatient wards in acute settings.<br>Excluded:<br>• Studies that only included high acuity settings for example ICU, HDU or critical care wards. |
| **Intervention** | Included:<br>• SPR accommodation with ensuite facilities (for example sink, toilet and shower<br>Excluded:<br>• Studies that did not explicitly state the SPRs have ensuite facilities<br>• Studies that examined the effects of transferring patients who were initially admitted to multi-bed rooms to a SPR after infection or colonisation. For example, interventions relating to patients identified as acquiring a HCAI or colonised with an AMRO while in a medical or surgical ward and subsequently transferred to a SPR as part of an infection control measure<br>• Studies where it was not possible to identify the effect of SPR alone on the reported outcome(s). For example, bundled interventions that included additional patient decolonisation strategies or healthcare worker education programs. |
| **Comparison** | • Multi-bed room accommodation (for example, shared rooms or bays that included patient rooms of two or more)<br>• Or a mix of multi and SPR accommodation (for example, a ward featuring SPRs and multi-bed rooms). |
| **Outcome(s)** | Primary:<br>• Reduction in HCAI rates (see section 1.1 for definition)<br>• Adverse events (including both physical and psychological harms).<br>Secondary:<br>• Reduction in colonisation rates by antimicrobial resistant organisms<br>• Any relevant measures of costs and benefits. |
| **Study design** | • RCTs, nRCTs studies<br>• Interrupted time series analysis<br>• Controlled and uncontrolled before-after studies<br>• Prospective and retrospective cohort studies<br>• Health economic studies. |
| **Search period** | For clinical studies 01.07.04 – 30.05.22<br>For cost-effectiveness studies 01.07.09 – 30.05.22 |

**Key:** AMRO – antimicrobial resistant organisms; HCAI – healthcare-associated infection; HDU – high dependency unit; ICU – intensive care unit; nRCT – non randomised controlled trial; RCT – randomised controlled trial; SPR – single patient room.

**Table 34** Methods: Databases searched by review question

| **Review question** | **Databases searched and search dates** | |
|---|---|---|
| | **Clinical effectiveness** | **Cost-effectiveness** |
| **Interventions that improve hand hygiene adherence** | Cochrane Central Register of Controlled Trials, MEDLINE (via OVID), Embase, CINAHL (via EBSCO), ClinicalTrials.gov, WHO International Clinical Trials Registry Platform.<br><br>**Search dates:** 19/10/16 to 08/07/19 | Cochrane Central Register of Controlled Trials, MEDLINE (via OVID), Embase, CINAHL (via EBSCO), ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, HTA & NHS EED on CRD.<br><br>**Search dates:** 01/07/09 to 08/07/19 |
| **Single patient rooms in acute settings** | Cochrane Central Register of Controlled Trials, MEDLINE (via OVID), Embase, CINAHL (via EBSCO), ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, PsycINFO.<br><br>**Search dates:** 01/07/04 to 30/5/2022 | Cochrane Central Register of Controlled Trials, MEDLINE (via OVID), Embase, CINAHL (via EBSCO), ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, PsycINFO, HTA & NHS EED on CRD.<br><br>**Search dates:** 01/07/09 to 30/5/2022 |

**Key:** CINAHL – Cumulative Index to Nursing and Allied Health Literature; CRD – Centre for Reviews and Dissemination – University of York; EBSCO – EBSCO information services; MEDLINE - Medical Literature Analysis and Retrieval System Online; HTA and NHS EED – Health Technology Assessment and National Health Service Economic Evaluation Database; OVID – Ovid Technologies; WHO – World Health Organization

# Appendix 3: Evidence tables

**Table 35** Clinical evidence for review question one: Summary of findings table for unimodal interventions compared with alternative or usual

**Patient or population:** healthcare workers
**Setting:** hospital setting
**Intervention:** strategy intended to improve adherence with hand hygiene
**Comparison:** no intervention or another intervention
**Outcome:** hand hygiene adherence

| Types of intervention | Impact | № of observations (studies) setting | Certainty of the evidence (GRADE) |
|---|---|---|---|
| Unimodal strategies (education and training) | 1 RCT reported statistically significant improvement in HH adherence following a talk and video on mindfulness and HH adherence, compared to usual care.<br>1 RCT reported statistically significant increases in HH adherence of 16.3 and 34.7 percentage points in the intervention group before and after patient contact, respectively, with no change or a decrease of 4.1 percentage points in the group that received usual care.<br>1 RCT reported improvement in HH adherence compared to usual care for 2 of 3 interventions, adjusted ORs of 1.96 (95% CI: 1.18 to 3.27; p=0.01) and 4.08 (95% CI: 1.51 to 11.0; p=0.05), while the third intervention was reported as statistically non-significant (with no further details). | 4,065*<br>3 RCTs<br>3 hospitals | ⨁◯◯◯<br>VERY LOW<br>a, b |
| Unimodal strategies (reminders) | 1 RCT compared two signs and reported an increase in HH adherence for the patient-consequences sign compared to the personal-consequences sign (p=0.05). | 567<br>1 RCT<br>1 hospital | ⨁◯◯◯<br>VERY LOW<br>b, c, d |
| Unimodal strategies (system change) | 1 RCT reported an absolute difference of 26% in HH adherence following the introduction of a bed-side-table with ABHR and gloves when compared to usual care (p<0.001). | 996<br>1 RCT<br>1 hospital | ⨁◯◯◯<br>VERY LOW<br>b, c |

**GRADE Working Group grades of evidence**
**High certainty:** We are very confident that the true effect lies close to that of the estimate of the effect
**Moderate certainty:** We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
**Low certainty:** Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
**Very low certainty:** We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

a. Downgraded twice for serious risk of bias: lack of blinding for participants and or outcome assessment; baseline characteristics and or outcomes not reported; and concurrent external campaigns in progress, b. Downgraded once for indirectness due to limited generalizability of setting, c. Downgraded twice for serious risk of bias: lack of blinding for participants and or outcome assessment; baseline characteristics and or outcomes not reported, d. Downgraded once for imprecision due to low number of observations and small effect size.

Key: ABHR – alcohol based hand rub; RCT – randomised controlled trial; HH – hand hygiene; LTCF – long term care facility; PHC - primary healthcare centre; OR – odds ratio

* data on observations was not reported in one study

**Table 36** Clinical evidence for question two: Primary outcome results relating to reduction in HCAI rates

| Author (year) Study design | Analysis | Outcome(s) |
|---|---|---|
| Davis (2019)[98]<br>Before-after study<br>Orthopaedic ward move to new hospital | Unadjusted analysis. | Primary outcome (SPR versus MBR)<br>**MRSA infections:** 0 cases out of 750 patients versus 3 cases out of 819 patients; p=0.25 |
| Maben (2015)[101]<br>ITS study<br>Move to a new hospital | 36 monthly data collection points (20 before and 16 after).<br>Five study groups in total: intervention hospital, new build control hospital, steady state control, national level data from the NHS, and trust level data from local NHS Trust. Interrupted time-series analysis augmented by statistical process control charts using volume-standardised rates to identify special-cause variations = 1) 1 data point outside the confidence limits or 2) 8 or more data points above the centre line.<br>Wards were matched for age, length of stay and the percentage of diagnosis included in the Charlson Comorbidity Index. | Primary outcomes (intervention hospital)<br>**MRSA infections:** Insufficient data - 1 case documented for the entire study period. |
| | | ***C. difficile* infections:** Increase in older persons ward only (1 of 3 study wards). Demonstrated by a special-cause variation in the time series analysed. |
| | | Primary outcomes (new build control hospital)<br>**MRSA infections:** Insufficient events for analysis<br>***C. difficile* infections:** No increase in any ward (0 of 3 study wards). No special-cause variation in time series analysed was demonstrated. |
| | | Primary outcomes (steady state control hospital)<br>**MRSA infections:** Insufficient events for analysis.<br>***C. difficile* infections:** No increase in any ward (0 of 3 study wards). No special-cause variation in time series analysed was demonstrated. |
| | | Primary outcomes (NHS Trust - trust level data)<br>**MRSA infections:** Not reported.<br>***C. difficile* infections:** Not reported. |
| | | Primary outcomes (NHS England - national level data)<br>**MRSA infections:** Decrease from 279 cases (before move) to 92 cases (after move).<br>***C. difficile* infections:** Decreased from 3,489 (before move) to 1,525 (after move), which represents a 56% reduction over the entire study period. |
| McDonald (2019)[102]<br>ITS study<br>Move to a new hospital | 62 data collection points (26 before and 36 after)<br>Poisson regression models with volume-standardised rates per 10,000 patient-days.<br>Results are reported as IRRs comparing consecutive times with 95% CIs. | Primary outcomes (SPR versus MBR<br>**MRSA infections:** 1.2 per 10,000 patient-days (0.8 to 1.6) versus 1.2 per 10,000 patient-days (0.8 to 1.8)<br>Trend over 26 months before move: IRR 0.98 (95% CI: 0.94 to 1.03) – not statistically significant<br>Immediate level change following move: IRR 0.89 (95% CI: 0.34 to 2.29) – not statistically significant<br>Trend over 36 months after move: IRR 1.02 (95% CI: 0.97 to 1.07) – not statistically significant |

| Author (year) Study design | Analysis | Outcome(s) |
|---|---|---|
| | Regional trend data were used to control for the underlying regional temporal trends for *C. difficile* and VRE. For MRSA, community acquired infection data was used. | ***C. difficile* infections:** 7.0 per 10,000 patient-days (6.1 to 8.0) versus 10.8 per 10,000 patient-days (9.5 to 12.2).<br>Trend over 26 months before move: IRR 0.99 (95% CI: 0.97 to 1.01) – not statistically significant.<br>Immediate level change following move: IRR 0.95 (95% CI: 0.51 to 1.76) – not statistically significant Trend over 36 months after move: IRR 1.00 (95% CI: 0.98 to 1.02) – not statistically significant.<br>**VRE infections:** 0.4 per 10,000 patient-days (0.2 to 0.7) versus 2.5 per 10,000 patient-days (1.9 to 3.3).<br>Trend over 26 months before move: IRR 1.01 (95% CI: 0.98 to 1.04) – not statistically significant.<br>Immediate level change following move: IRR 0.30 (95% CI: 0.12 to 0.75) – statistically significant.<br>Trend over 36 months after move: IRR 0.95 (95% CI: 0.88 to 1.00) – not statistically significant. |

**Key:** *C. difficile* - *Clostridioides difficile*; IRR - incidence rate ratio; ITS – interrupted time series; MRSA - meticillin-resistant *Staphylococcus aureus*; VRE - vancomycin-resistant enterococci.

# Appendix 4: Consultation report

**Table 37** Consultation report

| | |
|---|---|
| **Date** | 20th January 2022 – 18th February 2022 |
| **Patients' groups** | Patients for Patient Safety Ireland (PFPSI) |
| **External reviewers** | • Professor Charles Van der Henst, Flanders Institute for Biotechnology, Brussels<br>• Dr Louis Palen, Multi-Site Director, Infection Prevention & Control, United States of America<br>• Dr Susanne Surman Lee, Director Legionella, United Kingdom |
| **Clinical Programmes and healthcare divisions** | • Office of Chief Clinical Officer, HSE<br>• National Clinical Leads Programmes, various settings, HSE<br>• Critical Care<br>• Surgery<br>• National Office of Procurement, HSE<br>• Acute Operations and Hospital Groups, HSE<br>• Community Operations and CHO, HSE<br>• Dental, Orthodontic and Oral health services, HSE<br>• Public Health/Medical Officer services, HSE<br>• National Clinical Occupational Health & Clinical Advisory Group for Occupational Health services, HSE<br>• IPC teams and services, HSE<br>• Acute hospitals drug programme, HSE<br>• Children's Hospital Ireland (CHI), various services, HSE<br>• Microbiology services, HSE<br>• Health Promotion, HSE<br>• HSE Climate Action and Sustainability<br>• Health Protection<br>• Medicine management programme |
| **Professional Groups** | • Irish Nurses and Midwives Organisation (INMO)<br>• Irish College of General Practitioners (ICGP)<br>• Irish Practice Nurses Association (IPNA)<br>• Irish Hospital Consultants Association (IHCA)<br>• Infection Prevention Society of Ireland<br>• Infection Prevention Control, Ireland (IPCI)<br>• Royal College of Physicians, Ireland (RCPI)<br>• Royal College of Surgeons, Ireland (RCSI)<br>• Infection Prevention Control Network (IPCN) |

**Feedback received from the following:**

| Name | Title and Organisation |
|---|---|
| Sean Bresnan | National Director of Procurement |
| Michael Power | Clinical Lead, National Clinical Programme for Critical Care |
| Chloe Heslin & Eileen Ruddin | Acute Operations |
| David Hegarty | Consultant Orthodontist, HSE Cork |
| Niamh Galvin | Assistant National Oral Health Lead, HSE Tralee |
| Grace Rothwell | General Manager, University Hospital Waterford |
| Andrea Mc Cabe | ADON, Peri-operative, Our Lady of Lourdes Drogheda & Louth County Hospital Dundalk |
| Toney Thomas | DON, Health Promotion, Office of National Clinical Director for Health Promotion |
| Emer O'Donovan | AMRIC, ADON, IPC |
| Padraig Creedon | Principal Dental Surgeon, HSE Dental Services, CHO 5 |
| Dr. Una Fallon | Director of Public Health, Public Health/Medical Officer of CHO 8 |
| Derbhla Mc Gann | CNM 2 IPC, Cappagh Hospital, Dublin |
| Dr. Diarmuid Quinlan | Medical Director, ICGP |
| Judith Davitt | ADON, IPC, Galway & Roscommon Hospital |
| Grainne Bourke & Louise Kenny | DON, St. Michaels House, Dublin |
| Mary O'Donnell & Professor David Coleman | Dental Services, Trinity College Dublin |
| Dr. Eimear Brannigan | Consultant in Infectious Diseases and National Clinical Lead, HSE AMRIC (May 2022) |
| Martina Queally | Chief Officer, CHO 6 |
| Rhona O'Neil | Chief Pharmacist, Acute Hospitals drug programme |
| Teresa Niedzwiecka | IPC, CNM 3 on behalf of CHI at Temple Street, Dublin |
| Bernadette Galvin | Nurse Tutor/ Quality Co-coordinator Hygiene Services, University Hospital Kerry |
| Deirdre Shanagher | CNS, Nursing Homes Ireland |
| Padraig Corbett | Pharmaceutical Society of Ireland (PSI) |
| Mairead Heffron | Royal College Physicians of Ireland |
| Dympna Kavanagh | Chief Dental Officer |
| Julie Meally | IPCN, CKK |
| Maeve Crudge | CNM 2 Cork University Hospital |
| Dr. Grainne Mc Nally on behalf of Dr. Lynda Sission | National Clinical Lead Occupational Health & Clinical Advisory Group for Occupational Health |

| Name | Title and Organisation |
|---|---|
| Sinead Wall | Academy of Clinical Science & Laboratory Medicine |
| Fiona Mc Daid | National Emergency Medicine Programme |
| Caroline Carpenter | ADON, Public Health, HSE |
| Eleanor McNamara | Consultant Microbiologist and Director, Public Health Laboratory, HSE, Cherry Orchard Hospital, Dublin |
| Sheila Hagan | Specialist Orthodontist, HSE |
| Gwen Regan | DON, IPC, Community Operations (on behalf of HSE Community Operations Infection Prevention and Control Nursing Staff) |
| Jillian Sexton | National Federation of Voluntary Service Providers |
| Mary Osakwe on behalf of IPNA | Irish Practice Nurse Association |
| Margaruite O'Connor | CNM, IPC, St. Johns Limerick |
| Stephen Murphy | Sustainable Development Project Manager, HSE |
| Louise Carton | ADON, Health Protection, HSE |
| Claire Boylan | Irish Hospital Consultants Association |
| Fildema Gallagher | IPC Lead, West, HSE |
| Ciara Hughes | National Clinical Programme in Surgery |
| Maura Smiddy | Infection Prevention Society of Ireland |
| Lucy Hayes | CNM 2, IPC, Portiuncula Hospital |
| Bernadette Higgins | ADON, Health Protection, HSE Mid-West, Department of Public Health |
| Marion Commane | ADON, Health Promotion, Merlin Park Campus, Galway |
| Leonora Leonard on behalf of IPCI members | Head of IPC, Beacon Hospital, Dublin |
| Dr Alida Fe Talento & IPC team | Consultant Microbiologist, Children's Health Ireland at Temple Street, Dublin |
| Phil Ni Sheaghdha | General Secretary, Irish Nurses Midwives Organisation |
| Clare O'Byrne | Consultation and Engagement Coordinator, Health Information Quality Authority |

The consultation period opened on 20th January 2022 and ended on 18th February 2022. A standard invitation letter and feedback form was used. All feedback received was collated using an excel spreadsheet. A summary of the feedback was then generated reducing duplicate comments to a single item. This was reviewed by the Chairperson of GDG and amendments, or clarifications were made where appropriate. Collated feedback and the response to each item can be obtained from Chairperson of CDG on request.

Stakeholder feedback was received from more than fifty (50) individuals or groups in total as well as three (3) international reviewers.

The GDG would like to acknowledge the time and effort of the stakeholders who provided feedback, and in particular the expert reviewers.

The following pages contain the invitation email and consultation form.

**Invitation to email**

**Consultation on the draft National Standards for Infection and Prevention Control (IPC) 2022 is open today until 5pm, 18 February 2022.**

As chair of NCEC Guideline Development Group, I am seeking your feedback on the above draft guideline, which is attached and available below.

The draft document has 360 pages so for practical reasons it is fine to limit feedback to areas in which you take a particular interest or have particular expertise.

Information on how to submit feedback.

Read the Draft National Standards for Infection and Prevention Control (IPC) 2022.

These guidelines will be a practical support to IPC practitioners and others in their work to control healthcare associated infection. Your feedback will be invaluable in helping to ensure that the document fulfils its intended purpose.

Email Margaret.culliton@hse.ie if you have questions about this consultation.

HSE AMRIC is supporting the drafting of the National Standards for Infection and Prevention Control (IPC) 2022 with the National Clinical Effectiveness Committee as part of the Guideline Development Group (GDG).

Martin Cormican
Chair, Guideline Development Group

ENDS

**Infection Prevention and Control (IPC)**
**Draft National Clinical Guideline**
**January 2022**
**Consultation feedback form**

Consultation closing date: The deadline for comments is **Friday 18th February 2022 at 5pm** using feedback sheet via email to: **margaret.culliton@hse.ie**

## Introduction

We would like to hear your views on the draft National Clinical Guideline for Infection Prevention and Control (IPC) (2022). All comments received on this form by the deadline will be considered and used to inform the final clinical guideline.

Clinical guidelines are an important contributor to safe high quality healthcare. Good clinical guidelines help change the process of healthcare, reduce variation, improve outcomes for service users and ensure the efficient use of healthcare resources (NCEC p.6).

Further information on the NCEC and National Clinical Guidelines is available from:

http://health.gov.ie/national-patient-safety-office/ncec/

**Notes:**

1. Feedback received may be edited and/or summarised.
2. This consultation is conducted in line with requirements of the Freedom of Information (FOI) Acts as applicable and Data Protection requirements. Please note your submission may be published under this or in a report on the consultation. This may be on a website or in a document.
3. Submissions which are not attributable to an individual or group will not be considered.
4. Organisations making submissions should be aware of their obligations under the terms of the Regulation of Lobbying Act 2015.

## Scope of draft clinical guideline

The Guidelines represents a national approach to IPC, focusing on core principles and priority areas for action. This document is intended generally to replace pre-existing pathogen-specific national IPC guidelines including Prevention and Control of Meticillin-Resistant *Staphylococcus aureus* (MRSA) National Clinical Guideline No. 2 (2013) and Surveillance, Diagnosis and Management of *Clostridium difficile* Infection in Ireland National Clinical Guideline No. 3 (2014). However some pathogen specific content in certain existing guidelines that has not yet been incorporated into this document may remain relevant.

These guidelines provide a basis for healthcare workers and healthcare facilities to develop detailed protocols and processes for IPC specific to local settings where they are required to address specific needs at the service level. However hospitals and other services providers are advised that investing time and resources in developing site specific IPC guideline documents that reiterate or reformat this document should not be done routinely and should be limited to situations in which the site specific document adds additional value.

The approach taken in this document is underpinned by a risk-management framework to ensure the basic principles of IPC can be applied to a wide range of healthcare settings including hospitals and community healthcare services including GP surgeries, dental clinics, long-term care facilities, home care and ambulance services. It is recognised that the level of risk of HCAI differs according to the different types of services.

The evidence base for the IPC guidelines is drawn predominantly from the acute-hospital setting. There is generally less evidence available for other health services settings. The recommendations should be read in the context of the evidence base. Some recommendations in this guideline may not be applicable in all settings. When implementing these recommendations all healthcare facilities need to consider the risk of HCAI and implement the guideline according to their specific setting and circumstances and advice on the practical application of the recommendations. Case studies giving examples of risk assessments have been included to help illustrate how these recommendations can be applied to different settings.

The Guidelines make reference to but do not include detailed information on:

- The reprocessing of reusable medical instruments or devices.
- Hospital hotel services such as food services, laundry services or waste disposal.
- Comprehensive information on many specific infectious diseases.
- Health facility design and engineering.
- Workspace health and safety.
- Pandemic planning.

**Target Audience**

The Guidelines are for use by all those working in healthcare - this includes healthcare workers, management and support staff. They are also relevant to people using healthcare services. Sections of particular relevance to people using healthcare services are highlighted as such in the text.

## How to submit your feedback

- All feedback must be submitted on this form if it is to be considered
- Ensure you have completed your details or your group's details
- Identify clearly the recommendation your feedback relates to by identifying recommendation number and inserting your comments into aligned row
- Each comment should be in a separate box
- Specifically you must explain the rationale for your comment, which should be written clearly and concisely.
- Submit the form as a word document via email.
- Organisations should submit one collated response
- Use full terms for abbreviations on first use
- If you refer to sources of evidence, please detail the reference (with web link if available)

## Consultation questions

This consultation focuses on how user friendly the document is, the content (evidence statements and recommendations) and the implementation of the draft guideline.

**1. Content**

a) Do the recommendations, practice statements, statutory requirements cover the scope of the IPC Guideline?

b) Do the recommendations, practice statements, statutory requirements clearly link to the evidence presented or otherwise to best practice?

c) Do the recommendations, practice statements, statutory requirements consider gaps in current practice and service needs?

**2. Implementation**

a) Are the recommendations, practice statements, statutory requirements suitable for routine use as intended?

b) Which areas do you think may be difficult to put into practice? Please explain why.

c) What would help users to implement the recommendations?

**Please DO NOT provide editing, proofing feedback on the IPC draft NCEC guideline as this will be edited and proof-read before submission to NCEC.**

**Your details:**

| | |
|---|---|
| Name of person completing form | |
| Organisation name | |
| Are you commenting ….? (tick box) | |
| Organisation Name | |
| Contact Name (if different to above) | |
| Contact Telephone Number | |
| Contact Email Address | |
| Date of feedback | |

**Feedback Section 1:**

| Page & line number | Summary of Recommendations |
|---|---|
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |

**Feedback Section 2:**

| Page & line number | Summary of Recommendations |
|---|---|
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |

**Feedback Section 3:**

| Page & line number | Summary of Recommendations |
|---|---|
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |

**Feedback Section 4 & Appendices:**

| Page & line number | Summary of Recommendations |
|---|---|
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |
| | **Comment/feedback** |

| **Please document and other relevant comments that you would like to make below. (Please detail below the page number, rationale and any supporting documentation).** |
|---|
| |

Thank you for your contribution, your feedback is appreciated.

ENDS

# Appendix 5: Economic assessment

**Please see section 3.12 and the Budget Impact Analysis prepared to support this guideline (Annex B)**

# Appendix 6: Logic Model and Implementation plan

## 6.1 Logic Model

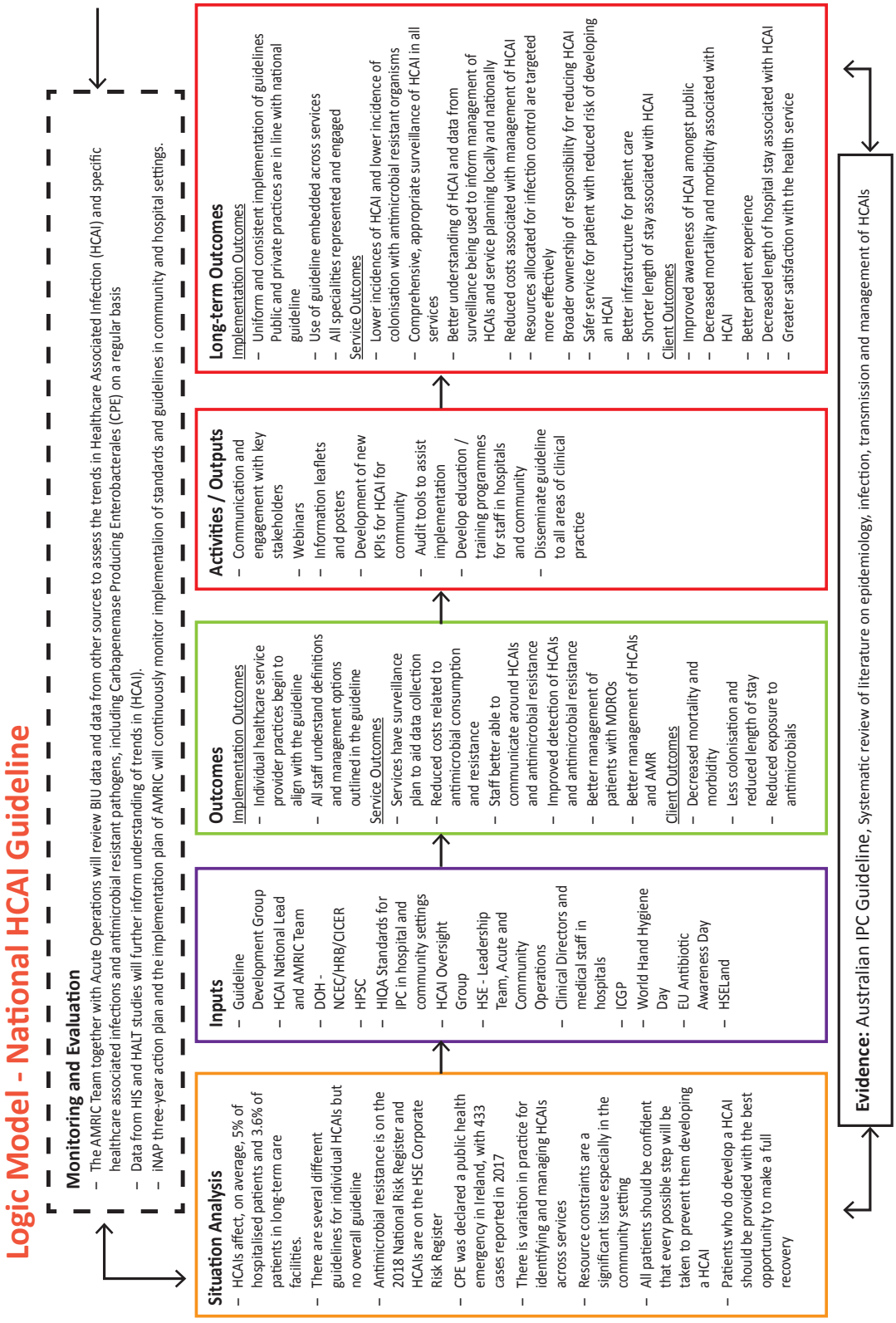


**Figure 6** Logic Model

## 6.2 Implementation plan

Tables 6.2.1-6.2.8 set out the implementation plan.

## 6.2.1 Recommendation 1 - 4 Hand Hygiene Implementation plan

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendations**<br><br>**1-4**<br><br>**Hand Hygiene** | **Enablers:**<br>• AMRIC National standardised approach - WHO 5 Moments for Hand Hygiene widely known and being utilised by staff<br>• Hand hygiene mandatory training programme agreed with AMRIC Oversight<br>• Experienced and skilled workforce<br>• Knowledgeable patient and service users<br>• Access to hand hygiene facilities widely available e.g. ABR & soap and water, Hand hygiene sinks<br>• RESIST campaign<br>• Existing hand hygiene national audit schedule (bi-annual)<br>• Pre-existing national hand hygiene policy in place<br>• HIQA compliance monitoring<br>• National Occupational Health staff guidance for hand conditions & availability of resources to maintain good skin integrity<br>**Barriers:**<br>• Instances of non-attendance for mandatory training<br>• Difficulty in adherence to five moments of hand hygiene in a pressured and busy working environment<br>• Gaps in access to appropriate facilities or resources to perform hand hygiene constraints and busy working environment | • IPC teams and hand hygiene champions within organisation<br>• Link practitioner programme available in community services aligned to AMRIC guidance<br>• Hand hygiene included in all healthcare job descriptions<br>• Hand hygiene audit schedule implemented<br>• Train the trainers programme implemented<br>• Hand hygiene auditor training programme<br><br><u>Education and training resources</u><br>• eLearning programmes<br>• Hand Hygiene train the trainer programme<br>• Webinars | Service managers in public and private healthcare sectors<br><br>CCO, HSE-AMRIC; Patient Safety<br><br>Programmes in public and private healthcare sectors<br><br>Hand Hygiene trainers & IPC teams nationally /local<br><br>All healthcare workers | Initiate | Continue | Complete | **Outcomes:**<br>• Improved awareness and knowledge of IPC guideline<br>• Improved adherence to hand hygiene practice (WHO 5 Moments)<br><br>**Verification:**<br>• Sustained achievement of national hand hygiene audit targets<br>• Local training records<br>• HSeLanD training reports<br>• HIQA inspection reports |

## 6.2.2 Recommendations 5 – 6 Routine Management of physical environment

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendations 5 – 6**<br><br>**Routine Management of physical environment** | **Enablers:**<br>• Experienced and skilled staff<br>• AMRIC materials and resources widely available existing protocols in place<br>• Local policies and guidelines in place<br>• Existing practice based on risk assessment<br>• Hygiene services committees (local) available<br>• Existing outbreak control teams available where required<br>• Acute hospital cleaning manual 2006<br><br>**Barriers:**<br>• Difficulties in consistent adherence to all requirements<br>• Gaps in supervision and audit<br>• Limited staff resources & lack of capacity and time<br>• Lack of dedicated cleaning storage rooms<br>• Heterogeneous facilities that include areas of suboptimal infrastructure that is inherently difficult to manage from an IPC perspective (for example difficult to thoroughly clean)<br>• Inconsistent policies and practices on environmental management | • Wide circulation of IPC NCG<br>• Access to AMRIC eLearning modules and educational webinars<br>• Promote environmental post clean audits (local)<br>• Promote establishment of hygiene services committees where these do not exist<br>• Promote better definition of roles for delivery of hygiene services | Service mangers in public and private healthcare sectors<br><br>CCO, HSE-AMRIC; Patient Safety Programmes in public and private healthcare sectors | Initiate | Continue | Complete | **Outcomes:**<br>More consistent management of the physical environment<br><br>**Verification:**<br>• Audit reports locally<br>• HIQA inspection reports on environmental commentary |

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendations AGAINST**<br><br>**7 - 9**<br><br>**Emerging disinfection methods** | **Enablers:**<br>• These practices are not widely embedded as routine practice<br>• Experienced and skilled IPC teams to asses role in specific circumstances<br>• Cost control process should limit unnecessary deployment<br>• Educational materials available<br>• Existing protocols in place<br>• Local policies and guidelines on cleaning and disinfection are in place<br>• Hygiene services committees (local) available<br>• IPC teams within organisation<br>• IPC committees in place<br>• AMRIC clinical leadership available to provide support as required<br>**Barriers:**<br>• Some products are intensively promoted<br>• Managers and IPC teams may feel pressured to deploy technology by pressure from peers, public and other stakeholders<br>• Practice may exist is some healthcare settings<br>• Gaps in skills to critical appraise claims made for technologies<br>• Lack of knowledge | • Effective management processes including financial management<br>• Wide circulation of IPC NCG<br>• Access to HSE AMRIC advice on the role of newer technologies<br>• AMRIC training and educational webinars are provided<br>• Promote establishment of hygiene services committees where gaps exist<br>• Continued provision of eLearning programme in place | Service managers in public and private healthcare sectors<br><br>CCO, HSE AMRIC, Patient Safety Programmes in public and private healthcare sectors | Initiate | Continue | Complete | **Outcomes:**<br>The use of these technologies is limited to circumstances where there is, at a minimum, a body of professional opinion that they have a role<br><br>**Verification:**<br>Use remains limited |

## 6.2.4 Recommendations 10 Aseptic Technique

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendations**<br><br>**10**<br><br>**Aseptic Technique** | **Enablers:**<br>• Skilled and experienced healthcare workers<br>• Current good practice<br>• Standardised terminology for aseptic technique agreed at AMRIC Oversight and with ONMSD<br>• Pre-existing interim guidance for IPC in place<br>• Educational materials widely available<br>• IPC teams within organisation<br>• IPC committees in place<br><br>**Barriers:**<br>• Attachment to established terminology and processes<br>• Difficulty in adherence to aseptic technique in a pressured and busy working environment<br>• Gaps in access to appropriate facilities or resources to adhere to aseptic technique outside of acute centres | • Wide circulation of IPC NCG<br>• Promotion of aseptic technique by training and professional groups<br>• AMRIC training and educational webinars are provided<br>• eLearning programme accredited<br>• Webinars | Service managers in public and private healthcare sectors<br><br>CCO, HSE-AMRIC, Patient Safety Programmes in public and private healthcare sectors | Initiate | Continue | Complete | **Outcomes:**<br>• Improved awareness and knowledge of aseptic technique<br>• Improved adherence to aseptic technique<br><br>**Verification:** Surgical site and device related infection rates |

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendations:**<br><br>**11-13**<br>**Contact precautions**<br><br>**14**<br>**Droplet precautions**<br><br>**15-16**<br><br>**Airborne precautions** | **Enablers:**<br>• Skilled and experienced healthcare workers with experience of COVID-19<br>• Current good practice<br>• Standardised terminology from the pre-existing interim guidance<br>• Educational materials widely available<br>• IPC teams within organisation<br>• IPC committees in place<br>• Procurement expertise in accessing PPE of the required standard<br>• Management, IPC and Estates experience in managing suboptimal facilities<br>• Acute operations checklist for early identification of patients at risk of transmission<br>• IPC teams & committees & Link Practitioners standardised resources & materials available<br>**Barriers:**<br>• Challenges in consistent adherence in a pressured and busy work environment<br>• Gaps in infrastructure required in particular for airborne precautions but more generally also<br>• Gaps in knowledge and skills<br>• Lack of knowledge and awareness<br>• Gaps in in access to human resources<br>• Gaps in access to rapid diagnostics | AMRIC standardised transmission-based precautions (TBP) posters developed based on IPC TBP<br><br>AMRIC educational training materials disseminated and utilised<br><br>AMRIC eLearning programmes implemented<br><br>Accredited eLearning programmes<br><br>Webinars<br><br>Programmes for building and refurbishment | Service managers in public and private healthcare sectors<br><br>CCO, HSE AMRIC, Patient Safety Programmes in public and private healthcare sectors | Initiate | Continue | Complete | **Outcomes:**<br>Reduction in incidence of hospital acquired droplet and airborne infection<br><br>**Verification:**<br>Rate of hospital acquired infection with relevant pathogens<br><br>HIQA inspections |

## 6.2.6 Recommendation 17 – 19 Personal Protective Equipment

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendation**<br><br>**17 – 19**<br>**Personal Protective Equipment** | **Enablers:**<br>• Skilled and experienced healthcare workers with experience of COVID-19<br>• Procurement and logistics expertise with PPE developed through COVID<br>• Standard national process for donning, doffing and disposal<br>• AMRIC education and training materials<br><br>**Barriers:**<br>• Challenges in consistent adherence to correct PPE use<br>• Limited PPE storage space in some areas<br>• Gaps in knowledge and skills<br>• Marketing of PPE that does not meet required standards<br>• Over confidence in the benefit of PPE resulting in discounting other measures | AMRIC standardised transmission- based precautions (TBP) posters developed based on IPC TBP<br><br>AMRIC educational training materials disseminated and utilised<br><br>AMRIC eLearning programmes implemented<br><br>Accredited eLearning programmes<br><br>Webinars<br><br>Continued programmes for procuring and distributing PPE | Service managers in public and private healthcare sectors<br><br>CCO, HSE AMRIC, Patient Safety Programmes in public and private healthcare sectors<br><br>Procurement managers<br><br>Staff health and safety processes including workplace health and safety representatives | Complete | | | **Outcomes:**<br>• Reduction in incidence of hospital acquired infection in staff and patients<br><br>• Staff confidence that they have access to appropriate PPE<br><br>**Verification:**<br>• Rate of hospital acquired infection with relevant pathogens<br><br>• HIQA inspections |

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendation 20**<br><br>**Multidrug resistant microorganisms** | **Enablers:**<br>• Skilled and experienced healthcare workers with experience of COVID-19<br>• Established cadre of surveillance scientists in acute operations and developing in community operations<br>• HPSC & EARS-Net<br>• HSE AMRIC<br>• High quality laboratory diagnostics<br>• AMRIC education and training materials<br>• CPE and other programmes for detection of colonisation with MDRO<br>**Barriers:**<br>• Challenges in consistent adherence to detection and management of MDRO<br>• Gaps in knowledge and skills<br>• New and emerging MDROs that may be difficult to detect and manage | Promote AMRIC standardised transmission-based precautions (TBP) posters developed based on IPC TBP<br><br>Promote programmes for detection of CPE and other MDRO<br><br>AMRIC educational training materials disseminated and utilised<br><br>AMRIC eLearning programmes implemented<br><br>Accredited eLearning programmes<br><br>Webinars | Service managers in public and private healthcare sectors<br><br>CCO, HSE AMRIC, Patient Safety Programmes in public and private healthcare sectors | Complete | | | **Outcomes:**<br>Reduction in incidence of MDRO colonisation and infection<br><br>**Verification:**<br>Data on incidence of infection and colonisation with key MDRO's |

## 6.2.8 Recommendation 21 Facilities Design

| Guideline Recommendation number | Implementation barriers / enablers | Action / intervention / task to implement recommendation | Lead responsibility for delivery of action | Timeframe for completion Yr 1 | Yr2 | Y3 | Expected outcome and verification |
|---|---|---|---|---|---|---|---|
| **Recommendation**<br><br>**21**<br><br>**Facilities design** | **Enablers:**<br>• Potential cost reductions from implementing change<br>• *HSE AMRIC Guidance on Infection Control Guiding Principles for Building Acute Hospitals and Community Settings for Building Acute Hospitals and Community Settings* V 6.0 available to HSE and non HSE services<br><br>**Barriers:**<br>• Existing expectations and recommendations that all new construction should be all single rooms | Publish and promote guideline | National AMRIC team, CCO in collaboration with DoH | Complete | | | **Outcomes:**<br>Acceptance of two bed rooms in new build in certain circumstances if appropriate to the needs of the service users<br><br>**Verification:**<br>No verification required during the 3 year implementation plan |

### Implementation of the overall guideline

The implementation plan addresses groups of related recommendations but there is considerable overlap between the actions required for each group and together these represent the overall plan for implementation of the guideline as a whole. Within the HSE the function of the implementation team will be assumed by the existing AMRIC structures (AMRIC Implementation Team with AMRIC Oversight). Non-HSE actors will be supported with access to HSE training materials as they develop their processes for implementation. HSE AMRIC structures represent a well established structure to drive the antimicrobial resistance and infection prevention and control agenda for the HSE in both Acute and Community operations. The HSE AMRIC structures are appended to this document as **Appendix 10**.

**Dissemination and communication plan:**

The Guideline will be accessible on the Department of Health website with links to the document on key HSE platforms including HPSC.

The document will be launched by key opinion leaders.

The Guidance will be promoted to key decision makers in the HSE and to professional societies, post graduate training bodies and undergraduate healthcare training programmes using social media, presentations to professional societies and the HSE AMRIC newsletter. Endorsement will be requested from key professional bodies.

The substance of the guidelines is already reflected in a suite of HSE AMRIC eLearning programmes and this suite will be expanded further over years 1 to 3.

**Implementation tools:**

AMRIC eLearning modules

Webinars

AMRIC communication channels and National HSE communication channels

# Appendix 7: Supporting tools and supplementary information

**Summary**

The following supplementary information provides further background information on infection prevention and control in healthcare.

**This covers:**

**7.0** Care of the deceased

**7.1** Recommended routine cleaning frequencies

**7.2** Checklist of standard precautions for procedures

**7.3** Use of standard and transmission-based precautions

**7.4** Type and duration of precautions for specific infections and conditions

**7.5** Allowing animals into healthcare facilities

**7.6** Examples of performance of aseptic technique

**7.7** Case Studies.

## 7.0 Care of the deceased

**Application of transmission-based precautions to the deceased in the context of key infections at time of death.**

The causative agents for the key infections listed below have been arranged according to the most likely route of transmission, taking account of the activity when handling the deceased, for example through post mortem examination and embalming.

**Table 38** Application of transmission-based precautions to the deceased in the context of key infections at time of death.

| Infection | Causative agent | Hazard group | Is an inner lining needed[1]? | Can the body be viewed? | Can post-mortem be carried out? | Can hygiene treatment be carried out? | Can embalming be carried out? |
|---|---|---|---|---|---|---|---|
| **Transmitted through air (some organisms are transmitted primarily by larger respiratory particles over short distances, (referred to as droplet transmission) and others are routinely transmitted in smaller respiratory particles over shorter distances (referred to as airborne transmission). The distinction is not absolute as some organisms primarily transmitted by larger particles can transmit in smaller particles under some circumstances.** | | | | | | | |
| Tuberculosis | *Mycobacterium tuberculosis* | 3 | Yes | Yes[2] | Yes[3] | Yes | Yes[3] |
| Middle East respiratory syndrome (MERS) | MERS coronavirus | 3 | Yes | Yes | Yes[3] | Yes | Yes[3] |
| Severe acute respiratory syndromes (SARS) | | 3 | Yes | Yes | Yes[3] | Yes | Yes[3] |
| Invasive meningococcal disease (blood stream infection or meningitis) | *Neisseriae meningitidis* | 2 | No | Yes | Yes[5] | Yes | Yes[5] |

| Infection | Causative agent | Hazard group | Is an inner lining needed[1]? | Can the body be viewed? | Can post-mortem be carried out? | Can hygiene treatment be carried out? | Can embalming be carried out? |
|---|---|---|---|---|---|---|---|
| Flu (animal origin) | For example H5 and H7 influenza viruses | 3 | No | Yes | Yes[5] | Yes | Yes[5] |
| COVID-19 | SARS-CoV-2 | 3 | No | Yes | Yes | Yes | Yes |
| Diphtheria | *Corynebacterium diphtheriae* | 2 | No | Yes | Yes | Yes | Yes |
| **Contact** Either direct via hands of employees, or indirect via equipment and other contaminated articles where transmission is primarily via an ingestion route | | | | | | | |
| Invasive Group A streptococcal infection (iGAS) | *Streptococcus pyogenes* (Group A streptococcus) | 2 | Yes | Yes | Yes[5] | No | No |
| Dysentery (shigellosis) | *Shigella dysenteriae* (type 1) | 3 | No[6] | Yes | Yes | Yes | Yes |
| Hepatitis A | Hepatitis A virus | 2 | No[6] | Yes | Yes | Yes | Yes |
| Hepatitis E | Hepatitis E virus | 3 | No[6] | Yes | Yes | Yes | Yes |
| Enteric fever (typhoid/ paratyphoid) | *Salmonella enterica* serovar Typhi/ Paratyphi | 3 | No[6] | Yes | Yes | Yes | Yes |
| Brucellosis | *Brucella melitensis* (most commonly identified species) | 3 | No | Yes | Yes[4] | Yes | Yes[4] |
| Haemolytic uraemic syndrome | Verocytotoxin/ shiga toxin-producing *E. coli* | 3 | No | Yes | Yes[4] | Yes | Yes[4] |
| **Contact** Either direct or indirect contact with blood/other blood containing body fluids via a skin-penetrating injury or via broken skin and through splashes of blood/other blood containing body fluids to eyes, nose and mouth | | | | | | | |
| Acquired immune deficiency syndrome (AIDS)-related illness | Human immuno-deficiency virus | 3 | No | Yes | Yes[7] | Yes | Yes[7] |
| Anthrax | *Bacillus anthracis* | 3 | Yes | No | Yes[8] | No | No |
| Hepatitis B, D and C | Hepatitis B,D and C viruses | 3 | No | Yes | Yes[7] | Yes | Yes[7] |
| Rabies | Lyssaviruses | 3 | No | Yes | No | No | No |
| Viral haemorrhagic fevers | Specifically Lassa fever, Ebola, Marburg, Crimean-Congo haemorrhagic fever viruses | 4 | Yes[9] | No | No | No | No |

| Infection | Causative agent | Hazard group | Is an inner lining needed[1]? | Can the body be viewed? | Can post-mortem be carried out? | Can hygiene treatment be carried out? | Can embalming be carried out? |
|---|---|---|---|---|---|---|---|
| **Contact** Either direct or indirect contact with body fluids (e.g. brain and other neurological tissue) via a skin-penetrating injury or via broken skin | | | | | | | |
| Transmissible spongiform encephalo-pathies (eg. CJD) | Various prions | 3 | Yes | Yes | Yes[10] | Yes | No |

**Key**

Red Minimise procedures or handling of the deceased

Yellow Transmission-based precautions are necessary when carrying out procedures or handling the deceased

The highlighted areas indicate an increased level of risk associated with the infection to workers (with areas in red posing increased risk) and therefore require additional control measures when handling the deceased.

**Notes**

1. It is advised that an inner lining is used to contain the body of the deceased in all cases where there is, or is likely to be, leakage of body fluids. Note inner lining is used in this document in preference to the term body bag.
2. With appropriate measures to deal with potential release of aerosols (for example place a mask over mouth when moving the deceased).
3. With appropriate measures to deal with aerosol-generating procedures.
4. With measures to minimise environmental contamination (because of low infectious dose, that is the amount of pathogen required to cause an infection, is low).
5. With appropriate measures to prevent exposure of mucosal surfaces (for example a physical barrier to protect eyes, mouth and nose, such as a facemask or visor).
6. Illness may have increased likelihood of leakage of body fluids.
7. With appropriate robust measures for the use of sharps (for example minimise use or use safer sharps devices).
8. Before undertaking a procedure, the rationale for a post-mortem should be carefully considered where anthrax infection is suspected, particularly where examination may increase the potential for aerosol generation.
9. With double inner lining to contain potential leaks of body fluids.
10. With appropriate measures to minimise percutaneous injury and contamination of work area, and to help with decontamination (for example high-level sharps control or dedicated equipment).

## 7.1 Recommend routine cleaning frequencies

The following table outlines the recommended minimum frequencies for routine cleaning and disinfection of various items in healthcare facilities. It is applicable to all settings (although some items may not be relevant to all settings) and is presented by level of risk as per **table 39** below. The table has been developed to provide a benchmark guide to best-practice cleaning schedules. Facilities should develop and implement a local cleaning schedule and policy that suits their environment, and consider regular monitoring and mechanisms to deal with specific organisms and outbreak situations.

**Table 39** Level of risk

| Risk rating | Settings |
|---|---|
| **Very high risk** | Outbreak in high-risk area. |
| **High risk** | Intensive care unit, high dependency unit, burns unit, renal units, operating suite, emergency departments. |
| **Significant risk** | General wards. |
| **Low risk** | Rehabilitation, long-term care, primary care, office-based, homecare services. |

Note: there may be a requirement for increase in intensity and frequency of cleaning in any setting in the context of an outbreak. For example the IPC team or outbreak control team (OCT) may advise escalation from the Low risk schedule to the significant risk schedule or higher in the context of an outbreak.

**Table 40** Minimum cleaning frequency

Note: The choice of disinfectant is dependent upon the local epidemiology and a local risk assessment

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Alcohol based hand rub dispenser, bedside** | Clean daily. | Clean daily. | Clean daily. | Clean weekly. | Detergent. |
| **Alcohol based hand rub dispenser, not in Patient/treatment rooms** | Clean daily. | Clean daily. | Clean daily. | Clean weekly. | Detergent. |
| **Bath** | Clean daily and spot/ check clean once daily. If used by more than one person must be cleaned after each use. | Clean daily and spot/check clean once daily. If used by more than one person must be cleaned after each use.. | Clean daily and spot/check clean once daily. If used by more than one person must be cleaned after each use. | Clean daily and spot/check clean once daily. If used by more than one person must be cleaned after each use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Bed** | Clean frame daily. Clean underneath weekly. Clean whole on discharge. | Clean frame daily. Clean underneath weekly. Clean whole on discharge. | Clean frame daily. Clean underneath weekly. Clean whole on discharge. | Clean frame weekly and when visibly soiled. Clean whole on discharge. | Detergent. Detergent plus disinfectant for MDRO and specific infections. |
| **Bedrails** | Clean twice daily and after discharge. | Clean twice daily and after discharge. | Clean twice daily and after discharge. | Clean daily and after discharge. | Detergent. Detergent plus disinfectant for MDRO and specific infections. |
| **Bedside table** | Clean twice daily and after use. | Clean twice daily and after use. | Clean daily. | Clean weekly and when visibly soiled. | Detergent. Detergent plus disinfectant for MDRO and specific infections. |
| **Bidet** | Clean three times daily and after each patient use. | Clean three times daily and after each patient use. | Clean daily assuming single person use. | Clean daily assuming single person use. | Detergent and disinfectant. |
| **Blood pressure cuff (note disposable cuffs may be preferred in some settings)** | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Detergent. Detergent plus disinfectant for MDRO and specific infections. Note: if a disposable sleeve or other barrier is used between the cuff and skin this reduces the requirement for cleaning. |
| **Call bell** | Clean Daily. Clean after discharge. | Clean Daily. Clean after discharge. | Clean Daily. Clean after discharge. | Clean Daily. Clean after discharge. | Detergent. Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Carpet (soft floor) (should generally be avoided in clinical areas but may be appropriate in special areas within clinical facilities for family /bereavement rooms)** | Vacuum clean twice daily. Steam clean 6-monthly. | Vacuum clean daily. Steam clean 6-monthly. | Vacuum clean daily. Steam clean annually. | Vacuum clean weekly. More frequent cleaning may be required in high use communal areas. Steam clean annually. | Vacuum with high efficiency particulate air filter. Steam clean (or shampoo). |
| **Catheter stand/ bracket** | Clean daily and after use. | Clean daily and after use. | Clean before initial use, after use and weekly. | Clean before initial use, after use and weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Ceiling** | Spot clean daily and wash yearly. | Spot clean daily and wash yearly. | Spot clean weekly and wash yearly. | Spot clean monthly and wash every 3 years. | Detergent/ Damp dust. |
| **Chair** | Clean twice daily. | Clean twice daily. | Clean daily. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Chair, dental and surrounds** | N/A | N/A | N/A | Clean daily and between patient use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Cleaning equipment** | Clean after use. | Clean after use. | Clean after use. | Clean after use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Clipboard** | Clean daily and between patient use. | Clean daily and between patient use. | Clean daily and between patient use. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Commode** | Clean contact points after use. Clean whole daily. | Clean contact points after use. Clean whole daily. | Clean contact points after use. Clean whole daily. | Clean contact points after use. Clean whole weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Computer and keyboard; used and/or located in close proximity to patient for example patient bay or room** | Clean twice daily and anytime when visibly soiled. | Clean twice daily and anytime when visibly soiled. | Clean daily and anytime when visibly soiled. | Clean daily and anytime when visibly soiled. | Manufacturers recommend-ations.<br>Install keyboard covers or washable keyboards where feasible.<br>Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Computer & keyboard; general ward use, non-mobile, located outside patient area** | Clean twice daily and anytime when visibly soiled. Clean between patients. Clean after discharge. | Clean daily and anytime when visibly soiled. Clean between patients. Clean after discharge. | Clean daily and anytime when visibly soiled. Clean between patients. Clean after discharge. | Clean weekly and anytime when visibly soiled. Clean between patients. Clean after discharge. | Manufacturers recommend-ations.<br>Install keyboard covers or washable keyboards.<br>Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Curtains and blinds** | Bed curtains – change or clean weekly and upon discharge. Patient with MDRO or other infectious disease – change bed curtains or clean upon discharge. | Bed curtains – change or clean monthly. Patient with MDRO change bed curtains or clean upon discharge. | Bed curtains – change or clean biannually. Patient with MDRO change bed curtains or clean upon discharge. | Bed curtains – change or clean biannually. Patient with MDRO change bed curtains or clean upon discharge. | Replace with laundered curtains. Blinds can generally be steam cleaned. Follow manufacturers recommend-ations. |
| **Door knob/handle general** | Clean twice daily. | Clean daily. | Clean daily. | Clean weekly. | Detergent. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Door knob/handle patient room** | Clean twice daily. | Clean daily. | Clean daily. | Clean daily. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Drip/ intravenous stands** | Clean daily and after use. | Clean daily and after use. | Clean before initial use, after use and weekly. | Clean before initial use, after use and weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Floor, non-slip** | Damp mop twice daily. | Damp mop twice daily. | Damp mop daily. | Damp mop daily. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Floor, polished** | Dust removal and clean twice daily. | Dust removal and clean daily. | Dust removal and clean daily. | Dust removal and clean weekly. | Detergent for routine.<br>Consider electrostatic mops.<br>Detergent and disinfectant for MDRO and specific infections. |
| **Fridges** | Weekly and defrost as required. Three times daily spot check-clean when necessary. | Weekly and defrost as required. Daily spot check-clean when necessary. | Monthly defrost as required. Daily spot check-clean when necessary. | Monthly defrost as required. Daily spot check-clean when necessary. | Detergent. |
| **Fridge (drug)** | Clean weekly. | Clean weekly. | Clean weekly. | Clean weekly. | Detergent. |
| **Glazing, internal (including partitions)** | Spot clean daily and full clean weekly. | Spot clean daily and full clean weekly. | Spot clean daily and full clean weekly. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Hoist, bathroom** | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Detergent.<br>Detergent and disinfectant for MDRO and specific infections. |
| **Drip/IV stand and poles** | Clean daily and clean contact points after use. | Clean daily and clean contact points after use. | Clean weekly and contact points after use. | Clean weekly contact points after use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Light switch** | Clean daily. | Clean daily. | Clean weekly. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Locker – bedside** | Clean contact points twice daily. | Clean contact points twice daily. | Clean contact points daily. | Clean contact points weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Manual handling (such as hoist)** | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Clean weekly and contact points after use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections Note: hoist slings may be disposable or reusable. Assign sling to an individual patient/ service user. If reusable clean/ disinfect as per manufacturer's instructions before assigned for use on another person. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Mattress (entire mattress should have a waterproof cover)** | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections.<br>Note: monthly check of mattress cover for integrity and inside the cover for soiling. |
| **Medical equipment (such as IV infusion pumps, pulse oximeters) NOT connected to a patient** | Clean daily (when in use) and between patient use. | Clean daily (when in use) and between patient use. | Clean daily (when in use) and between patient use. | Clean daily (when in use) and between patient use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Medical gas equipment** | Clean daily. | Clean daily. | Clean daily. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Microwave** | Clean daily and leave clean after each use. | Clean daily and leave clean after each use. | Clean daily and leave clean after each use. | Clean daily and leave clean after each use. | Detergent. |
| **Nebuliser, portable (when in use)** | Clean daily and after use. | Clean daily and after use. | Clean monthly and after use and before initial use. | Clean every 2 months and after use and before initial use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Notes folder** | Clean daily. | Clean daily. | Clean weekly. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections if taken into patient zone. |
| **Over bed tray table (overway table)** | Twice daily. | Daily. | Daily. | Weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Oxygen equipment** | Clean daily and after use. | Clean daily and after use. | Clean monthly and after discharge and before initial use. | Clean monthly and after discharge and before initial use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Patient slide/ board** | Clean daily and after use. | Clean daily and after use. | Clean monthly and after use. | Clean monthly and after use. | Detergent.<br>Detergent plus disinfectant for MDRO. |
| **Pillow (waterproof cover)** | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Clean when visibly soiled/ bodily substances and after discharge. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections.<br>Note: monthly check of pillow cover for integrity and inside the cover for soiling. |
| **Sharps container trolley** | Clean daily. | Clean twice weekly. | Clean weekly. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections if taken into patient zone. |
| **Shower – In addition to cleaning there should be a daily check that water is draining freely with no pooling or backflow** | Clean daily and one spot check clean daily. If used by more than one person clean after each use. | Clean daily and one spot check clean daily. If used by more than one person clean after each use. | Clean daily. If used by more than one person clean after each use. | Clean daily. If used by more than one person clean after each use. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Sink (hand washing) – in addition to cleaning there should be a daily check that water is draining freely with no pooling or backflow** | Clean twice daily and after use. | Clean twice daily and after use. | Clean daily and after use. | Clean daily. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Stethoscope – surfaces in contact with skin** | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Clean after each patient use if used on multiple patients. If dedicated to one patient clean daily and after discharge. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Surfaces (general horizontal) in patient room such as ledges** | Clean twice daily and spot clean after use. | Clean twice daily and spot clean after use. | Clean daily and after discharge. | Clean weekly and after discharge. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Telephone** | Clean daily. | Clean daily. | Clean daily. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections if taken into patient zone. |
| **Toilet** | Clean twice daily and spot clean after use. | Clean twice daily and spot clean after use. | Clean daily and spot clean after use. | Clean daily and spot clean after use. | Detergent and disinfectant. |
| **Toilet seat, raised** | Clean twice daily and spot clean after use. | Clean twice daily and spot clean after use. | Clean daily and spot clean after use. | Clean daily. | Detergent for routine.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Trolley, dressing** | Clean utilised surfaces before and after use. Clean whole trolley weekly. | Clean utilised surfaces before and after use. Clean whole trolley weekly. | Clean utilised surfaces before and after use. Clean whole trolley weekly. | Clean utilised surfaces before and after use. Clean whole trolley weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Trolley, linen** | Clean contact points daily. Clean whole trolley weekly. | Clean contact points daily. Clean whole trolley weekly. | Clean contact points daily. Clean whole trolley weekly. | Clean contact points weekly. Clean whole trolley monthly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |

| Element | Very high risk | High risk | Significant risk | Low risk | Method |
|---|---|---|---|---|---|
| **Trolley, resuscitation** | Clean daily. | Clean weekly. | Clean weekly. | Clean weekly. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **TV, fixed (out of patient reach)** | Clean weekly. | Clean weekly. | Clean weekly. | Clean weekly. | Detergent. |
| **TV, patient beside (mobile and within patient reach)** | Clean daily and between patients. | Clean daily and between patients. | Clean daily and between patients. | Clean monthly and between patients. | Detergent / damp dust.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Walls** | Spot clean daily and dust weekly and full clean yearly. | Spot clean daily and dust weekly and full clean yearly. | Spot clean weekly and full clean yearly. | Spot clean weekly. | Detergent / damp dust. |
| **Washbowl, patient Each person should have their own washbowl** | One full clean daily and between patient use. | One full clean daily and between patient use. | One full clean daily and between patient use. | One full clean daily and between patient use. | Detergent.<br>Detergent plus disinfectant for MDRO specific infections or consider disposable lining. |
| **Waste receptacle** | Clean weekly and spot clean when visibly soiled /bodily substances. | Clean weekly and spot clean when visibly soiled /bodily substances. | Clean weekly and spot clean when visibly soiled /bodily substances. | Clean weekly and spot clean when visibly soiled /bodily substances. | Detergent.<br>Detergent plus disinfectant for MDRO and specific infections. |
| **Wheelchair** | Clean daily and after use. | Clean daily and after use. | Clean monthly and after use. | Clean monthly and after use. | Detergent.<br>Detergent plus disinfectant for MDRO specific infections. |

## 7.2 Checklist of PPE typically required for common procedures performed on patients on standard precautions

Table 41 below, outlines the use of standard precautions for a range of example procedures. It is assumed that there is no known or suspected infection. Decision-making about the level of protection required involves a risk assessment of the procedure to be performed; for example, usual wound care is unlikely to require surgical mask and eye protection in primary care, but this may be required more often in the hospital setting if there are elements of the procedure that involve a risk of splash.

**Table 41** Standard precautions for procedures

| Procedure | Hand hygiene | Gloves | Sterile gloves | Surgical mask | Eye protection | Gown |
|---|---|---|---|---|---|---|
| Activities of daily living | ✓ | - | - | - | - | - |
| Routine observations (for example blood pressure measurement) | ✓ | - | - | - | - | - |
| General medical | ✓ | ✓ For contact with broken skin/rash/ mucous membrane | - | ✓ If splash risk likely | ✓ If splash risk likely | ✓ If splash risk likely |

| Examination Procedure | Hand hygiene | Gloves | Sterile gloves | Surgical mask | Eye protection | Gown |
|---|---|---|---|---|---|---|
| Wound examination/ Dressing | ✓ | For contact with body substances | For direct contact with wound | For wound irrigation if splash likely | For wound irrigation if splash likely | For grossly infected wounds |
| Blood glucose and haemoglobin monitoring | ✓ | ✓ | - | - | - | - |
| Vaginal delivery | ✓ | - | ✓ | - | ✓ if splash likely | ✓ |
| Intravenous cannula insertion | ✓ | ✓ | - | - | ✓ If splash likely | - |

| Examination Procedure | Hand hygiene | Gloves | Sterile gloves | Surgical mask | Eye protection | Gown |
|---|---|---|---|---|---|---|
| Intravascular access device insertion | ✓ | - | ✓ | ✓ | ✓ | ✓ Where max barrier precautions are used |
| Intravascular access device care | ✓ | ✓ | - | - | - | - |
| Surgical aseptic technique procedure (such as lumbar puncture) | ✓ | - | ✓ | ✓ | ✓ If splash likely | ✓ |
| Insertion of urinary catheter | ✓ | - | ✓ | ✓ If splash likely | ✓ If splash likely | ✓ If exposure likely |
| Urinary catheter care | ✓ | ✓ | - | ✓ If splash likely | ✓ If splash likely | ✓ If exposure risk likely |
| Suctioning: endotracheal tube, tracheostomy | ✓ | - | ✓ Dominant hand (open suction system) | ✓ | ✓ | ✓ If exposure risk likely |
| Major dental procedure | ✓ | - | ✓ | ✓ | ✓ | ✓ |
| Routine intra-oral dental procedures | ✓ | ✓ | - | ✓ | ✓ | ✓ If exposure risk likely |

## 7.3 Use of standard and transmission-based precautions

Transmission-based precautions are applied in addition to standard precautions. Depending on the infectious organism and its mode of transmission, one or more types of precautions may be required. See Section 7.4 for further information.

**Table 42** Use of personal protective equipment for standard and transmission-based precautions

| Type of precautions | Examples of infectious agents | Single room or cohort | Gloves | Apron/ Gown | Mask | Eye protection | Handling of equipment |
|---|---|---|---|---|---|---|---|
| **Standard** | Standard precautions apply for all work practices to prevent the likelihood of transmission of infection | | | | | | |
| **Contact** | Multidrug resistant organisms, *C. difficile*, norovirus | ✓ | ✓ | ✓ | If infectious agent in respiratory secretion | If splash risk | Single use or reprocess |
| **Droplet** | norovirus, pertussis, meningoc-occus, Influenza | ✓ | ✓ | ✓ | ✓ Surgical mask (unless AGP) | If splash risk | Single use or reprocess |
| **Airborne** | Pulmonary TB, measles, chickenpox | Controlled ventilation when possible | ✓ | ✓ | ✓ FFP2 respirator | ✓ | Single use or reprocess |

**Notes on Table 42.**

Aprons or gowns are required in some situations where there is likely to be physical contact between the healthcare worker and the person cared for or the patient environment. There is no requirement for an apron or gown when entering the patient space briefly (for example visual check or deliver a meal). In general, an apron is sufficient for brief light contact. A gown rather than an apron is required where there is expected to be extensive physical contact. Mouth and eye protection should be worn when there is potential for exposure to splashes or sprays to mucosa.

**Environmental cleaning** has not been addressed in this table but it is an essential component of infection prevention and control. For further guidance please refer to Section 3.1.3 and Practice Statement 9 practical information.

**Table 43** Requirements for visitors to people on standard or transmission-based precautions

The relationship between visitors and the people they visit is often a very personal matter and considerable sensitivity is required. Visitors (for example partners, or parents and children) and those they visit may choose to accept some risk of transmission of microorganisms to have some physical contact with a significant other person. Visitors and those they visit should have information to make an informed choice. A total restriction on visiting is rarely if ever justified and if imposed must be for the shortest possible period of time.

People with suspected or confirmed communicable infectious disease should not visit people in healthcare facilities. Exceptions are required in limited circumstances, for example, approaching end of life. If an exception is made with respect to a prospective visitor with a suspected or confirmed communicable infectious disease the visit must be carefully planned to minimise risk of exposure of others to infection and the visitor must cooperate fully with measures required to manage the risk.

Information for patients and visitors regarding visiting should have high visibility and be provided in multiple formats (for example leaflets, posters, direct communication from healthcare workers and audio or video messages) and languages to ensure that the messages are readily understandable. It is important that patients and their visitors can see that restrictions on visitors are applied with consistency, equity and compassion. The specific needs of children, people with intellectual disability, people with cognitive impairment and mental health problems must be taken into account both when they are in the healthcare setting and when they are prospective visitors. The scope of choices for visitors and those they visit cannot put other people receiving care, staff or members of the public at unacceptable risk.

| **Level of Precaution** | **Recommended** |
|---|---|
| Standard | Hand hygiene, respiratory hygiene, cough etiquette. |
| Contact | Hand hygiene, respiratory hygiene, cough etiquette. Provide information and access to appropriate PPE. Avoid visiting other people in the health care facility. Advise limitation of visitors. |
| Droplet | Hand hygiene, respiratory hygiene, cough etiquette. Visitors should be provided with and encouraged to wear a surgical mask unless known to be immune to the infection in question. Avoid visiting other people in the healthcare facility. Advise limitation of visitors. |
| Airborne | Hand hygiene, respiratory hygiene, cough etiquette. Visitors should be provided with appropriate PPE and strongly encouraged to adhere to requirements for respiratory protection unless known to be immune to the infection in question. Avoid visiting other patients. Advise very limited visiting. If the period of airborne precautions is of short duration avoidance of visiting should be advised. |

**Notes on Table 43.**

Visitors should be given instruction about the precautions they should take when visiting a person to whom transmission-based precautions are applied and given appropriate resources to support them in meeting these requirements. Note: there is generally no rationale for requiring a visitor to follow healthcare specific measures such as use of PPE during a visit to a person colonised with MDRO if they have regular close social contact with that person in their home or in the community.

For vaccine preventable disease, it is preferable that only those visitors who have confirmed immunity (evidenced by serological immunity or vaccination history) to the specific infectious agent should enter the room, see Section 3.7.1 for further information. However, this may not be practical in all cases. Visitors should be provided with appropriate PPE and be shown how to use it.

## 7.4 Type and duration of precautions for specific infections and conditions

The information in the table below provides a summary of diseases and the precautions, which may be required by healthcare workers. Decisions regarding precautions should be based on a risk assessment performed by the Infection Prevention and Control Team, and in the context of locally agreed policy relating to management of patients with specific diseases.

**REMINDER: Transmission-based precautions are applied in addition to standard precautions.**

**S = Standard, C = Contact, D = Droplet, A = Airborne**

**Table 44** Precautions for specific infections and conditions

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| Draining abscess, major | Bacterial | Contact | S+C | Duration of illness - until drainage stops or can be contained by dressing. | This applies if there is no dressing or containment of drainage. |
| Abscess Draining, minor or limited | Bacterial | Contact | S | Duration of illness. | This applies when dressing covers and contains drainage. |
| Actinomycosis *(Actinomyces spp.)* | Bacterial | Not transmitted person to person. | S | Standard precautions required for all patients at all times. | |
| Adenovirus infection | See agent-specific guidance under gastroenteritis, conjunctivitis, pneumonia. | | | | |
| Amoebiasis *(Entamoeba histolytica)* | Protozoan | Ingestion; person to person transmission rare. | S | Standard precautions required for all patients at all times. | Person to person transmission is rare. Transmission in settings caring for those with intellectual disability and in a family group has been reported. Particular care is required if caring for infants or others who require nappies. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| Anthrax *(Bacillus anthracis)* Cutaneous | Bacterial | Inoculation; person to person transmission rare. | S (+C as per additional comments) | Duration of illness. | Transmission occurs through non-intact skin. Use contact precautions if large amount of uncontained drainage. Hand washing with soap and water preferable to use of alcohol-based hand rub since alcohol does not have sporicidal activity. |
| Anthrax (*Bacillus anthracis*) Pulmonary | Bacterial | Inhalation; not transmitted person to person. | S | Standard precautions required for all patients at all times. | |
| Antibiotics-associated colitis | See *Clostridioides difficile* | | | | |
| Arthropod-borne (arboviruses)<br>• viral encephalitides (eastern, western, Venezuelan equine encephalo-myelitis; St Louis, California encephalitis; West Nile Virus) and viral fevers (dengue, yellow fever, Colorado tick fever) | Viral | Not transmitted from person-to-person except rarely by transfusion, and for West Nile virus by organ transplant, breastmilk or transplacental. | S | Standard precautions required for all patients at all times. | |
| Ascariasis *(Ascaris lumbricoides)* | Helminth | Ingestion | S | Standard precautions required for all patients at all times | |
| **Aspergillosis** *(Aspergillus spp.)* | Fungal | Inhalation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | Contact precautions and Airborne if massive soft tissue infection with copious drainage and repeated irrigations required. |
| **Babesiosis** | Parasitic | Tick bite; not transmitted from person-to- person, except rarely by transfusion. | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Botulism** | Bacterial | Ingestion; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Bronchiolitis** | Viral, bacterial | Contact; droplet | S+C+D | Duration of illness | Surgical mask unless performing an Aerosol Generating Procedure with increased risk of infection. If AGP use FFP2. |
| **Respiratory infection with *Burkholderia cepacia* and related species** | Bacterial | Contact & Droplet | S + C + avoid exposure to other persons with cystic fibrosis | Duration of illness/ colonisation | Precautions required to protect other people with cystic fibrosis. Unlikely to pose significant risk to healthcare workers or others. |
| **Brucellosis** *(Brucella spp.)* | Bacterial | Inoculation; ingestion; person-to- person transmission rare (sexual); airborne transmission in laboratory accidents | S | Standard precautions required for all patients at all times | |
| **Campylobacter gastroenteritis** | Bacterial | Ingestion | S+C | 48 hours after resolution of diarrhoea | |
| **Candidiasis** (*Candida spp.* other than *C. auris*) All forms including mucocutaneous | Fungal | Usually endogenous | S | Standard precautions required for all patients at all times | |
| ***Candida auris*** | Fungal | Contact | S+C | Duration of illness/ colonisation | Notifiable as a rare or emerging infection. |
| **Carbapenemase Producing Enterobacterales (CPE)** | Bacterial | Contact | S+C | Duration of illness/ colonisation | Single room with ensuite toilet facilities particularly for patients incontinent of faeces. Contact precautions are generally not appropriate for colonisation with MDRO in many non-acute care settings. |
| **Cat-scratch Fever** *(Bartonella spp.)* | Bacterial | Inoculation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Cellulitis (Intact skin and no discharge)** | Bacterial | Inoculation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Chancroid** *(H. ducreyi)* | Bacterial | Transmitted sexually | S | Standard precautions required for all patients at all times | |
| **Chickenpox (Varicella-Zoster virus)** | Viral (enveloped virus) | Airborne droplets; direct contact with fluid in blisters or nasopharyngeal secretions | S+C+A | Until lesions dry and crusted over | Screen by history and serology. Varicella vaccine offers effective protection (see immunisation guidelines). Post-exposure prophylaxis (vaccination, aciclovir or Varicella-Zoaster Immunoglogulin (VZIG)) may be indicated. |
| ***Chlamydia trachomatis*** **Conjunctivitis** | Bacterial | Contact | S | Standard precautions required for all patients at all times | |
| ***Chlamydia trachomatis*** **Genital** | Bacterial | Transmitted sexually | S | Standard precautions required for all patients at all times | |
| ***Chlamydia trachomatis*** Pneumonia (infants less than or equal to 3 months) | Bacterial | Contact (mother to child) | S | Standard precautions required for all patients at all times | |
| ***Chlamydophila pneumoniae*** | Bacterial | Contact; droplet | S | Standard precautions required for all patients at all times | |
| **Cholera** *(Vibrio cholerae)* | Bacterial | ingestion | S +C | Until 7 days after resolution of symptoms | Particular care required when caring for those who are incontinent or require nappies. |
| ***Clostridioides difficile*** | Bacterial | Contact | S+C | Contact until 48 hours after resolution of diarrhoea | Discontinue antibiotics if appropriate. Alcohol-based hand hygiene products are adequate if gloves are used and hands are visibly clean but otherwise hand washing with soap and water is required. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| ***Clostridium perfringens*** Food poisoning | Bacterial | Ingestion; not transmitted from person-to-person. | S | Standard precautions required for all patients at all times | |
| ***Clostridium perfringens*** Gas gangrene | Bacterial | Contact | S (+ C as per additional comments) | Duration of illness | Transmission from person to person rare; 1 outbreak in a surgical setting reported. Use contact precautions if wound drainage is extensive. |
| **Coccidioido-mycosis (valley fever)** Pneumonia or draining lesions | Fungal | Inhalation of spores in contaminated dust/soil | S | Standard precautions required for all patients at all times | Not transmitted from person to person except under extraordinary circumstances, because the infectious arthroconidial form of *Coccidioides immitis* is not produced in humans. Inform laboratory prior to submission of samples for culture. |
| **Conjunctivitis** Acute bacterial | Bacterial | Contact | S | Duration of illness | |
| **Conjunctivitis** *Chlamydia trachomatis* | Bacterial | Contact | S | Duration of illness | |
| **Conjunctivitis** Gonococcal | Bacterial | Contact | S | Duration of illness | |
| **Conjunctivitis** Acute viral (haemorrhagic) | Viral | Contact | S+C | Duration of illness | Adenovirus, enterovirus, Coxsackie A24 most common. Highly contagious; outbreaks in eye clinics, paediatric and neonatal settings and institutions. Eye clinics should follow standard precautions when handling patients with conjunctivitis. |
| **COVID-19 (SARS-CoV-2)** | Viral | Transmission through air | S+C+D (airborne transmission in some circumstances) | **If in hospital or long term residential care** minimum of 7 days from date of onset of symptoms. | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Creutzfeldt-Jakob disease** (CJD) | Prion | Iatrogenic (CNS, instruments); grafts, hormones; zoonotic (vCJD) | S | Standard precautions required for all patients at all times | Use disposable instruments where possible or special decontamination processes if contamination with neural tissue if CJD or vCJD not ruled out. See 2019 HPSC guidelines at www.hpsc.ie |
| ***Cryptosporidium spp.*** | Protozoan | Ingestion | S (+C as per additional comments) | Contact until 48 hours after resolution of diarrhoea | Use contact precautions for people using diapers or who are incontinent of faeces for duration of illness or to control outbreaks. |
| **Cysticercosis** *(Taenia solium)* | Helminth | Ingestion; not transmitted person to person | S | Standard precautions required for all patients at all times | |
| **Cytomegalovirus (CMV) infection** | Viral (enveloped) | Contact (Mucosal) | S | Standard precautions required for all patients at all times | No additional precautions for pregnant healthcare workers. Note: contact precautions required in neonatal intensive care unit. |
| **Dengue Fever** | Viral | Female mosquito bite; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Diphtheria** *(Corynebacterium diphtheriae)* Cutaneous | Bacterial | Contact | S+C | Until off antimicrobial treatment and culture reported not-detected | Until 2 cultures taken 24 hours apart are reported not detected. Note: important that healthcare worker vaccination is up to date. Contact microbiology laboratory immediately. |
| **Diphtheria** *(Corynebacterium diphtheriae)* Pharyngeal | Bacterial | Droplet | S+D | Until off antimicrobial treatment and culture reported not-detected. | Until 2 cultures taken 24 hours apart are reported not detected. Note: important that healthcare worker immunisation is up to date. |
| **Echinococcosis** (hydatid disease) *(Echinococcus granulosis)* | Helminth | Ingestion; not transmitted person to person | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Enterobiasis** *(Enterobius vermicularis)* | Helminth | Ingestion | S | Standard precautions required for all patients at all times | |
| **Enterococcus, vancomycin-resistant** (VRE) | Bacterial | Contact | S+C | Duration of colonisation | Single room with ensuite toilet facilities for patients incontinent of faeces. Contact precautions are generally not appropriate for colonisation with MDRO in many non-acute care settings. |
| **Enteroviral infections** (i.e. Group A and B Coxsackie viruses and Echo viruses) (excludes polio virus) | Viral (non-enveloped) | Contact (ingestion) | S+C | Duration of illness | |
| **Epiglottitis** due to *Haemophilus influenzae* type b | Bacterial | Droplet; contact (rare) | S+D | Until 48 hours after initiation of effective therapy | See specific disease agents for epiglottitis due to other aetiologies. |
| ***Escherichia coli*** (if VTEC/STEC) | Bacterial | Contact (ingestion) | S+C | Until 48 hours after resolution diarrhoea | Note: shedding of VTEC can continue for extended periods after clinical recovery-if hospitalised/ institutional setting risk asses with infection prevention and control practitioner before discontinuing transmission-based precautions. Microbiological clearance may be required. |
| ***Escherichia coli gastroenteritis*** Other than VTEC/ STEC | Bacterial | Contact (ingestion) | S+C | Until 48 hours after resolution diarrhoea | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Extended-spectrum beta-lactamase producing Enterobacterales** | Bacterial | Contact | S+C | Duration of colonisation | Single room with ensuite toilet facilities for patients incontinent of faeces.<br>Contact precautions may not be required in all cases in the acute setting, subject to risk assessment.<br>Contact precautions are generally not appropriate for colonisation with MDRO in many non-acute care settings. |
| **Furunculosis** *Staphylococcus aureus* | Bacterial | Contact | S (+C as per additional comments) | Duration of illness | Contact precautions if drainage is not controlled. |
| **Furunculosis** *Staphylococcus aureus* Infants and young children | Bacterial | Contact | S+C | Duration of illness (with wound lesions, until wounds stop draining) | |
| **Gastroenteritis** Adenovirus | Viral (non-enveloped) | Contact (ingestion) | S+C | Until 48 hours after resolution of diarrhoea | |
| **Gastroenteritis** - bacterial *(Salmonella enterica, Shigella spp.)* | Bacterial | Contact (ingestion) | S+C | 48 hours after resolution of diarrhoea | If continuing in an hospital / institutional setting risk assess before discontinuing transmission-based precautions. |
| **Gastroenteritis** *Vibrio parahaemolyticus* | Bacterial | Contact (ingestion) | S+C | 48 hours after resolution of diarrhoea | If continuing in an hospital / institutional setting risk assess before discontinuing transmission-based precautions. |
| **Gastroenteritis** *Yersinia enterocolitica* | Bacterial | Contact (ingestion) | S+C | 48 hours after resolution of diarrhoea | If continuing in an hospital / institutional setting risk assess before discontinuing transmission-based precautions. |
| **Giardiasis** | Protozoan | Contact (ingestion) | S | 48 hours after resolution of diarrhoea | If continuing in an hospital / institutional setting risk assess before discontinuing transmission-based precautions. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Gonococcal ophthalmia neonatorum** *Neisseria gonorrhoeae* (acute conjunctivitis of new-born) | Bacterial | Contact | S | Standard precautions required for all patients at all times | |
| **Gonorrhoea** *Neisseria gonorrhoeae* | Bacterial | Sexual, contact | S | Standard precautions required for all patients at all times | |
| **Granuloma inguinale** (Donovanosis, granuloma venereum) *Klebsiella granulomatis* | Bacterial | Sexual; contact | S | Standard precautions required for all patients at all times | |
| ***Haemophilus influenzae*** (type b only) meningitis | Bacterial | Droplet; contact (rare) | S+D | Until 24 hours after initiation of effective therapy | |
| ***Haemophilus influenzae*** (type b only) pneumonia – adults | Bacterial | Droplet; contact (rare) | S+D | Until 24 hours after initiation of effective therapy | |
| **Haemophilus influenzae** (type b only) pneumonia - children | Bacterial | Droplet; contact (rare) | S+D | Until 24 hours after initiation of effective therapy | |
| ***Helicobacter pylori*** | Bacterial | Most likely contact (ingestion) | S | Standard precautions required for all patients at all times | |
| **Hepatitis A** | Viral (non-enveloped) | Most likely contact (ingestion) | S+C | For 7 days after onset of jaundice; for duration of hospitalisation for children less than 3 years. Some authorities recommend contact precautions for 2 weeks after symptom onset in those aged 3 to 14 years | Immunise if at high risk; provide hepatitis A vaccine or normal human immunoglobulin (NHIG) post- exposure if recommended. |
| **Hepatitis B** | Viral (enveloped) | Blood-borne | S | Standard precautions required for all patients at all times | Immunise all healthcare workers and test to confirm immunity. Occupational exposure protocol for blood-borne viruses. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Hepatitis C** | Viral (enveloped) | Blood-borne | S | Standard precautions required for all patients at all times | Occupational exposure protocol for blood-borne viruses. |
| **Hepatitis D** | Viral (enveloped) | Blood-borne, cannot occur without hepatitis B coinfection | S | Standard precautions required for all patients at all times | Immunise and test all healthcare workers for hepatitis B. Occupational exposure protocol for blood-borne viruses. |
| **Hepatitis E** | Viral (non-enveloped) | Contact (ingestion) | S+C | Period of communicability unknown, probably at least 14 days after onset of jaundice | |
| **Hepatitis G (GB virus C)** | Viral (enveloped) | Blood-borne; sexual | S | Standard precautions required for all patients at all times | |
| **Herpes simplex virus infection** Encephalitis | Viral (enveloped) | Contact | S | Standard precautions required for all patients at all times | |
| **Herpes simplex virus infection** mucocutaneous, disseminated or primary, severe | Viral (enveloped) | Contact | S+C | Until lesions dry and crusted | |
| **Herpes simplex virus infection** mucocutaneous, recurrent (skin, oral, genital) | Viral (enveloped) | Contact | S | Standard precautions required for all patients at all times | |
| **Herpes simplex virus infection** neonatal | Viral (enveloped) | Contact | S+C | Until lesions dry and crusted | Also, for asymptomatic exposed infants delivered vaginally or by C-section and if mother has active infection and membranes have been ruptured for more than 4 to 6 hours until samples obtained at 24-36 hours of age are reported not detected (liaise with the laboratory). |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| ***Herpes zoster* (disseminated shingles)** disseminated disease generally in those with suppressed immune function, characterised by skin lesions outside the affected dermatome and dermatomes directly adjacent to the affected dermatome, with potential involvement of other organs | Viral (enveloped) | Airborne droplets; direct contact with fluid in blisters | S+C+A | Duration of illness | Susceptible healtcare workers should not provide patient care. Vaccination of healthcare workers protects against infection. |
| ***Herpes zoster* (shingles)** Localised disease in patients with intact immune system, characterised by skin lesions that follows a dermatome in an area that can be covered | Viral (enveloped) | Primarily by contact | S | Standard precautions required for all patients at all times | Susceptible healthcare workers should not provide patient care. Vaccination of healthcare workers protects against infection. |
| ***Herpes zoster* (shingles)** Localised disease in patients with intact immune system is characterised by skin lesions that follows a dermatome in area that cannot be covered or any localised infection in immuno-compromised | Viral(enveloped) | Primarily by contact | S&C&A | Duration of illness (if wound lesions, until wounds cease draining, are dry and crusted) | Susceptible healthcare workers should not provide patient care. Vaccination of healthcare workers protects against infection. |
| **Hookworm (Necator, Ancylostoma)** | Helminth | Skin penetration; not transmitted person to person | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Human Immuno-deficiency Virus (HIV)/AIDS** | Viral (enveloped) | Blood-borne; sexual | S | Standard precautions required for all patients at all times | Occupational exposure protocol for blood-borne viruses post-exposure prophylaxis if indicated; patients with complicating conditions (for example tuberculosis) may need further precautions. |
| **Human Metapneumo-virus** | Viral (enveloped) | Contact; droplet | S+C+D | Duration of illness | May be prolonged shedding in immunocompromised consider extend period of precautions. |
| **Impetigo** | Bacterial | Contact | S+C | Until 24 hours after initiation of effective therapy | |
| **Infectious mononucleosis** (glandular fever) | Viral (enveloped) | Saliva via oropharyngeal route | S | Standard precautions required for all patients at all times | |
| **Influenza** | Viral (enveloped) | Droplet; contact (both direct & indirect) | S+C+D | Until after 72 hours of the patient receiving anti- influenza medication; or five days have elapsed since onset of respiratory symptoms. May be longer for young children, immunosuppressed or ICU patients. | Annual vaccination recommended |
| **Legionellosis** *Legionella pneumophila* (Legionnaires' Disease) | Bacterial | Inhalation of aerosolised contaminated water (not person-to-person) | S | Standard precautions required for all patients at all times | Very rarely transmitted from person to person |
| **Leprosy (***Mycobacterium leprae)* | Bacterial | Contact | S | Standard precautions required for all patients at all times | |
| **Leptospirosis** *(Leptospira spp.)* | Bacterial | Contact | S | Standard precautions required for all patients at all times | Not transmitted from person to person |
| **Lice** (pediculosis) Head | Athropod | Contact | S+C | Contact until 24 hours after initiation of effective therapy | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Lice** (pediculosis) Body | Athropod | Contact | S+C | Contact until 24 hours after initiation of effective therapy then standard | Transmitted person to person through infested clothing. Bag and wash clothing in hot cycle or dispose of clothing. |
| **Lice** Pubic | Athropod | Contact (sexual) | S | Standard precautions required for all patients at all times | |
| **Listeriosis** *(Listeria monocytogenes)* | Bacterial | Usually via contaminated foods | S | Standard precautions required for all patients at all times | Person to person transmission rare with the exception of mother-foetus transmission. |
| **Malaria (***Plasmodium species)* | Protozoan | Mosquito bite; not transmitted person-to-person (except rarely through blood transfusions) | S | Standard precautions required for all patients at all times | |
| **Measles (rubella) virus** | Viral (enveloped) | Airborne; contact with discharges from respiratory and mucous membranes | S+A | Until 4 days after rash appears: duration of illness in immune compromised patients | Screen by history/ serology; pre-employment measles, mumps, rubella vaccine (MMR) if not contraindicated. Non-immune staff should not care for patient. |
| **Meticillin-resistant *Staphylococcus aureus (MRSA)*** | Bacterial | Contact | S+C (+D as per additional comments) | Duration of colonisation | Droplet precautions may be considered for patients with MRSA in the lower respiratory tract, when patient care activities are likely to expose healthcare workers to respiratory droplets. |
| **Meningitis** Bacterial, in neonates | Bacterial | Variable depending on the type of bacteria. Most commonly mothers can pass on *Streptococcus* and *Escherichia coli* to their babies during labour and birth | S | Standard precautions required for all patients at all times | If MDRO add contact precautions. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Meningitis Fungal** | Fungal | Not transmitted person to person. Fungal meningitis can develop after a fungus spreads through the bloodstream from somewhere else in the body | S | Standard precautions required for all patients at all times | |
| **Meningitis** *Streptococcus pneumoniae* | Bacterial | Contact | S | Standard precautions required for all patients at all times | |
| **Meningococcal infection** *(Neisseria meningitidis)* | Bacterial | Droplet | S+D | For 24 hours after beginning effective treatment | Vaccination possible in outbreaks. Post-exposure prophylaxis if indicated. Follow up of contacts may be required. |
| **Middle East Respiratory Syndrome** Coronavirus (MERS-CoV) | Viral | Not fully known. Presumed contact; droplet; | S+C+D | Duration of illness (see note) | Transmission based precautions for duration of admission is often appropriate but if patient remains hospitalised for some time after recovery from the infection consult with infection prevention and control team 24 hours after the resolution of clinical features of active infection |
| **Molluscum contagiosium** | Viral (enveloped) | Contact | S | Standard precautions required for all patients at all times | |
| **Mucormycosis** (Mucor, Rhizopus, Absidia, Cunninghamella etc.) | Fungal | Inhalation; inoculation; not transmitted person to person | S | Standard precautions required for all patients at all times | |
| **Mumps** | Viral (enveloped) | Contact, droplet (respiratory secretions) | S+D | Until 5 days after onset of swelling. Exposed non- immune people should be considered infectious from 12$^{th}$-25$^{th}$ day after exposure, with or without symptoms | Screen by serology; pre-employment measles mumps rubella vaccine (MMR) if not contraindicated |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Mycobacteria, non-tuberculous** (atypical) (*see also* Tuberculosis) | Bacterial | Inoculation; inhalation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Mycoplasma pneumonia** *(Mycoplasma pneumoniae)* | Bacterial | Droplet | S+D | Duration of illness | |
| **Necrotising enterocolitis** | Bacterial | Usually endogenous | S+C | Duration of illness | |
| **Nocardiosis** *(Nocardia spp.)* | Bacterial | Inhalation; inoculation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Norovirus** | Viral (non-enveloped) | Contact (droplet in certain circumstances) | S + C (+ D if determined to be necessary by risk assessment | For a minimum of 48 hours after the resolution of symptoms or to control institutional outbreaks | |
| **Orf** | Viral (enveloped) | Contact (from animals); not transmitted person to person | S | Standard precautions required for all patients at all times | |
| **Parainfluenza** | Viral (enveloped) | Droplet | S+D | Duration of illness | Viral shedding may be prolonged in immunosuppressed patients. |
| **Parvovirus B19 Infection** (Erythema infectiosum) | Viral (non-enveloped) | Droplet | S+D | Duration of hospitalisation | Maintain precautions for duration of hospitalisation when chronic disease occurs in an immunocompromised patient. For patients with transient aplastic crisis or red-cell crisis, maintain precautions for 7 days. Duration of precautions for immunosuppressed patients with persistently positive PCR not defined, but transmission has occurred. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Pertussis** *Bordetella pertussis* (Whooping cough) | Bacterial | Droplet | S+D | Until at least 5 days after commencement of appropriate antimicrobial therapy, or; for 21 days after the onset of symptoms if not receiving antimicrobial treatment, or; for 14 days after the onset of paroxysmal cough (if the onset is known). | Pre-employment booster/vaccination recommended; post-exposure prophylaxis for healthcare worker in late pregnancy and high-risk areas. |
| **Plague *(Yersinia pestis)* bubonic** | Bacterial | Flea bites, contact | S | Standard precautions required for all patients at all times | |
| **Plague *(Yersinia pestis)* pneumonic** | Bacterial | Droplet | S+D | Until 48 hours after initiation of effective antimicrobial therapy. Patient must be in respiratory isolation room. | Antimicrobial prophylaxis for exposed healthcare workers. |
| **Pneumococcal pneumonia** *(Streptococcus pneumoniae)* | Bacterial | Droplet | S | Standard precautions required for all patients at all times | Use droplet precautions if evidence of transmission within a facility. |
| **Pneumocystis pneumonia** *(Pneumocystis jiroveci)* | Fungal | Uncertain | S | Standard precautions required for all patients at all times | Avoid placement in the same room with an immunocompromised patient. |
| **Pneumonia** Adenovirus | Viral (non-enveloped) | Droplet | S+D+C | Duration of illness | In immunocompromised hosts, extend duration of droplet and contact precautions due to prolonged shedding of virus. |
| **Pneumonia** *Legionella spp.* | Bacterial | Inhalation; rarely transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Pneumonia** Meningococcal | Bacterial | Droplet | S+D | Until 24 hours after initiation of effective antimicrobial therapy effective therapy | |
| **Pneumonia Viral (specific pathogen not identified)** | Viral | Droplet; contact | S+D | Duration of illness | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Poliomyelitis** | Viral | Contact (ingestion) | S+C | Duration of illness; may be shed in faeces for up to 6 weeks | Healthcare workers should be vaccinated (if have not had childhood vaccinations); non-immune healthcare workers should not care for patient |
| **Pressure ulcer** (decubitus ulcer, pressure sore) Infected or heavily colonised with MDRO | Bacterial (commonly) | Not transmitted person-to-person | S+C | Duration of illness | |
| **Psittacosis/ Ornithosis** *(Chlamydophila psittaci)* | Bacterial | Inhalation of *C. psittaci* which has been aerosolised from dried faeces, feather dust, or respiratory secretions of infected birds; mouth-to-beak contact | S | Standard precautions required for all patients at all times | Person-to-person transmission has been reported only rarely – hence the infectious period is unknown. |
| **Q Fever** *(Coxiella burnetii)* | Bacterial | Inhalation; not transmitted person-to-person (rarely by sexual contact) | S | Standard precautions required for all patients at all times | |
| **Rabies** | Viral (enveloped) | Transmitted by animal bites, scratches, or by contamination of mucous membranes or broken skin | S+C | Duration of illness | Person to person transmission rare; if patient bites another person, wash exposed area thoroughly and administer post-exposure prophylaxis |
| **Respiratory Syncytial Virus** (RSV) | Viral (enveloped) | Contact; droplet | S+C+D | Duration of illness | May be prolonged shedding in immunocompromised patients-as such extend duration of contact precautions. |
| **Rhinovirus** | Viral (non-enveloped) | Contact; droplet | S+D (add C as per additional comments) | Duration of illness | Add contact precautions if copious moist secretions and close contact likely to occur (for example young infants). |
| **Rickettsial fevers for example** Tick typhus | Bacterial | Tick bites; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Roseola infantum** (exanthem subitum) HHV-6 | Viral (enveloped) | Unknown, thought to be through oral secretions; low infectivity | S | Standard precautions required for all patients at all times | |
| **Rotavirus gastroenteritis** | Viral (non-enveloped) | Contact (ingestion), possibly droplet | S+C | Until 24 hours after resolution of diarrhoea | Alcohol-based hand hygiene products are less effective than hand washing with soap and water for this infectious agent. Ensure consistent environmental cleaning and disinfection and frequent removal of soiled diapers. Prolonged shedding may occur in both immunocompetent and immunocompromised children and older people. |
| **Rubella** | Viral (enveloped) | Contact; droplet | S+D (+ Contact if touching respiratory secretions and bodily substances) | Until 7 days after onset of rash | Screen by serology; pre-employment MMR if not pregnant; non-immune and pregnant staff should not attend patient. |
| **Rubella** Congenital | Viral (enveloped) | Mother to child | S+C | Until 1 year of age | Standard precautions may be used if nasopharyngeal and urine cultures are repeatedly negative after 3 months of age; non-immune pregnant staff should not attend patient. Application of standard and contact precautions is not practical in the home setting. |
| **Scabies** *(Sarcoptes scabiei)* | Anthropod infestation | Contact (skin to skin) or from infested fomites | S+C | Until 24 hours after treatment commenced | Healthcare workers should be excluded from work until effective treatment has been commenced. |
| **Schistosomiasis** *(Schistosoma spp.)* | Helminth | Skin penetration; not transmitted person to person | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Sporotrichosis** | Fungal | Contact; inhalation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Staphylococcal infection** *(Staphylococcus aureus)* | Bacterial | Contact | S +C unless unable to contain wound drainage S+C for MRSA | Duration of illness or in the case of MRSA duration of colonisation | Occupational health assessment for staff with exfoliative skin conditions.<br>Single room isolation of patients with MRSA may not be feasible. In each case, the implementation of contact precautions and isolation should be based on an appropriate risk assessment.<br>Isolation is generally not appropriate in the person's residence (including residential care facilities). |
| **Staphylococcal infection** *(Staphylococcus aureus)* Scalded skin syndrome | Bacterial | Contact | S+C | Duration of illness | Consider healthcare workers as potential source of nursery or NICU outbreaks. |
| **Staphylococcal infection** (*Staphylococcus aureus)* Skin, wound, or major burn | Bacterial | Contact | S+C | Duration of illness for draining wound | No dressing or dressing does not contain drainage adequately. |
| **Staphylococcal infection** (*Staphylococcus aureus)* Skin, wound, or minor burn or limited | Bacterial | Contact | S (+C if MRSA) | Duration of illness | Dressing covers and contains drainage adequately. Single room isolation of patients with MRSA may not be feasible. In each case, the implementation of contact precautions and isolation should be based on an appropriate risk assessment.<br>Isolation is generally not appropriate in the person's residence (including residential care facilities). |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Staphylococcal infection** *(Staphylococcus aureus)* Enterocolitis | Bacterial | Contact (ingestion) | S+C | Until 48 hours after resolution of diarrhoea | |
| **Staphylococcal infection** *(Staphylococcus aureus)* Pneumonia | Bacterial | Contact | S+C if MRSA | Until 24 hours after effective treatment commenced.<br>Note: if MRSA colonised contact precautions required for the duration of hospitalisation | Single room isolation of patients with MRSA may not be feasible. In each case, the implementation of contact precautions and isolation should be based on an appropriate risk assessment. |
| **Staphylococcal infection** *(Staphylococcus aureus)* Toxic shock syndrome | Bacterial | Contact | S | Standard precautions required for all patients at all times | |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Skin, wound or major burn | Bacterial | Contact | S+C+D | Until 24 hours after treatment commenced | |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Skin, wound or minor burn or limited | Bacterial | Contact | S | Until 24 hours after treatment commenced | If dressing covers and contains drainage adequately. |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Endometritis (puerperal sepsis) | Bacterial | Contact | S | Until 24 hours after treatment commenced | |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Pharyngitis in infants and young children | Bacterial | Contact | S+D | Until 24 hours after treatment commenced | |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Pneumonia | Bacterial | Contact | S+D | Until 24 hours after treatment commenced | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Scarlet Fever in infants and young children | Bacterial | Contact | S+D | Until 24 hours after treatment commenced | |
| **Streptococcal Infection** (*Streptococcus pyogenes*/Group A) Serious invasive disease | Bacterial | Contact | S+D | Until 24 hours after treatment commenced | Outbreaks of serious invasive disease have occurred secondary to transmission among patients and Healthcare personnel. |
| **Streptococcal Infection** (Group B), Neonatal | Bacterial | Mother to child | S | Standard precautions required for all patients at all times | |
| **Strongyloidiasis** (Strongyloides stercoralis) | Helminth | Skin penetration; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Syphilis** (T*reponema pallidum)* | Bacterial | Sexually or mother to child transmitted; close skin contact; infected blood | S | Standard precautions required for all patients at all times | |
| **Tetanus** *(Clostridium tetani)* | Bacterial | Inoculation; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Tinea** (dermatophytosis, dermatomycosis, ringworm) | Fungal | Direct or indirect contact | S | Standard precautions required for all patients at all times | Person to person transmission in healthcare is rare |
| **Toxoplasmosis** *(Toxoplasma gondii)* | Protozoan | Ingestion; rarely transmitted person-to- person (vertical, blood transfusion) | S | Standard precautions required for all patients at all times | Transmission from person to person is rare; vertical transmission from mother to child, transmission through organs and blood transfusion rare. |
| **Trachoma** *(Chlamydia trachomatis)* | Bacterial | Contact; eye-seeking flies; infected ocular and nasal secretions | S | Standard precautions required for all patients at all times | |
| **Trichomoniasis** *(Trichomonas vaginalis)* | Protozoan | Sexually transmitted | S | Standard precautions required for all patients at all times | |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Tuberculosis** Extrapulmonary, draining lesion | Bacterial | Airborne | S+A+C | At least until patient improving clinically and drainage has ceased – consider laboratory results | See Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010 at www.hpsc.ie |
| **Tuberculosis** Extrapulmonary but no draining lesion; meningitis | Bacterial | Airborne | S | | Examine for pulmonary TB. For infants and children use airborne precautions until active pulmonary TB ruled out in visiting family members. |
| **Tuberculosis** Pulmonary or laryngeal disease, confirmed | Bacterial | Airborne | S+A | Until at least 2 weeks after start of effective treatment and consider clinical and laboratory evidence of response | See Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010 p 4 |
| **Tuberculosis** Pulmonary or laryngeal disease, suspected | Bacterial | Airborne | S+A | Until TB excluded or until at least 2 weeks after starting effective treatment consider clinical and laboratory evidence of response | See Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010 p 4 |
| **Tuberculosis** Skin test positive or laboratory evidence of latent infection but no evidence of current active disease | Bacterial | Not an infectious condition | S | Standard precautions required for all patients at all times | |
| **Tularaemia** *(Francisella tularensis)* | Bacterial | Arthropod bites; inoculation; inhalation; ingestion; not transmitted person-to-person | S | Standard precautions required for all patients at all times | |
| **Typhoid and Paratyphoid** (*Salmonella enterica* serovar Typhi and *Salmonella enterica* serovar Paratypi) | Bacterial | Contact (ingestion), ingestion of contaminated water and food or person-to-person | S+ add C if required | Duration of illness | Individual toilet in addition to standard precautions. Use contact precautions for people incontinent of faces or using nappies or to control institutional outbreaks. |

| Disease | Type of infection | Transmission route | Required precaution/s | Duration of precautions | Additional comments |
|---|---|---|---|---|---|
| **Typhus** *Rickettsia prowazekii* (Epidemic or Louse-borne Typhus) | Bacterial | Contact with infected body lice | S | Standard precautions required for all patients at all times | Transmitted from person-to-person by lice through close personal or clothing. |
| **Varicella-Zoster Virus** | See chickenpox; herpes zoster (disseminated shingles); herpes zoster (shingles) | | | | |
| **Viral haemorrhagic fevers** (VHF) Crimean-Congo, Ebola, Lassa, Marburg | Viral (enveloped) | Contact with blood or body substances (mucosal, parenteral) either directly or indirectly<br>Lassa fever: aerosols | S+C+D+A | Duration of illness; isolation room | Emphasise: use of sharps safety devices and safe work practices; hand hygiene; barrier protection against blood and body substances upon entry into room—gloves, fluid-impermeable gown, face/eye protection with masks, goggles or face shields; appropriate waste handling. See www.hpsc.ie for additional details on appropriate use of PPE |
| **Wound infections major** | Bacterial (Usually) | Contact | S+C | Duration of Illness | Until drainage stops or can be contained by dressing. |
| **Wound infections minor or limited** | Bacterial (Usually) | Contact | S | Standard precautions required for all patients at all times | If dressing covers and contains drainage. |
| **Zika Virus** | Viral (enveloped) | Mosquito bite; Sexually or maternal-fetal and perinatal transmission | S | Standard precautions required for all patients at all times | |

## 7.5 Allowing animals into healthcare facilities

Assistance, therapeutic and companion animals are used in healthcare facilities. Accommodation for assistance animals such as guide dogs for people with visual impairment is particularly important. Where this is practiced, the healthcare facility should have a policy on infection prevention and control for animal-assisted interventions, with input from an infection prevention and control expert.

This may include:

- Ensuring regular hand hygiene is performed before and after entering a patient care area, before and after handling an animal, and after toileting an animal
- Restricting entrance into specific clinical areas for example neonatal and new-born nurseries, and other areas identified specifically by the healthcare facility
- Ensuring routine environmental cleaning is performed after animal visits
- Ensuring that animals visiting multiple patients/service users or permanently residing in the healthcare facility have been assessed by a veterinarian, screened for parasites and skin problems, and are fully vaccinated (a veterinary vaccination certificate should be provided). It is not likely to be practical or appropriate to apply this to assistance dogs accompanying an individual person.

Dalton and colleagues have published a literature of risks associated with animal-assisted intervention programs that may be useful to healthcare facilities in developing policies (Dalton *et al.* 2020).

## 7.6 Examples of how to perform aseptic technique

**Aseptic technique for peripheral and central access intravenous therapy (IV)**

Typically, IV maintenance procedures will be assessed as requiring aseptic technique with the employment of a main general aseptic field and critical micro aseptic fields.

**Table 45** Aseptic technique for peripheral and central access IV

| |
|---|
| **1. Perform hand hygiene**<br>This will interrupt any potential transmission of infection by contaminated hands from the clinical ward environment to the clean preparation area/room. Effective hand hygiene is vital to reduce the risk of contaminating key parts/sites. |
| **2. Use a clean tray or trolley**<br>A tray or trolley provides a sufficiently large, robust and controlled working area. Reprocess re-usable trays according to local policy. |
| **3. While the tray is drying, gather equipment**<br>Hands are contaminated when gathering equipment from storage cupboards etc. It's important therefore to gather all equipment before performing hand hygiene at Step 4. Gathering equipment at this point also allows the tray to dry properly and saves a little time. |
| **4. Perform hand hygiene**<br>This occurs immediately before assembly of equipment and the preparation of drugs. This way, hands are optimally clean prior to glove application and aseptic technique key part manipulation. |

**5. Apply non-sterile gloves (use sterile gloves if you must touch key parts)**
Primarily, gloves are worn to protect the user from drug exposure and blood products. All peripheral and central access IV procedures should be performed without touching key parts. Therefore, non-sterile gloves will nearly always be the logical and efficient glove choice.

**6. Assemble equipment and prepare medications—protect key parts using aseptic technique**
Aseptic technique is the most important component of aseptic practice because a key part cannot be contaminated directly if it is not touched. Key parts should be protected throughout the procedure when they are not in use. This can be achieved by using sterilised IV bungs or the inside of syringe packets. Both systems provide critical micro aseptic fields around the key part.

**7. If gloves become contaminated – remove gloves – decontaminate hands and re-glove**
This is necessary when it is not possible to proceed from preparation to administration without contaminating gloved hands (for example due to prepping a patient).

**If gloves remain uncontaminated between steps 6 and 8 proceed directly to step 8**

Where it is possible to retain the asepsis of gloved hands between preparation and administration, the user does not need to remove gloves, decontaminate hands and replace gloves between administration and preparation.

This will promote compliance and save time.

**8. Clean key parts**
Wipes impregnated with 70% alcohol or 70% alcohol plus 2% chlorhexidine should be used to clean the hub and other key parts.In addition, the benefit of using friction and allowing key parts to dry has been demonstrated.

**Method:**

A large wipe impregnated with 70% alcohol or 70% alcohol plus 2% chlorhexidine should be fully unfolded to provide a suitable working surface area.

One side of the wipe should be exposed to the user's gloved hand, the other side should be applied to to the hub.

This should be repeated using different parts of the wipe (to remove dirt from the tip). After cleaning the hub, clean the sides of the port and line, working away from the port tip. The port tip should be thoroughly wiped hard for five seconds. This is to create friction.

Allowing the hub to air dry promotes asepsis.

Using different parts of the wipe ensures any dirt is transferred from the hub to the wipe. The hub must dry before use otherwise it won't be aseptic (if organisms have remained, a wet tip will facilitate their transportation into the patient on injection).

**9. Administer medication using aseptic technique**
Key parts cannot be contaminated by contact if they are not touched. Aseptic technique should therefore be used even if the user is wearing sterile gloves (because once sterile gloves are open to air they are no longer sterile, and can also be inadvertently contaminated by touch). If necessary, a small sterilised towel can be placed under a patient's line to promote safe handling.

**10. Dispose of sharps and equipment then dispose of gloves**
Sharps are best disposed of at the bedside (on the basis that the quicker they are disposed of the less chance there is of an accident).

| |
|---|
| **11. Clean tray**<br>Re-usable trays are reprocessed at the end of the procedure to prevent cross infection between patients and staff. Trays are reprocessed according to local policy. |
| **12. Perform hand hygiene**<br>It is essential that the post-procedure hand hygiene is performed immediately after glove removal, that is before contact with the environment (because gloves encourage the hands to sweat-out organisms from the skin). |

**Aseptic technique for wound care**

Wound care procedures are highly variable. Typically, a critical aseptic field is employed and practice is dictated accordingly.

**Table 46** Aseptic technique for wound care

| |
|---|
| **1. With clean hands clean trolley surfaces**<br>Clean surface according to local policy to promote a general aseptic field. |
| **2. Gather dressing pack and equipment, place on bottom shelf**<br>Hands are contaminated when gathering equipment from storage cupboards and other places. It's important therefore to gather all equipment before the next performance of hand hygiene. Gathering equipment at this point also allows the trolley to dry properly and saves a little time. |
| **3. Perform hand hygiene**<br>This occurs immediately before assembly of the aseptic field drape and other items in order to promote asepsis. Aseptic field is normally assembled at the point of procedure. |
| **4. Prepare work area**<br>Open pack, place drape on top shelf and position waste bag adjacent to the patient to prevent taking waste across the aseptic field for disposal. |
| **5. Assemble equipment**<br>Assemble equipment and position onto top shelf, protecting key parts. |
| **6. Apply non-sterile gloves**<br>Non-sterile gloves are indicated because Steps 7 and 8 do not involve the touching of key sites or key parts. |
| **7. Position a paper towel or drape under the wound**<br>This will promote asepsis and help protect the surrounding environment from contamination. |
| **8. Remove dressing, expose wound and dispose of dressing into waste bag**<br>Disposing of the dressing here limits the movement of contaminated waste, helping to protect the wider clinical or community environment. |
| **9. Remove gloves and perform hand hygiene**<br>Steps 7 and 8 are 'dirty' procedures and hand hygiene will promote asepsis. |
| **10. Apply sterile gloves**<br>Although not essential, for some small, minor dressings, sterile gloves at this stage will help promote asepsis of the wound. It is important to note that sterile gloves are essential at this stage if the wound requires direct touching with gloved hands. |
| **11. Clean wound**<br>To help protect the wound from colonisation or infection. |

| |
|---|
| **12. Dress wound**<br>To help protect the wound from colonisation or infection. |
| **13. Dispose of equipment, waste and gloves**<br>After ensuring sharps have been disposed of in a sharps container, folding other used equipment and waste into the aseptic field drape and disposing of it in the attached waste bag will minimise the movement of waste and protect the wider working environment. |
| **14. Clean trolley surfaces**<br>Cleaning according to local policy will prevent cross infection. |
| **15. Perform hand hygiene**<br>This will help break any chain of potential cross infection. |

## 7.7 Case Studies

This section sets out case studies to support risk management decision making:

**Summary**

The following risk-management case studies and examples provide practical guidance on how to implement infection prevention and control recommendations and practice statements in practice. The examples are intended to outline a general approach. They do not attempt to cover all areas and the worked examples are not intended to address all of the issues that may require consideration in a particular context.

**This section covers:**

**7.7.1** Risk-management: Case study for hand hygiene in a neonatal intensive care unit

**7.7.2** Risk-management: Case study for glove use, hand hygiene and seasonal influenza vaccination in an office-based practice

**7.7.3** Risk-management: Case study for the prevention of needle-stick injury during surgery at a Model 4 hospital

**7.7.4** Risk-management: Case study for spills management in a busy paediatric ward

**7.7.5** Risk-management: Case study for ESBL *E. coli* sepsis in a neonatal unit

**7.7.6** Risk-management: Case Study for influenza in a long-term care facility

**7.7.7** Risk-management: Case study for *M. tuberculosis*

**7.7.8** Risk-management: Case study for *M. tuberculosis* among immunocompromised patients attending outpatient services

**7.7.** Risk-management: Case study for norovirus outbreak in a long-term residential care facility

**7.7.10** Risk-management: Case study for management of confirmed case of CarbapenemaseProducing Enterobacterales

**7.7.11** Risk Management: Case study for Vancomcin Resistant Enterococcus outbreak in a large Model 4 hospital

**7.7.12** Risk-management: Case study for infection prevention during renovation of emergency department.

### 7.7.1 Risk-management: Case study for hand hygiene in a neonatal intensive care unit

*The neonatal intensive care unit in a large university hospital identifies 2 cases of blood stream infection with Pseudomonas aeruginosa within 1 week. Surveillance cultures identify 6 additional infants colonised with Pseudomonas aeruginosa. Inspection and environmental sampling fail to identify an environmental reservoir. One of the infection prevention and control team observes a staff member wearing artificial fingernails. The staff member agrees to submit samples for culture. An indistinguishable P. aeruginosa is detected. The staff member is new to the unit and has not attended induction or hand hygiene training.*

**Table 47** Case study for hand hygiene in a neonatal intensive care unit

| |
|---|
| **Establishing the context**<br>Context is a NICU as outlined above – infection is high risk in this context. |
| **Risk Assessment - Risk identification**<br>In this case, the risk has been identified as acquisition of *Pseudomonas aeruginosa*. Sampling must continue to identify other infants who become colonised or infected. |
| **Risk Assessment - Risk analysis**<br>One source of the risk is the lack of appropriate hand hygiene practice (wearing artificial nails) by a staff member. Each time this staff member is involved in the care of an infected or colonised infant, there is potential for spread of the infectious microorganism (to other infants and also to staff members). The risk continues until appropriate hand hygiene practices are performed. Neonates in a NICU are at a greater risk of infection than an average patient for multiple reasons including immature immune system and intravascular access devices. Other possible factors contributing to the risk need to be considered (for example line setup, type of hand hygiene products available, reprocessing of equipment, water sources and environment). Existing measure to control the risk need to be identified and reviewed. |
| **Risk Assessment - Risk evaluation**<br>The balance of likelihood (acquisition of *P. aeruginosa*) and consequences (potentially life-threatening infection) identify this as a 'very high risk' situation requiring immediate risk treatment including daily review.<br><br>Sources of *P. aeruginosa* specifically water outlets should be considered and environmental sampling is likely to be appropriate |
| **Risk Treatment**<br>Immediate measures may include the provision of alcohol-based hand rub next to each incubator, introducing clustering of patient-care activities to reduce contact, placing point of use water filters and providing staff education sessions. Artificial fingernails in neonatal intensive care units should not be permitted. Improvements are required in the NICU induction processes. |
| **Monitoring**<br>Hand hygiene compliance could be audited through direct observation by trained observers.<br><br>Ongoing monitoring for new cases of *P. aeruginosa* colonisation or infection and typing of isolates as appropriate. |

### 7.7.2 Risk-management: Case study for glove use, hand hygiene and seasonal influenza vaccination in an office-based practice

*As part of a review of hand hygiene practices during influenza season in a general practice, a general practitioner (GP) identifies a poor rate of compliance with the 5 Moments for Hand Hygiene in her practice. The practice comprises five GPs and two part-time practice nurses. It is common in the practice for staff members to use gloves for contact with people using the service. They change gloves between people. Performing hand hygiene between different care activities for the same person or after removing gloves is not frequent. There is no written guidance on glove use or hand hygiene. There is no policy on vaccination of the workforce for annual seasonal influenza vaccination to be offered or assessed.*

**Table 48** Case study for glove use, hand hygiene and seasonal influenza vaccination in an office-based practice

| |
|---|
| **Establishing the context**<br>Context is as outlined above. GP practice is likely to be visited by people with influenza and other infections who may be infectious both before and after they present with symptoms. The practice is likely to care for people at high risk from influenza virus infection. In this situation it is not possible to eliminate risk of spread of infection including influenza in the practice. |
| **Risk assessment – Risk identification**<br>The risk has been identified as cross-transmission of influenza and other infectious agents. An audit of records of recent patient attendances may assist in identifying if patients with other infectious agents that may pose a risk in the practice have attended. |
| **Risk Assessment – Risk analysis**<br>• Staff in the general practice who have not been vaccinated for seasonal influenza may be at increased risk of contracting influenza from people presenting for care or transmitting it to patients if they are at work whilst infectious.<br>• Each time a person infected with influenza is examined, there is potential for the spread of the infectious agent directly to the unvaccinated healthcare worker or from the glove to the healthcare worker's hand and to the gloves worn when caring for subsequent people. The same applies for other infectious agents spread by contact or droplet routes.<br>• Glove use is not appropriate for all patient contact in the context of standard precautions and does not replace the need for hand hygiene. Inappropriate glove use generates unnecessary waste with environmental impact. Sources of the risk have been identified as inappropriate glove use and the lack of hand hygiene before and after use of gloves.<br>• Existing controls such as availability of alcohol-based hand rub or hand washing facilities, and other sources of risk such as environmental surfaces need to be considered. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a 'very high risk' situation requiring risk treatment. |

**Risk Treatment**

Immediate measures may include:

- Increased provision of alcohol-based hand rub or hand washing facilities, as well as signage at all points of care, staff education in hand hygiene, appropriate use of PPE and environmental cleaning
- Identify if an area in the waiting room can be allocated for segregation of patients with signs and symptoms of influenza-like-illness whilst waiting to see a GP or practice nurses
- Identify which healthcare staff have been vaccinated for influenza and offer it to any of the workforce who haven't been vaccinated
- Promote influenza vaccination with patients for whom vaccination is recommended
- Additional cleaning of the practice to reduce the levels of transient microorganisms
- With a typical patient interaction, the practitioner should complete appropriate hand hygiene before seeing the person. If the person shakes the practitioner's hand, risk should be mitigated by again performing hand hygiene. When attending to the person, hand hygiene is required between all procedures. Gloves should not be used for routine skin-to-skin contact. When gloves are required hand hygiene is required before and after glove use
- The practitioner should also consider that infectious agents which are transferred by droplet routes could also require contact and droplet precautions. The practitioner should ensure that both opened and unopened boxes of gloves and other clinical equipment are stored appropriately to prevent exposure to droplets from infected patients.

Long-term measures may include:

- Development or revision and implementation of hand hygiene, healthcare worker vaccination and environmental cleaning policies. This could be carried out by the GP as practice leader, in consultation with other staff
- A range of environmental controls should be in place to reduce the risk of transmission of influenza for patients visiting the practice; including, the design of the facility for example to maximise space between patients, availability of PPE for staff and patients, routine cleaning of waiting and treatment rooms, and environmental cleaning schedules.

**Monitoring and Review**

GPs and practice nurses should continue to monitor patients for influenza-like illness (ILI) and ongoing ILI surveillance should be heightened during the influenza season.

Systems should be in place which allow for reporting, monitoring and rectifying breaches of infection prevention and control policies.

*For example:* Changes in practice could be monitored through audit of the amount of gloves and quantity of alcohol- based hand rub used and by observational audit of hand hygiene. Repeating the audit to identify if appropriate precautions have been applied to infectious patients at regular intervals would assist in monitoring improvements.

### 7.7.3 Risk-management: Case study for the prevention of needlestick injury during surgery at a Model 4 hospital

*As part of the revision of infection prevention and control policies at a Model 4 hospital, an analysis of the risk of percutaneous blood and body substance exposure during surgical procedures was undertaken. Separate analyses were conducted for different device types and for different members of the surgical team. Surgeons and first assistants were at highest risk for injury, suffering more than half of injuries in the operating room, followed by scrub nurses and technicians, anaesthetists and circulating nurses. Rates of needle-stick injury increased with estimated blood loss and surgery duration. Suture needle injuries were the most common and mostly occurred during wound closure.*

*A considerable number of injuries also occurred while passing sharp instruments hand-to-hand. As many as one-third of devices that caused injuries came in contact with the patient after the injury to the healthcare worker. However, only a small proportion of injuries to surgeons (0.5%) involved hollow-bore vascular access needles, which are defined as 'high risk'.*

**Table 49** Case study for the prevention of needlestick injury during surgery at a Model 4 hospital

| |
|---|
| **Establishing the context**<br>The context is as described – use of sharps in this setting is unavoidable and to the risk must be managed. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified as exposure of healthcare workers to blood and body substances (and potential infection) through suture needle injury. Risks associated with sharps injuries can be increased when the sharp is a hollow-bore needle (for example a hypodermic needle) compared to a solid needle or sharp (for example a suture needle) due to the increased risk of exposure to blood. As a high proportion of devices causing injury came into contact with the patient after injury to the healthcare worker, there could also be a risk of transmission of blood-borne infection to the patient. |
| **Risk Assessment – Risk analysis**<br>The fundamental source of risk is the need to use sharps coupled with the potential for a patient to be a source of infection. The level of risk increases with duration of procedure and amount of blood lost. Other factors that may contribute to the risk are levels of staff training and experience, staffing levels, the existence of a hospital policy for safe use of sharps and compliance with the policy.<br>Other factors that would need to be included in the analysis are existing controls to mitigate risk and other possible causes (for example poor surgical technique increasing blood loss and procedure duration). The risk to patients is mitigated by policies to ensure that exposure prone procedures are not performed by staff who pose a specific risk related to blood borne virus. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a high risk situation so that risk treatment is required. |

**Risk Treatment**

- All healthcare workers should understand their obligation to report all sharps injuries, whether or not there was a risk of exposure to the person cared for. Comprehensive reporting is required to enhance surveillance of possible blood-borne virus (BBV) transmission
- Healthcare workers who are BBV positive and who undertake exposure-prone procedures must be familiar with the current standards of infection prevention and control and have an action plan in place in the event of a potential transmission event that includes reporting the event according to local policies
- Immediate additional measures to treat the risk may include providing staff education, use of blunt suture needles and use of a neutral zone for passing surgical equipment
- Long-term measures may include reviewing local policy on the prevention of needlestick injury and raising awareness of measures to reduce injury among staff members might also be considered. Reviewing the policy on identifying and managing healthcare workers who should not perform exposure borne procedures may mitigate risk to patients.

**Monitoring and Review**

Changes in adverse events could be evaluated by repeating the analysis after implementation of changes. Regular review of training requirements and provision of training can help to sustain good practice.

### 7.7.4 Risk-management: Case study for spills management in a busy paediatric ward

*A visitor to the paediatric ward in a Model 4 hospital notices that the child in the next bed is vomiting and has diarrhoea. The ward is extremely busy and the two nurses on duty are fully occupied. The child's mother has cleaned up spills, but there are still traces of vomit on the bedside table. Later the visitor notices that equipment is being placed on this table. When there is a lull in activity in the ward, the visitor approaches one of the nurses and mentions what she has noticed. The nurse is grateful for the advice and the quiet period is used for more thorough cleaning of surfaces around the vomiting child. The nurse thanks the mother for her assistance.*

**Table 50** Case study for spills management in a busy paediatric ward

**Establishing the context**

In the context of a busy paediatric service contamination of the environment with body fluids cannot be entirely eliminated.

**Risk Assessment – Risk identification**

The risk has been identified as potential cross-transmission of infectious microorganisms through environmental contamination with body fluids.

**Risk Assessment – Risk analysis**

A major component of the risk is that the patient with diarrhoea and vomiting was not provided with a single patient room. A visitor has identified inadequate environmental cleaning resulting in potential contamination of equipment placed on environmental surfaces (bedside table) or hands touching this surface. Leaving equipment on the person's bedside table is not ideal. There is potential for direct or indirect spread of infection to other children, visitors and healthcare workers.

| |
|---|
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood of spread of microorganism and consequences (healthcare associated infection) identify this as a 'high risk' situation requiring risk treatment. |
| **Risk Treatment**<br>Immediate measures include providing the patient with a single patient room as quickly as possible in addition to cleaning and disinfecting the patient's environment and equipment. Improve the overall cleaning capacity on the ward. Encouraging other children and visitors to bring such issues to attention. This could be done through posters and/or discussion with children and carers on admission.<br><br>Long-term measures could include review of role, responsibilities and supervision of environmental cleaning policies and involvement of children/visitors in this review and assessing if the ward has sufficient single-patient room capacity for the service.<br><br>Retrospectively, a review would be undertaken to determine why the child was not placed in a single room as per contact precautions. |
| **Monitoring and Review**<br>Changes in practice could be monitored through performance and monitoring of hygiene audits, observation of child/visitor behaviour and records of recurrence of similar incidents. |

### 7.7.5 Risk-management: Case study for Extended Spectrum Beta-Lactamase *E. coli* sepsis in a neonatal unit

*During a 7-month period, seven infants in a neonatal unit developed blood stream infection from multi-resistant extended spectrum Beta-Lactamase producing (ESBL)* ***E. coli****, and two babies died. Molecular typing revealed that four of the strains were indistinguishable; not all isolates were available for typing. Testing of all babies on the unit at the time of recognition of the outbreak identified two additional babies with ESBL* ***E. coli*** *colonisation. Environmental sampling did not identify any environmental reservoir. The outbreak was brought under control by in-service education and improvement of hand hygiene compliance, and wearing of single-use gloves when babies' nappies were being changed. Nurses agreed to act as the advocates for the babies, and the nurse caring for each baby was authorised to ensure that all attending personnel perform hand hygiene before and after handling the baby, with non-compliance being reported to the relevant line manager.*

**Table 51** Case study for MDR, ESBL and *E. coli* blood stream infection in a neonatal unit

| |
|---|
| **Establishing the Context**<br>In a neonatal unit is it not possible to eliminate the risk of spread of multidrug resistant Gram-negative bacilli entirely, so it must be managed. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified in the context of a risk incident as cross-transmission of ESBL *E. coli* resulting in blood stream infection. Note: that risk identification should not wait until an incident has occurred. |
| **Risk Assessment – Risk analysis**<br>The major source of the risk is transmission between neonates by healthcare workers' hands, with failure to perform hand hygiene when changing nappies by some staff members. Contamination of frequently touched surfaces in the neonatal intensive care unit could also support indirect person to person transmission. Accommodation of colonised babies in the same space as other babies may contribute to spread. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood (spread) and consequences (serious infection) identify this as a 'very high risk' situation requiring immediate risk treatment. |

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|---|
| **Risk Treatment**<br>Immediate measures include review of the application of standard and contact precautions should be applied to all babies in the unit, known colonised with antimicrobial resistant organisms. Audits of practice and provision of in-service education on hand hygiene are required. A review of equipment used and decontamination of reusable invasive medical devices. A review of environmental cleaning and disinfection is required.<br><br>Long-term measures a review of surveillance processes is required to determine why concern was not raised earlier in the outbreak before 7 babies had developed infection. Review if the unit has adequate space, single rooms and storage space and staffing ratio to manage risks of spread of infection. |
| **Monitoring and Review**<br>Changes in rates of infection and colonisation with this strain could be monitored through ongoing surveillance. |

### 7.7.6 Risk-management: Case study for influenza in a long-term care facility

*A cluster of cases of confirmed influenza occurred in a long-term care facility, which were observed after a group activity involving dancing was held in the dining room prior to the midday meal. It was observed that a resident who was unwell with nasal discharge and cough had attended the group activity and had sat at the dining tables. It was noted that during the meal, the ill resident placed used tissues on the dining room table. It was also noticed that a number of residents remained in the vicinity of the dining room post activity as their rooms were a short distance from the dining room. There were no facilities for hand hygiene in the dining room. Six residents reported signs and symptoms consistent with influenza two to three days following the event. Samples from 4 patients were submitted for laboratory testing and Influenza A virus infection was confirmed in 3 of the 4. Two staff members also developed flu like illness. The vaccination coverage of the residents was 66% and for staff was 41.7%.*

**Table 52** Case study for influenza in a long-term care facility

| |
|---|
| **Establishing the Context**<br>As per the above context, it is not possible to eliminate the risk of spread of acute respiratory virus infection in residential facilities, so it must be managed. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified as cross-transmission of influenza virus in the context of a risk incident. Note: that risk identification should not wait until an incident has occurred. |
| **Risk Assessment – Risk analysis**<br>Assembling of a large numbers of residents in one area increases the opportunity for contact and droplet transmission of respiratory virus but is important for the residents overall wellbeing. Attendance at the event by a resident with features of an acute viral respiratory tract infection increased the risk of transmission. Placing used tissues on the table could have increased opportunities for virus transmission. If waste receptacles were used opportunities for transmission would be less. The lack of hand hygiene facilities in the immediate vicinity could have resulted in poor hand hygiene compliance, with staff or residents not decontaminating their hands prior to eating, after sneezing or coughing. Low levels of resident and staff vaccination are likely to have contributed to the infection and to the severity of illness resulting from infection. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a ‘very high risk’ situation requiring additional risk treatment. |

**Risk Treatment**

Note: the Department of Public Health must be notified that there has been an outbreak (Note: this should not wait for laboratory confirmation where there is a pattern of illness consistent with an outbreak).

Other Immediate measures may include:

- Request residents with flu like symptoms to stay in their room as much as possible for the relevant defined period if they have a specific pathogen identified or otherwise until symptoms are resolved for 48 hours & offering them antiviral treatment
- Guideline on use of antiviral treatment and antiviral prophylaxis should be used to minimise risk of infection for residents.
- Providing hand hygiene facilities in common areas and encouraging residents and staff to use them. Regular cleaning and disinfection of high touch surfaces
- Provide waste receptacles in common areas, so people can dispose of tissues immediately after use
- Additional work to promote vaccination to all residents and staff.

Other measures may include:

- Education of staff and residents on the importance of limiting contact with others if they have a flu like illness and reminding staff to stay home if they have a flu like illness
- Checking that visitors do not have symptoms of influenza like illness or other viral respiratory tract infection
- Education of staff and residents on hand hygiene, respiratory hygiene and cough etiquette
- Influenza vaccination of residents and staff
- Displaying posters and signage on hand hygiene and respiratory hygiene around the facility on an ongoing basis.

**Monitoring and Review**

Staff should continue to monitor residents for influenza-like illness (ILI) and ongoing ILI surveillance should be heightened during the influenza season.

Vaccination rates among staff and residents could be monitored, as well as monitoring the difference in case numbers from previous influenza outbreaks and outbreaks after the measures have been put in place.

### 7.7.7 Risk-management: Case study for *Mycobacterium tuberculosis*

*A young male (patient A) with cough and weight loss is admitted to a two-bed room with another person (patient B) on a medical ward in a Model 3 hospital on a Friday night. Patient B has pneumonia. Patient A has just returned from an extended working holiday in Central America, spending time in Mexico, Panama and Bolivia. When he was assessed in the emergency department, he said he had been coughing for a few weeks. He had a recent course of antibiotics from his GP and had improved a bit but had not fully recovered. When the antibiotics had been completed, he continued to be tired and still had the cough. He had been well in the past. When examined he was very thin. He was coughing and short of breath. He had a chest X-ray that showed features of pneumonia on the right side. He started treatment with antibiotics for pneumonia. After a 24 hour stay in the ED he was admitted to the two-bed area on the ward. The medical registrar reviews the patient and requests that a routine sputum sample is sent to the laboratory with a request for culture and sensitivity and testing for M. tuberculosis. Standard precautions are used for all care provided and Patient A mobilises freely around the clinical area.*

*The laboratory contacts the ward on Monday afternoon, to advise the patient's sputum has tested positive for Acid Fast Bacilli (AFBs) and molecular testing has confirmed M. tuberculosis DNA. The provisional diagnosis is pulmonary tuberculosis. The patient is moved to a single-patient room for further care. The IPC Nurse reviews patient placement since admission. The case is notified to the Department of Public Health.*

**Table 53** Case study for *M. tuberculosis*

| |
|---|
| **Establishing the Context**<br>In the context of a Model 3 hospital receiving patients for unscheduled medical care and in particular if there are limited single rooms it is not possible to eliminate the risk of introduction of tuberculosis in the healthcare setting , so it must be managed. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified in the context of a risk incident. Specifically potential exposure of patients and staff to a case of *M. tuberculosis* from a patient attending the emergency department and a number of areas within the hospital. Note: that risk identification should not wait until an incident has occurred. |
| **Risk Assessment – Risk analysis**<br>The sources of risk are a failure to consider the possibility of pulmonary tuberculosis in the ED and failure to request appropriate transmission-based precautions when tuberculosis was suspected after admission to the ward. There was also an apparent lack of awareness that rapid molecular testing for tuberculosis may be available and should be requested for a patient where there is a strong clinical suspicion of tuberculosis. These oversights resulted in a lack of transmission-based precautions applied to Patient A for a period of about 3 days. This is a source of risk to subsequent patients and healthcare workers who had contact with Patient A. It is not clear that Patient A has had a HIV test. If the patient had a drug resistant pulmonary tuberculosis the risk of exposure is greater.<br><br>The laboratory reported the microscopy and rapid molecular tests. The rapid molecular test shows no evidence of drug-resistance but cannot entirely exclude this. Culture will take an extended period. Evaluation and response to the risk should not await the culture report. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a 'very high risk' situation requiring an immediate response. |
| **Treating risks**<br>Immediate measures include advising the person of their working diagnosis and what measures are required to care for them and protect other people including healthcare workers. This includes placing Patient A in a single patient room with appropriately controlled ventilation (if available) with airborne precautions applied in addition to standard precautions and commencing effective treatment promptly. Implementing a care plan to minimise risk of exposure to other patients and healthcare workers when tests or other department (x-ray) visits are required. Identification of patients and staff who may have been exposed and assessment of degree of exposure should commence promptly.<br><br>Long-term measures could include implementation of education and training to raise awareness of clinical features that suggest tuberculosis, the requirements for airborne precautions based on clinical suspicion and the role of rapid testing. |
| **Monitoring and Review**<br>Ongoing surveillance would assist in reducing the risk of subsequent incidents. Retrospective review and review of other contacts and laboratory typing of *M. tuberculosis* isolates to identify unrecognised, linked transmission could also inform future actions. |

### 7.7.8 Risk-management: Case study for *M. tuberculosis* among immunocompromised patients attending outpatient services

*An investigation into the healthcare-associated transmission of **M. tuberculosis** followed reports of molecular typing results suggesting a link between two patients (Patient 1 and Patient 2) with haematological malignancies and active pulmonary tuberculosis (TB). During a review it was found that four oncology patients had spent some hours in the same room as Patient 1. Patient 1's pulmonary TB was not diagnosed for 3 months after he began coughing as clinical findings were attributed to lower respiratory tract infection from other infectious agents or adverse effects of oncology treatments. Testing for **M. tuberculosis** was not requested. Patient 1 was not placed on airborne precautions during this period although he had been an inpatient on 2 occasions and attended the day ward regularly. The investigation found that delayed TB diagnosis in Patients 1 and 2 ultimately resulted in the transmission of **M. tuberculosis** to 10 patients and 9 staff at the hospital he attended.*

**Source:** Based on Malone *et al.* (2004)

**Table 54** Case study for *M. tuberculosis* among immunocompromised patients attending outpatient services

| |
|---|
| **Establishing the Context**<br>The risk of exposure to tuberculosis exists in the healthcare setting and cannot be entirely eliminated, so it must be managed. Such transmission incidents are much more likely to be identified now than in the past because of molecular typing of *M. tuberculosis* isolates. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified as a result of a risk incident – that is cross-transmission of *M. tuberculosis* from a single patient attending a number of clinical facilities. Note: that risk identification should not wait until an incident has occurred. |
| **Risk Assessment – Risk analysis**<br>The sources of risk are the sub-acute presentations of tuberculosis and failure to consider the possibility of tuberculosis when the clinical features are easily attributed to other causes. These resulted in a lack of transmission-based precautions applied to Patient 1, and a source of risk to subsequent patients. |
| **Risk Assessment – Risk evaluation**<br>It is clear from this incident that although the likelihood that any individual patient has infectious tuberculosis may be low, the consequences of failure to identify it are very serious therefore this is a 'very high risk' situation requiring immediate response. |
| **Risk Treatment**<br>Immediate measures include advising the patients affected that their infection may be healthcare associated in addition to information on what measures are required to care for them and protect other patients and healthcare workers. Placing Patient A in a single patient room with appropriately controlled ventilation (if available) with airborne precautions applied in addition to standard precautions and commencing effective treatment promptly. Avoidance of further exposures in outpatient settings when the patient is discharged until he is no longer infectious. Notification of the Department of Public Health as required by legislation. Clear communication with all patients and staff affected and provision of support and treatment as required.<br>Long-term measures could include increasing awareness of tuberculosis generally, educating staff about identifying the high-risk patients for a particular facility, and development of specific protocols. |
| **Monitoring and Review**<br>Ongoing surveillance will assist in reducing the risk of subsequent outbreaks. Routine typing of *M. tuberculosis* isolates can help to identify other incidents of unrecognised, linked transmission. This could also inform future actions. |

### 7.7.9 Risk-management: Case study for norovirus outbreak in a long-term residential care facility

*A resident in a long-term care facility for older people with a mixture of high-dependency and low dependency residents tells the staff of the facility that they have been unwell for over 24 hours with diarrhoea. The resident returned two days previously from an acute hospital with a recent outbreak of norovirus. While ill, the resident attended the communal dining room as well as group activities. The laboratory is called and agrees to test a sample urgently. Later that day norovirus infection is confirmed and **C. difficile** is not detected. The long-term care facility has a policy in place which requires that residents are asked to stay in their room, as much as possible, and minimise contact with other residents, if they appear to have infectious diarrhoea. The facility only has one communal dining area for meals. Staffing to monitor residents who are spending most of their time and taking meals in their rooms is a challenge. The facility assesses all the residents and identifies a further two residents who have diarrhoea. Samples are also submitted on those two residents. All residents who are symptomatic are asked to stay in their rooms and use the toilet facilities in those rooms. The Department of Public Health is notified.*

*Healthcare workers pay particular attention to hand hygiene and appropriate use of personal protective equipment. No further cases are identified. Review of practice reveals low levels of hand hygiene among residents. An education programme is developed and provided to assist in preventing further infections. Cleaning staff, food services and general care staff are notified to report any signs and symptoms of gastroenteritis. Increased cleaning of frequently touched surfaces is implemented to reduce environmental contamination and risk of transmission.*

**Table 55** Case study for norovirus outbreak in a long-term care facility

| |
|---|
| **Establishing context**<br>The risk of introduction of highly transmissible infectious agents into a long-term residential care facility and subsequent spread cannot be eliminated and so it must be managed. The risk is higher when the infectious agents is circulating widely in the community. |
| **Risk Assessment – Risk Identification**<br>In this case, the risk has been identified in the context of a risk incident. The incident was introduction and spread of norovirus. This may be by contact (faecal-oral) transmission or by the droplet route if droplets are generated during the symptomatic stage. Note that risk identification should not wait until an incident has occurred. |
| **Risk Assessment – Risk analysis**<br>One source of risk is the limited practice of hand hygiene by some residents. Each time there is social contact between these and other residents, there is potential for cross- transmission. Inadequate hand hygiene by residents and staff increases potential for the infection to spread through the facility. Healthcare workers and visitors are also at risk of cross-contamination. Return of residents from another facility with a current /recent norovirus outbreak is a source of risk. However, it is not possible to eliminate this risk but it could be managed by asking residents returning to the facility in this context to stay in their rooms as much as possible for some days, be careful about hand hygiene and ask them regularly about norovirus related symptoms. Access to and use of individual patient specific toilet facilities may be important in managing risk. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a 'very high risk' situation requiring risk treatment. |

**Risk Treatment**

Immediate measures may include:

- Communication with residents, significant others and staff to ensure that they are aware of the outbreak
- Ensure all hand washing facilities have soap, water and disposable hand towel available and encourage hand washing
- Raising residents' awareness of the need to tell someone if they have diarrhoea or vomiting and encouraging healthcare workers to be vigilant when residents return from facilities with recent norovirus outbreaks
- For healthcare workers, the following hand hygiene practices are recommended when caring for residents with norovirus infection
  - If gloves have not be worn, use soap and water to facilitate the mechanical removal of virus After washing, hands should be dried thoroughly with a single-use towel
  - If gloves have been worn, a lower density of contamination of the hands would be expected and alcohol-based hand rub remains the agent of choice for hand hygiene
- Ask symptomatic residents to avoid the common dining area and group activities until they are recovered
- Support symptomatic residents to stay in their room and implement relevant elements of contact precautions for the residents who are symptomatic. Closely monitor the other residents for signs and symptoms of norovirus. Some residents may find prolonged periods in a single room alone distressing. Leaving the room to go outside for exercise is very low risk if they avoid contact with other residents.

Long-term measures may include:

- Providing education to residents and visitors on hand hygiene and other infection prevention and control measures
- Education for healthcare workers to raise awareness of the high transmissibility of norovirus, and its capacity to spread very rapidly within long-term care facilities
- Visitors should be requested not to enter the facility if they are unwell.

**Monitoring and Review**

Changes in practice could be evaluated by surveying residents on hand hygiene practice and reviewing the availability and use of soap and/or alcohol-based hand rubs.

### 7.7.10 Risk-management: Case study for management of confirmed case of Carbapenemase Producing Enterobacterales (CPE)

*A liver transplant patient accomodated in a two-bed room at a Model 4 hospital is tested for CPE rectal colonisation as part of the hospital's CPE surveillance programme. The two-bed room shares a toilet and shower with an adjacent 2 bed-room. The patient's primary team and the infection prevention and control team are informed by the laboratory that the patient had CPE. The patient was transferred immediately to a single patient room with ensuite facilities. The patient has been an in-patient for 2 weeks prior to test date but had not been tested previously. He was CPE not detected during a previous admission 2 months previously.*

*As such, the period during which he could potentially have acted as a source of CPE was considered to be from the beginning of the current admission. He has had no known contact with CPE positive patients. Review of records indicates that another patient with the same type of CPE was identified in the adjacent two-bed room 5 weeks previously.*

**Table 56** Case study for management of confirmed case of CPE

| |
|---|
| **Establishing the Context**<br>The risk of CPE acquisition in acute hospital settings is an established risk in Ireland that hospitals have not been able to eliminate, so it must be managed. |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified in the context of a risk incident. Specifically, a known case of CPE that was in a two-bed area and may have acquired CPE in the facility or may have transmitted CPE to other patients in the healthcare facility. Risk identification should not wait for an incident to occur. |
| **Risk Assessment – Risk analysis**<br>One source of the risk is that the patient was sharing a room with multiple other patients. The infected patient is identified as high-risk due to faecal incontinence and wandering behaviours.<br><br>The understanding of the risk related to the fact that the patient was not tested for CPE on admission as per national guidelines. The identification of a previous patient with the same type of CPE associated with the same section of the ward raises concern of a possible environmental reservoir – it is possible that CPE is resident in the ward (typically in the drains/sinks) and that patients are becoming contaminated from this reservoir. Review of molecular typing of this and other recent patient and environental CPE isolates may help to improve understanding of the risk. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood of CPE acquisition and consequences of CPE acquisition identify this as a 'high risk' situation requiring risk treatment. |
| **Risk Treatment**<br><u>Immediate measures</u> include:<br>• Primary team should inform the patient that they are CPE positive and what this means for their care and provide relevant printed / on line information<br>• Arrange for a follow up visit from IPC team members if required and if practical<br>• Place the patient in a single patient room with their own bathroom<br>• Implement contact precautions including the wearing of PPE when appropriate<br>• Limiting movement of this patient and intensifying routine environmental cleaning<br>• All healthcare workers should be provided with education about infection prevention and control strategies for CPE<br>• Review national guidance on measures to prevent transmission of CPE<br>• Review why testing for CPE was not performed on admission<br>• If the two cases are considered linked this represents an outbreak and should be notified to the Department of Public Health. |

Other measures:

- Convene an incident management group /outbreak control team
- If other patients are assessed as at specific increased risk of CPE acquisition inform them of this and institute appropriate testing
- Carry out hand hygiene, transmission-based precautions and hygiene audits and check pillow and mattress integrity
- Consider ward discharge testing for a period of time (for example 4 weeks) to monitor for ward-associated CPE acquisition
- Confirm that the bed-pan washer is working correctly and that all water drainage points are draining quickly and completely
- Sample the environment in particular moist areas in the shared bathroom/toilet and, if appropraite, the kitchen
- Send the relevant isolates for typing including environmental isolates if any detected
- Review antimicrobial use in the unit to assess if there is potential to improve antimicrobial use
- Take any necessary measures required to manage the potential for exposed patients to serve as as source of CPE for other patients
- An alert should be placed in their medical history for the CPE case. Take any necessary measures required to manage the potential for exposed patients to serve as as source of CPE for other patients
- Review education and training about the need for testing CPE colonisation.

**Monitoring and Review**

- The healthcare facility should implement a surveillance programme to monitor the development of transmission of CPE. Healthcare workers adherence to infection prevention strategies should also be monitored. The surveillance programme should inform subsequent review.
- The healthcare facility can also review and monitor their antimicrobial prescription/use trends and use audit systems to identify inappropriate antimicrobial use.

### 7.7.11 Risk Management: Case study for Vancomycin Resistant Enterococi (VRE) outbreak in a large Model 4 hospital

*Two months ago a patient colonised with VRE was admitted to the ICU of a Model 4 hospital as an emergency. They were placed in an open area and in the centre of the ICU because no single room was available. There was an episode of gross faecal soiling of the patient environment while the patient was in the open area. In the following 4 weeks patients with previous samples reported VRE not detected tested positive for VRE. Standard infection prevention and control procedures are in place. The Department of Public Health were notified of the outbreak and an OCT was convened by the hospital manager. Introducing additional control measures brought the outbreak under control. In total, 15 patients appear to have acquired VRE in the ICU (VRE not detected on admission but detected subsequently before discharge). The outbreak was terminated within 6 weeks.*

**Table 57** Case study for VRE outbreak in a Model 4 hospital

| |
|---|
| **Establishing the Context**<br>It is not possible to eliminate the risk of introduction and spread of MDRO in ICU, so it must be managed |
| **Risk Assessment – Risk identification**<br>In this case, the risk has been identified as cross-transmission of VRE in the context of a risk incident – specifically an outbreak of VRE. Risk identification should not await the occurrence of a risk incident. |
| **Risk Assessment – Risk analysis**<br>The source of the risk is introduction of patients colonised with MDRO coupled with a vulnerable patient population (intensive care unit) and limited isolation facilities. Each time there is contact with an infected patient there is potential for cross-transmission to the healthcare workers and/or other patients. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood of introduction and spread and consequences of spread identify this as a high risk situation requiring risk treatment. |
| **Risk Treatment**<br>Immediate measures to control the outbreak may include:<br>• Informing patients of their VRE status and the VRE outbreak<br>• Review of practice of standard precautions and transmission-based precautions including observational audit and feedback<br>• Audit of equipment cleaning and how easily cleanable the equipment is<br>• Formation of a VRE Outbreak Control Team<br>• Increased testing for VRE colonisation and prioritisation of samples in the laboratory<br>• Relevant typing of VRE<br>• Increased cleaning<br>• Consider testing the environment for VRE<br>• Consider antibiotic restrictions (third-generation cephalosporin's and vancomycin).<br>In the long-term, review of isolation facilities in the ICU, review/restrict antibiotic use, institute targeted screening and increase environmental cleaning efficiency and frequency. |
| **Monitoring and Review**<br>Repeated testing for VRE and appropriate typing of isolates when required will identify further incidents of transmission and indicate how effective risk treatment measures are. |

### 7.7.12 Risk-management: Case study for infection prevention during renovation of emergency department

*An emergency department in a Model 3 hospital needs renovation. The work involves construction of new walls and major cabling activities, so will result in a moderate to high level of dust generation.*

**Table 58** Case study for infection prevention during renovation of emergency department

| |
|---|
| **Establishing the Context**<br>The risk to patients from dust related to the performance of this kind of work cannot be eliminated in the context of ongoing clinical service provision on the site. Therefore it must be managed. |
| **Risk Assessment – Risk identification**<br>The key risk identified is invasive aspergillosis. The concentration of aspergillus and other fungal spores will likely increase during the renovation activities and may infect at-risk patients. In this case, the risk has been identified by anticipation in absence of any risk-incident. The risk will vary over time and the activities where there is interruption of ceiling space will have higher risks than others. |
| **Risk Assessment – Risk analysis**<br>The extent of the risk may depend upon the nature of the renovation, the location of the patient population in relation to the renovation site, the type of ventilation systems in place and the identification of possible sites of contamination (for example ceiling dust, service shafts, inadequately filtered air supply, gaps in integrity of the fabric of the room including unsealed vents or windows) and their locations. It is also important to consider the profile of patients likely to attend the ED as the risk is greater for immunocompromised patients. |
| **Risk Assessment – Risk evaluation**<br>The balance of likelihood and consequences identify this as a high risk situation requiring risk treatment to mitigate risk. The risk treatment should be addressed during the planning phase of this project and included a system for immediate response to any risks identified during the work. |

**Risk Treatment**

Measures to prevent infections during the renovation period include:

- Establishing a multidisciplinary team including infection prevention and control experts and project staff who must be consulted early in the planning phase and then during all stages of the project
- Review relevant guidance on managing risk of aspergillosis in context of building works. The grade of the works must be known and appropriate preventative measures identified and agreed prior to the work starting. The measures should be implemented and audited during the works
- Review need for baseline environmental monitoring before works commence and consider requirements for monitoring during the works
- Options for safe placement of at-risk patients and staff need to be identified before work starts
- Provide an induction programme to address infection risks for all contractors (HPSC National Guidelines for the Prevention of Nosocomial Aspergillosis)
- Ensure all healthcare and construction staff are aware of the necessary precautions as well as relevant workplace health and safety requirements for training and personal protective equipment
- Completing all renovation barriers before the renovation begins
- Minimise dust generation during construction work by use of measures such as wet drilling, dampening ground, dampening and covering soil or debris for removal, use of wet cement, removal of waste in clean covered containers
- Wet mop or vacuum (with a High Efficiency Particulate Air filtered vacuum cleaner) frequently during periods of renovation activity to minimise tracking
- Place a dust-mat at the entrances and exits to all work areas
- Monitoring dust levels in work area and in adjacent areas and where high-risk patient services are located
- Monitor movement of materials and workers into and out of the construction/renovation area.

**Monitoring and Review**

Active monitoring is required throughout the construction period to ensure that risk-treatment measures agreed are adhered to.

# Appendix 8: Monitoring and audit

The purpose of the audit process is to assess the adherence of the healthcare facility to the recommendations in this guideline. Because of the nature of the recommendations the audits are audits of process in all cases. The frequency with which audits are performed and the priority given to audit of individual recommendations should be based on institutional risk assessment taking account, in particular, of issues identified in previous audits as well as reported incidents and complaints.

**Table 59** Monitoring and audit

| Recommendation | Audit Criteria | Description |
|---|---|---|
| 1 | Process | Observational audit of hand hygiene by trained auditor. |
| 2 | Process | Audit of alcohol content of hand rubs by trained auditor. |
| 3 | Process | Observational audit of hand hygiene by trained auditor. |
| 4 | Process | Observational audit of hand hygiene by trained auditor. |
| 5 | Process | Audit of cleaning guidance and spills management training. Opportunistic observational audit of practice by a person with IPC training may be possible if present when an event occurs. |
| 6 | Process | Audit of cleaning guidance and spills management training. Observational audit of cleaning practice. |
| 7 | Process | Periodic audit of appropriateness of use of hydrogen vapour disinfection if used. |
| 8 | Process | Periodic audit of appropriateness of ultra-violet light disinfection and of ultra-violet light in combination with sodium hypochlorite hydrogen vapour disinfection if used. |
| 9 | Process | Periodic audit of appropriateness of use of surfaces, fittings or furnishing containing materials with antimicrobial properties if used. |
| 10 | Process | Periodic observational audit. |
| 11 | Process | Periodic audit of procedures and training and observational audit. |
| 12 | Process | Periodic audit of procedures and training and observational audit. |
| 13 | Process | Periodic audit of procedures and training and observational audit. |
| 14 | Process | Periodic audit of procedures and training and observational audit. |
| 15 | Process | Periodic audit of procedures and training and observational audit. |
| 16 | Process | Periodic audit of procedures and training and observational audit. |
| 17 | Process | Periodic audit of procedures and training and observational audit. |
| 18 | Process | Periodic audit of procedures and training and observational audit. |
| 19 | Process | Periodic audit of procedures and training and observational audit. |
| 20 | Process | Periodic audit of procedures and training and observational audit. |
| 21 | Process | Audit of the IPC aspects of project planning for representative major capital developments. |

# Appendix 9: Glossary of terms and abbreviations

**Table 60** Glossary of terms and abbreviations
The following abbreviations are used in this document:

| Abbreviation | Term |
|---|---|
| **ADON** | Assistant Director of Nursing |
| **AGPs** | Aerosol Generating Procedures |
| **ABHR** | Alcohol Based Hand Rub |
| **AMR** | Antimicrobial resistance |
| **AMRIC** | Antimicrobial Infection control |
| **ASTM** | American Society for Testing and Materials |
| **ATP** | Adenosine Triphosphate |
| **BSI** | Bloodstream infections |
| **BBV** | Blood Borne Virus |
| **CAUTI** | Catheter associated urinary tract infections |
| **CDC** | Centres for Disease Control |
| **CE** | Conformité Européenne |
| **CEO** | Chief Executive Officer |
| **CEU** | Clinical Effectiveness Unit |
| **CJD** | Creutzfeldt Jakob disease |
| **CPE** | Carbapenemase Producing Enterobacterales |
| **CVC** | Central Venous Catheter |
| **DOH** | Department Of Health |
| **DON** | Director of Nursing |
| **EN** | European Norm |
| **EPP** | Exposure Prone Procedures |
| **ESBL** | Extended Spectrum Beta-Lactamase |
| **FFP** | Filtering Facepiece |
| **GDG** | Guideline Development Group |
| **GM** | General Manager |
| **GP** | General Practitioner |
| **HBV** | Hepatitis B Virus |
| **HCAIs** | Healthcare Associated Infections |
| **HCRW** | Healthcare Risk Waste |
| **HCV** | Hepatitis C Virus |
| **HCW** | Healthcare worker |
| **HEPA** | High Efficiency Particulate Air |
| **HIQA** | Health Information Quality Authority |
| **HIV** | Human Immune Deficiency Virus |
| **HPSC** | Health Protection Survillence Centre |
| **HSE** | Health Service Executive |

| | |
|---|---|
| **ICGP** | Irish College of General Practitioners |
| **ICT** | Information and Communications Technology |
| **IHI** | Institute for Healthcare Improvement |
| **iNAP** | Ireland's National Action Plan for Antimicrobial Resistance |
| **IPC** | Infection Prevention Control |
| **IPCI** | Infection Prevention Control Ireland |
| **IPCN** | Infection Prevention Control Nurse |
| **ISCM** | Irish Society of Clinical Microbiology |
| **ISO** | International Organization for Standardisation |
| **m** | Metre |
| **MDRGN** | Multi Drug Resistant Gram-negative |
| **MDRO's** | Multi Drug Resistant Organisms |
| **MRSA** | Meticillin resistant *Staphylococcus aureus* (methicillin is an alternative spelling) |
| **NCEC** | National Clinical Effectiveness Committee |
| **NHS** | National Health Service |
| **OCT** | Outbreak Control Team |
| **PEP** | Post-Exposure Prophylaxis |
| **PFPSI** | Patients For Patient Safety Ireland |
| **pH** | Potential of hydrogen |
| **PICC** | Peripherally inserted central catheter |
| **PICO** | Population, Intervention, Comparison/control, Outcome |
| **PPE** | Personal Protective Equipement |
| **TBP** | Transmisison based precautions |
| **RCPI** | Royal College of Physicians in Ireland |
| **RMDs** | Reusable medical devices |
| **SI** | Statutory Instrument |
| **SSAI** | Surveillance Scientist Assocation Ireland |
| **SSI** | Surgical Site Infection |
| **TB** | Tuberculosis |
| **UK** | United Kingdom |
| **US** | United States |
| **UV** | Ultraviolet |
| **v/v** | Volume per volume |
| **VAP** | Ventilator associated pneumonia |
| **VRE** | Vancomycin-resistant enterococci |
| **WHO** | World Health Organisation |

# Appendix 10: HSE AMRIC Governance Structures

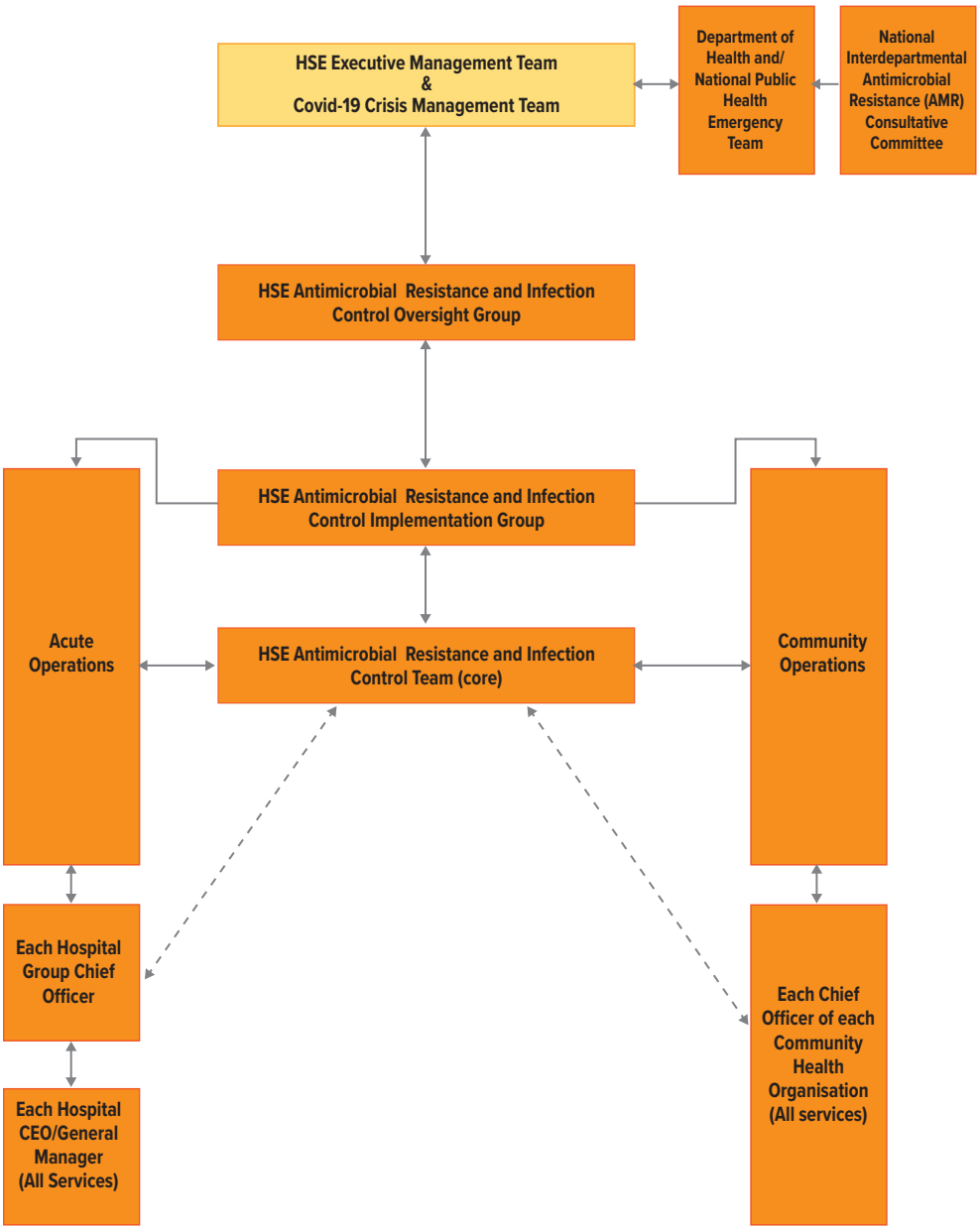


**Figure 7** HSE AMRIC Governance Structures

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