AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Selected best practices and suggestions for improvement for clinicians and health system managers

Hospital-Acquired Complication **3**

HEALTHCARE-ASSOCIATED INFECTIONS

	HOSPITAL-ACQUIRED COMPLICATION	RATE[a]
1	Pressure injury	10
2	Falls resulting in fracture or intracranial injury	4
3	Healthcare-associated infection	135
4	Surgical complications requiring unplanned return to theatre	20
5	Unplanned intensive care unit admission	na[b]
6	Respiratory complications	24
7	Venous thromboembolism	8
8	Renal failure	2
9	Gastrointestinal bleeding	14
10	Medication complications	30
11	Delirium	51
12	Persistent incontinence	8
13	Malnutrition	12
14	Cardiac complications	69
15	Third and fourth degree perineal laceration during delivery (per 10,000 vaginal births)	358
16	Neonatal birth trauma (per 10,000 births)	49

a per 10,000 hospitalisations except where indicated
b na = national data not available

This hospital-acquired complication includes the diagnoses of*:

Healthcare-associated infections and hospital-acquired infections

Healthcare-associated infections are infections that are acquired in healthcare facilities (known as nosocomial infections) or that occur as a result of healthcare interventions (known as iatrogenic infections). Healthcare-associated infections may become evident after a person leaves the healthcare facility.[1]

A hospital-acquired infection is a type of healthcare-associated infection and refers specifically to infections that are acquired in hospital.

Why focus on hospital-acquired infections?

Each year, a large number of hospital patients in Australia experience a healthcare complication in the form of a hospital-acquired infection. In 2015–16, 60,037 hospital-acquired infections were diagnosed in Australian public hospitals,[2] affecting one in every 74 hospitalisations.†[2] Hospital-acquired infections are one of the most common complications affecting hospital patients, and greatly increase morbidity and mortality, as well as the risk of readmission within 12 months.[3] For example, an intensive care unit patient with

* The specifications for the Hospital-Acquired Complications list providing the codes, inclusions and exclusions required to calculate rates is available on the Commission's website.

† Data reported within the hospital-acquired complications fact sheet are derived from the admitted patient care national minimum data set. Data on healthcare-associated infections are also monitored through hospital-based laboratory information systems. The rates produced using these two data sources may differ due to the purpose of the data set, method of data collection and way in which the data are analysed and reported. Having multiple sources of data is important for quality improvement, as it allows for the identification of an issue through one data set, and then investigation of the issue through a more detailed or focused source of data and clinical engagement.

a bloodstream infection is two to three times more likely to die than those without such an infection[3], and a patient's risk of mortality is at least three times greater if they acquire an infection in hospital.[4]

A hospital-acquired infection may occur in the presence or absence of an invasive procedure or device. Depending on the site of infection, patients with this complication may experience a range of distressing symptoms including fevers, chills, pain, hypotension and dizziness, tachycardia, collapse, delirium, cough, shortness of breath, urinary frequency, diarrhoea, purulent discharges, wound breakdown, and even death.

A hospital-acquired infection often also results in a prolonged hospital stay that is 18.1 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074 each the result of this longer hospital stay involving a hospital-acquired infection may therefore be associated with $37,539 in extra costs.[5]

Preventing hospital-acquired infections therefore presents an important challenge to clinicians and health service managers. Significant reductions in hospital-acquired infection rates are already being achieved in some hospitals through preventative initiatives. The rate for hospital-acquired infections at Principal Referral Hospitals* was 148 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 148 per 10,000 hospitalisations, then 7,165 hospital-acquired infections would be prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the Australian Institute of Health and Welfare's (AIHW)'s) former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

What is considered best practice for preventing hospital-acquired infections?

All hospital-acquired complications can be reduced (but not necessarily eliminated) by the provision of patient care that mitigates avoidable risks to patients.

The **health service organisation** providing services to patients at risk of hospital-acquired infections:

- Has safety and quality systems in place for the prevention, surveillance, management and control of hospital-acquired infections
- Has processes in place to apply standard and transmission-based precautions that are consistent with national best-practice guidelines[6,7]
- Ensures clinicians have access to relevant national best-practice guidelines
- Supports the workforce to undertake ongoing training relevant to the prevention and control of hospital-acquired infections
- Ensures that:
  - suitable equipment, devices and products are available to minimise and effectively manage hospital-acquired infections
  - reusable equipment, instruments and devices are reprocessed in a manner consistent with relevant national and international standards and in conjunction with manufacturer's guidelines

- Ensures a clean and hygienic environment
- Has systems for the safe and appropriate prescribing and use of antimicrobials as part of an antimicrobial stewardship program.

Clinicians caring for patients at risk of hospital-acquired infections:

- Conduct comprehensive clinical assessments in accordance with best-practice time frames and frequency
- Practice standard precautions when caring for all patients in accordance with best-practice guidelines. This includes:
  - perform hand hygiene before and after every patient contact
  - use personal protective equipment when there is a risk of blood or body fluid exposure
  - use and dispose of sharps safely
  - perform routine environmental cleaning
  - clean and reprocess shared patient equipment
  - follow respiratory hygiene and cough etiquette
  - use of aseptic technique
  - handle and dispose of waste and linen safely
- Assess infection risks and employ transmission-based precautions, based on the risk of transmission of infectious agents, in accordance with best-practice guidelines
- Prescribe antimicrobials safely and appropriately
- Partner with patients to involve them in their own care.

URINARY TRACT INFECTION

Urinary tract infection (UTI) refers to an infection affecting the bladder, urethra, ureters or kidneys.

Symptoms of a urinary tract infection may include localised symptoms, such as dysuria, frequency, suprapubic pain, gross haematuria, costovertebral angle tenderness or new or worsening urgency or urinary incontinence, or systemic symptoms such as fever, rigors or delirium.[8]

Hospital-acquired UTIs are one of the most common hospital-acquired complications that occurs in Australian hospitals and a longer length of stay increases the likelihood of developing a UTI.

In 2015–16, hospital-acquired UTIs accounted for 26.6% of all hospital-acquired infections.[2] On average, a patient with a hospital-acquired UTI will remain in hospital for 20.6 days longer than a patient without this complication[2] and a hospitalisation involving a hospital-acquired UTI may therefore be associated with $42,724 in extra costs, with the national average cost per admitted acute overnight stay being $2,074.[5]

The rate for hospital-acquired UTIs at Principal Referral Hospitals* was 47.1 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 47.1 per 10,000 hospitalisations, then 2,757 hospital-

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acquired UTIs in these hospitals would have been prevented, and more when other types of facilities are considered.

Catheter-associated UTIs (CAUTI) are the most prevalent of all hospital-acquired UTIs in Australia, accounting for 80% hospital-acquired UTIs.[9] The main risk factor for a CAUTI is unnecessary catheterisation.[10] However CAUTIs are the most preventable types of UTIs. The duration of catheterisation and the place where catheter was inserted in the hospital, as well as gender (female) and other comorbidities (diabetes), also may increase a patient's risk of acquiring a CAUTI during their hospital stay.[11] For a CAUTI to occur, microorganisms need to enter the catheter system either extraluminally (contamination of the catheter at the time of insertion by microflora and other organisms from perineal region) or intraluminally (contamination caused by the manipulation of the catheter or drainage system post insertion).

Key strategies to prevent CAUTIs include[12]:

- Insert catheters only for clinically appropriate indications
- Select most appropriate catheter for the patient in terms of size, length, material and drainage system
- Ensure that catheter insertion is done only by clinicians who have demonstrated competence in aseptic technique and catheter insertion
- Insert catheters using aseptic technique
- Clearly document the indication for the catheter insertion, review or removal time, and details of the insertion, that is person inserting the catheter, date, time and gauge of catheter
- Following catheter insertion:
  - ensure the catheter is secured to the patient
  - maintain a closed drainage system and unobstructed urine flow (that is, no kinking, no backflow, drainage bag should not more than ¾ full at any time)
  - catheters and the drainage system should only be handled using aseptic technique and sampling port should be used to collect urine samples if needed
  - ensure that the insertion site and peri-urethral care is washed and checked daily
- Leave the catheters in place only for as long as needed and regularly review the need for catheterisation at least daily.

Consider adopting quality-improvement initiatives to enhance appropriate use of indwelling catheters and reduce the risk of CAUTI, such as[13,14]:

- Use of portable ultrasound devices to assess urine volumes
- Pre-insertion decision support tool and catheter restriction protocols
- Checklists for urinary catheter insertion and maintenance urine specimen collection decision support tool
- Alerts or reminders
- Stop orders
- Protocols for nurse-directed removal of unnecessary catheters
- CAUTI surveillance with feedback to clinical services.

Practices that are not recommended:

- Changing urethral catheters at routine, fixed intervals (clinical indications include infection, obstruction, or compromise of closed system)
- Routine antimicrobial prophylaxis for catheter insertion
- Bladder irrigation with antimicrobials
- Routine screening for asymptomatic bacteriuria.

Risk factors for CAUTI[15,16]

Host factors

- Female
- Increasing age
- Impaired immunity
- Diabetes mellitus.

Modifiable factors

- Prolonged catheterisation
- Disconnection of drainage system
- Lower professional training of inserter
- Placement of catheter outside operating theatre.

Issues to monitor for prevention and management

- Document clinical need for catheterisation
- Ensure insertion site and peri-urethral care is cleaned as part of daily hygiene
- Ensure there are no kinks or blockages in the catheter.

ACSQHC resources:

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016)

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

SURGICAL SITE INFECTION

Surgical site infection refers to an infection that occurs in the region of the body where prior surgery has been performed. It may or may not be associated with an indwelling device, such as a surgical drain.

Surgical site infection is one of the most common complications associated with surgery. In Australia, infection of the surgical site occurs in approximately 3% of surgical procedures.[17] Each year, patients in Australia experience a large number of hospital-acquired surgical site infections, with 5,596 occurring in public hospitals in 2015–16.[2]

Surgical site infections can cause significant distress for patients as they may experience drainage of pus or unpleasant smelling fluid from the wound, as well as localised heat, swelling, redness, pain and tenderness to touch, as well as systemic symptoms of fevers, sweats and chills, nausea and vomiting, as well as confusion.

Surgical site infections also prolong length of stay. A patient with a surgical site infection may need additional antimicrobial treatment, or may require further surgery, particularly if grafts or implants have been compromised, or may need to be readmitted to hospital which involve considerable physical and emotional burden for the patient. Additionally, there is also a higher risk of mortality associated with surgical site infections, particularly among elderly patients.[17]

Patients with a hospital-acquired surgical site infection remain in hospital for 20.3 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a surgical site infection may be associated with $42,102 in extra costs.

The rate for hospital-acquired infections at Principal Referral Hospitals* was 13.9 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 13.9 per 10,000 hospitalisations, then 786 hospital-acquired surgical site infections in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors[18]	**Host factors** • Existing infection • Low serum albumin • Increasing age • Obesity • Malnutrition • Smoking • Immunosuppression • Diabetes mellitus and glucose control • Excessive alcohol consumption • Intravenous drug use • Chronic liver disease • Chronic renal failure • Ischaemia secondary to vascular disease or radiation. **Procedural factors** • Site of wound and wound class • Presence of drains • Extent of wound • Prolonged surgery • Interference with wound or dressing intra or postoperatively • Inappropriate use of antimicrobial prophylaxis.
Preoperative patient optimisation may include, depending on procedures	• Glucose and ulcer control in diabetic patients • Controlling nidi of infection • Addressing malnutrition and obesity • Optimising skin condition • Improving vascular status • Smoking cessation • Modifying intake of immunosuppressive drugs • Short preoperative hospital stay such as admission on day of surgery.[19]
Intra-operative patient optimisation may include, depending on procedures[20]	• Antibiotic prophylaxis for caesarean section and hernia repair • The timing of prophylactic intravenous antibiotics administered before caesarean incision • Not using adhesive curtains.
Postoperative patient optimisation may include, depending on procedures[21]	• Ensuring wound dressings are not interfered with • Control blood glucose during the immediate postoperative period.

ACSQHC Resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016).

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Australian Commission on Safety and Quality in Health Care. Approaches to Surgical Site Infection Surveillance: For acute care settings in Australia. Sydney: ACSQHC; 2017.

PNEUMONIA

Pneumonia refers to an infection of the lungs.

Each year, patients in Australia experience a large number of episodes of hospital-acquired pneumonia, with 17,854 occurring in public hospitals in 2015–16.[2]

Pneumonia can cause significant distress for patients as they may experience cough producing phlegm that may be streaked with blood, laboured breathing, chest pain, increased heart rate, as well as systemic symptoms of fevers, sweats and chills, fatigue, anorexia, nausea and confusion. While hospital-acquired pneumonia frequently presents with generic symptoms it is associated with a high mortality rate.[22]

Hospital-acquired pneumonia also prolongs length of stay. Patients with a hospital-acquired pneumonia remain in hospital for 19.0 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired pneumonia may be associated with $39,406 in extra costs.

The rate for hospital-acquired pneumonia at Principal Referral Hospitals* was 46.6 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 46.6 per 10,000 hospitalisations, then 2,830 episodes of hospital-acquired pneumonia in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors for pneumonia[23]

Host factors

- Severity of underlying illness
- Presence of multiple co-morbidities
- Increasing age
- COPD
- Multi-trauma
- Poor general condition
- Diabetes
- Malignant diseases
- Immunosuppression
- Smoking
- Colonization of the oropharynx with pathogenic organisms.

Modifiable factors

- Mechanical ventilation for >48 hours
- Admission to an ICU
- Duration of hospital or ICU stay.

Additional risk factors for ventilator-assisted pneumonia (VAP)

Host factors

- Supine positioning
- Extensive burns
- Mechanical ventilation,
- Cardiothoracic surgery
- Airway Respiratory Distress Syndrome
- Head trauma.

Modifiable factors

- Nasogastric tubes and condensate in ventilator tubing
- Acid-suppressing medications, such as antacids and H2 blockers, that are employed to prevent stress ulcer bleeding in ventilated patients.[22]

Prevention strategies[24]

- Appropriate vaccines where indicated, such as influenza and pneumococcal vaccine
- Allied health interventions including chest physiotherapy and swallowing assessment and management
- Positioning (for VAP)
- Maintaining good oral hygiene (for VAP).[25]

Issues to monitor for management and prevention of pneumonia

- Early identification of the possibility of pneumonia in a hospitalised patient and undertaking appropriate investigations, as clinically indicated, which could include:
  - Respiratory rate
  - Monitor for signs of sepsis: temperature, heart rate, blood pressure
  - White cell count, C reactive protein
  - Arterial blood gases where indicated.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016).

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Note: Further information on aspiration pneumonia can be found in the Hospital-Acquired Complication fact sheet: 6 – Respiratory Complications.

BLOODSTREAM INFECTION

Bloodstream infection refers to the presence of live pathogens in the blood, causing an infection.[6]

Each year, patients in Australia experience a large number of hospital-acquired blood stream infections, with 15,238 occurring in public hospitals in 2015–16.[2]

Bloodstream infections can cause significant distress for patients as they may experience increased heart rate, palpitations, fevers and chills, dizziness, postural hypotension, extreme weakness and lethargy, skin rash, altered mental status with impaired focus and agitation. Bloodstream infections may be a secondary infection as a result of having a CAUTI, surgical site infection or pneumonia.[26]

Hospital-acquired bloodstream infections can prolong length of hospitalisation. Patients with a hospital-acquired bloodstream infection remain in hospital for 20.6 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired blood stream infection may be associated with $42,724 in extra costs.

The rate for hospital-acquired blood stream infections at Principal Referral Hospitals* was 39.5 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 39.5 per 10,000 hospitalisations, then 2,616 hospital-acquired blood stream infections in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors[27]

Host factors

- Immunosuppression
- Increasing age
- Diabetes mellitus
- Debility
- Hypoproteinaemia including hypoalbuminaemia
- Chronic renal failure, in particular haemodialysis
- Chronic liver disease.

Modifiable factors

- Surgical procedures
- Indwelling devices, such as vascular devices and urinary catheters.

Prevention strategies

- Use best-practice guidelines relevant to the procedure
- Use aseptic technique.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016).

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Australian Commission on Safety and Quality in Health Care. Implementation Guide for Surveillance of Staphylococcus aureus Bacteraemia. 2013.

CENTRAL LINE AND PERIPHERAL LINE ASSOCIATED BLOOD STREAM INFECTION

Central line and peripheral line associated blood stream infection refers to a blood stream infection caused by introduction of pathogens into the blood stream via a central or peripheral line.

Each year, patients in Australia experience a large number of hospital-acquired central line and peripheral line associated blood stream infections (CLABSI), with 4,416 occurring in public hospitals in 2015–16.[2]

Blood stream infections associated with intravascular devices can cause significant distress for patients as they may experience increased heart rate, palpitations, fevers and chills, dizziness, postural hypotension, extreme weakness and lethargy, skin rash, altered mental status with impaired focus and agitation. They may also experience tenderness, redness swelling and heat at the insertion site.

Hospital-acquired line associated blood stream infections also prolong length of stay. Patients with a hospital-acquired CLABSI remain in hospital for 16.8 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired infection may be associated with $34,843 in extra costs.

The rate for hospital-acquired infections at Principal Referral Hospitals* was 11.9 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 11.9 per 10,000 hospitalisations, then 804 hospital-acquired CLABSIs in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors

Host factors

- Heavy microbial colonisation of the insertion site that contaminate the catheter during insertion and migrate along the cutaneous catheter track.

Modifiable factors

- Prolonged hospitalisation before the intravascular device is inserted
- Prolonged placement of the device
- Heavy microbial colonisation of the insertion site that contaminate the catheter during insertion and migrate along the cutaneous catheter track
- Heavy microbial colonisation of the cannula/catheter hub, usually secondary to contamination from healthcare workers' hands during care interventions such as injections
- Antibiotic use during catheterisation.[28]

Core prevention strategies[6,29-31]

- Develop guidelines for vascular access device use, insertion and maintenance
- Clearly document the details of the insertion; that is the person inserting the catheter, date and time
- Insert vascular access devices only for appropriate indications
- Leave vascular access devices in place only for as long as needed
- Standard infection control precautions including hand hygiene and aseptic technique when inserting and maintaining vascular access devices
- Use an appropriate skin preparation
- Choose appropriate dressings and change dressings as indicated
- Use full barrier precautions during central line insertion including sterile drapes, gown and gloves.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016).

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Australian Commission on Safety and Quality in Health Care. Implementation Guide for Surveillance of Central Line Associated Bloodstream Infection. 2015.

MULTI-RESISTANT ORGANISMS

Multi-resistant organism (MRO) refers to bacteria that are resistant to one or more classes of antimicrobial agents and usually are resistant to all but one or two commercially available antimicrobial agents.[6]

Each year, patients in Australia develop a large number of hospital-acquired multi-resistant organisms (MROs), with 3,768 occurring in public hospitals in 2015–16.[2]

Patients with MROs experience challenges related to failure to respond to routine antibiotics, causing prolonged therapeutic regimens and use of antimicrobials with potentially problematic side effect profiles.

Hospital-acquired MROs also prolong length of stay. Patients with a hospital-acquired MROs remain in hospital for 29.6 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired infection may be associated with $61,390 in extra costs.

The rate for hospital-acquired MROs at Principal Referral Hospitals* was 8.9 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 8.9 per 10,000 hospitalisations, then 791 hospital-acquired MROs in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors

Host factors

- Increasing age
- Co-morbidities.

Modifiable factors

- Prolonged hospital admission
- Prolonged intensive care unit (ICU) admission
- Exposure to affected patients or their surroundings.

Strategies to prevent transmission of MROs

- Develop guidelines for management of patients colonised or infection with MROs
- Practicing standard precautions including hand hygiene, environmental cleaning and cleaning of patient care
- Practicing transmission based precautions where appropriate
- Implementing strategies to prevent transmission from patients known or suspected to be colonised or infected with MROs including isolation of affected patients. **Note**: Ensure patients are appropriately supported if isolation precipitates anxiety.

Further measures may include:

- Alerts for MRO
- Targeted screening in accordance with agreed protocols
- MRSA decolonisation protocols
- MRO surveillance and timely feedback to appropriate services
- Agreed protocol for MRO clearance
- Auditing of compliance with standard or transmission based precautions
- Communicating infection risk.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016).

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Australian Commission on Safety and Quality in Health Care. Recommendations for the control of carbapenemase-producing Enterobacteriaceae (CPE). A guide for acute care health facilities. Sydney: ACSQHC; 2017.

Australian Commission on Safety and Quality in Health Care. Information for clinicians - Carbapenemase-producing Enterobacteriaceae (CPE). 2017.

Australian Commission on Safety and Quality in Health Care. Information for patients being screened for Carbapenemase-producing Enterobacteriaceae (CPE). 2017.

Australian Commission on Safety and Quality in Health Care. Information for ward staff and after-hours managers Carbapenemase-producing Enterobacteriaceae (CPE). 2017.

Australian Commission on Safety and Quality in Health Care. Information for clinicians and health service managers on the management of Carbapenemase-producing Enterobacteriaceae (CPE). 2017.

National Health & Medical Research Council. Healthcare Associated Infection - Methicillin Resistant Staphylococcus aureus (MRSA): Consumer factsheet. 2013.

National Health & Medical Research Council. Healthcare Associated Infection - Vancomycin Resistant Enterococci (VRE): Consumer factsheet. 2013. Available from: https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/cd33_vre_brochure_131106.pdf.

INFECTION ASSOCIATED WITH PROSTHETICS AND IMPLANTABLE DEVICES

Infections associated with prosthetics and implantable devices refers to infections that are complications related to the insertion and care of medical devices, such as shunts, cochlear implants, pacemakers and insulin pumps.

Each year, patients in Australia experience a large number of hospital-acquired infections associated with prosthetics and implantable devices, with 6,835 occurring in public hospitals in 2015–16.[2]

Infections associated with prosthetics and implantable devices can cause local symptoms pf pain, swelling, tenderness to touch, and redness, as well as systemic symptoms of fevers, sweats and chills, palpitations, dizziness, postural hypotension, decreased urine output, extreme weakness and lethargy, skin rash and altered mental status with impaired focus, confusion and agitation.

Hospital-acquired infections also prolong length of stay. Patients with hospital-acquired infections associated with implantable devices remain in hospital for 19.9 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired infection associated with an implantable device may be associated with $41,272 in extra costs.

The rate for hospital-acquired infections related to implantable devices or prostheses at Principal Referral Hospitals* was 18.1 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 18.1 per 10,000 hospitalisations, then 1,126 hospital-acquired infections associated with prosthetics and implantable devices in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors for infections of implantable cardiac devices[32]

- Diabetes mellitus
- Underlying heart disease
- Use of more than one lead
- Early second procedure.

Risk factors for infections in prostheses

- Bleeds into prosthetic joint
- Duration of procedure
- Requirement for re-operation
- Increasing age.

Issues to monitor for prevention and management

- Fevers or rigors
- Observations: temperature, heart rate, blood pressure
- Wound ooze/dehiscence.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

Australian Commission on Safety and Quality in Health Care. Healthcare Associated Infection. Sydney. ACSQHC; (2016)

Australian Commission on Safety and Quality in Health Care. Infection Prevention and Control Online Modules.

Australian Commission on Safety and Quality in Health Care. National Infection Control Guidance: Non-tuberculous Mycobacterium associated with heater-cooler devices 2017; Second release.

GASTROINTESTINAL INFECTIONS

Gastrointestinal infections refer to infections of the gastrointestinal tract that may be acquired in hospital, especially Clostridium difficile, rotavirus and norovirus.

Each year, patients in Australia experience a large number of hospital-acquired gastrointestinal infections, with 2,863 occurring in public hospitals in 2015–16.[2] The rate of hospital-acquired gastrointestinal infections in Australian hospitals was 6.42 per 10,000 hospitalisations in 2015–16.[2]

Gastrointestinal infections can cause significant distress for patients as they may experience abdominal cramps, nausea and vomiting, diarrhoea, fatigue, lethargy and dehydration.[33]

Hospital-acquired gastrointestinal tract infections also prolong length of stay. Patients with a hospital-acquired gastrointestinal infection remain in hospital for 25.3 days longer on average than patients without this hospital-acquired complication.[2] As the national average cost per admitted acute overnight stay is $2,074[5] each hospitalisation involving a hospital-acquired infection may be associated with $52,472 in extra costs.

The rate for hospital-acquired gastrointestinal infections at Principal Referral Hospitals* was 6.9 per 10,000 hospitalisations in 2015–16.[2] If all Principal Referral Hospitals above this rate reduced their rate to 6.9 per 10,000 hospitalisations, then 540 hospital-acquired gastrointestinal infections in these hospitals would have been prevented, and more when other types of facilities are considered.

* Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the AIHW's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

Risk factors[33]

Host factors

- Immunosuppression.

Modifiable factors

- Exposure to pathogens spread by faecal oral route
- Failure to ensure enteric precautions are followed
- Prolonged hospital admission
- Exposure to antibiotics.

Transmission based precautions

- Practicing standard precautions and relevant transmission based precautions, depending on the pathogen suspected or confirmed, such as:
  - if Clostridium difficile infection is suspected or confirmed – contact precautions are recommended
  - if norovirus is suspected or confirmed – contact and droplet precautions are recommended.

Issues to monitor for prevention and management

- Routinely document hydration status including a fluid balance (intake and output)
- Routinely complete a stool chart
- Where indicated, appropriate blood tests including electrolytes and renal function
- Assess for admission screen
- Prior clinical history including:
  - recently travelled overseas
  - recent surgery
  - admission to a residential aged care facility.

ACSQHC resources

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

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The National Safety and Quality Health Service (NSQHS) Standards (second edition), in particular the Comprehensive Care Standard[1], support the delivery of safe patient care.

The advice contained in the hospital-acquired complication fact sheets aligns with the criteria in this standard, which are as follows:

- Clinical governance structures and quality-improvement processes supporting patient care
- Developing the comprehensive care plan
- Delivering the comprehensive care plan
- Minimising specific patient harms.

Clinical governance structures and quality-improvement processes

to support best practice in prevention and management of hospital-acquired infections

Health service organisations need to ensure systems are in place to prevent hospital-acquired infections through effective clinical governance and quality improvement.

The NSQHS Standards (2nd ed.) describe actions that are relevant to the prevention and management strategies outlined below. These actions are identified in brackets.

Policies, procedures and protocols

Health service organisations ensure policies, procedures and protocols are consistent with national evidence-based guidelines for the risk assessment, prevention, surveillance, management and control of hospital-acquired infections. **(1.27, 1.7, 3.19**)

Best-practice screening and management

Health service organisations:

- Agree on the process and criteria for hospital-acquired infection risk assessment **(3.4, 5.7)**
- Inform the clinical workforce of risk assessment requirements **(3.1b, 5.1b, 5.1c)**
- Identify a format for prevention plans for high-risk patients **(5.4)**
- Identify a management plan format for patients with a hospital-acquired infection. **(5.12, 5.13**)

Identification of key individuals/ governance groups

Health service organisations identify an individual or a governance group that is responsible for:

- Monitoring compliance with the organisation's infection control policies, procedures and protocols **(1.7b, 3.2)**
- Presenting data on the performance of infection prevention and control systems to the governing body **(1.9, 3.2c)**
- Designing and implementing surveillance relevant to the activities of the hospital **(3.4)**
- Overseeing the infection prevention and control system. **(1.25, 1.26, 1.6)**

Training requirements

Health service organisations should:

- Identify workforce training requirements **(1.20a)**
- Train relevant staff on the use of risk assessment, hand hygiene protocols, aseptic technique, use of personal protective equipment, and infection prevention and management plans **(1.20b, 1.20c, 5.1c)**
- Ensure workforce proficiency is maintained. **(1.20d, 1.22, 1.28b)**

Monitoring the delivery of prophylaxis and care

Health service organisations ensure mechanisms are in place to:

- Report hospital-acquired infections **(1.9, 3.4)**
- Manage risks associated with prevention and management of hospital-acquired infections **(3.1b)**
- Identify performance measures and the format and frequency of reporting **(1.9, 3.4)**
- Set performance measurement goals **(1.8a)**
- Collect data on compliance with policies **(1.7)**
- Collect data about hospital-acquired infection risk assessment activities, including whether risk assessment is leading to appropriate action **(3.1, 3.1b, 3.2)**
- Identify gaps in systems for screening patients for hospital-acquired infections, collect data on incidence, prevalence and severity of hospital-acquired infections **(3.2)**
- Provide timely feedback and outcomes data to staff. **(3.2c)**

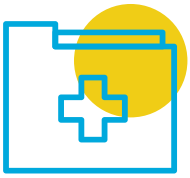
Quality-improvement activities

Health service organisations:

- Implement and evaluate quality-improvement strategies to reduce the frequency and harm from hospital-acquired infections **(3.2)**
- Use audits of patient clinical records and surveillance and other data to
  - identify opportunities for improving hospital-acquired infection control plans **(3.2c)**
  - identify gaps and opportunities to improve the use of hospital-acquired infection control plans **(3.2c)**
  - monitor the overall effectiveness of systems for prevention, management and control of hospital-acquired infections. **(3.2c)**

Equipment and devices

Health service organisations facilitate access to equipment and devices for the prevention and management of hospital-acquired infections. **(3.10)**



Developing the patient's comprehensive care plan

to support best practice in the prevention and management of hospital-acquired infection

Clinicians should collaborate with patients, carers and families in assessing risk, in providing appropriate information to support shared decision making, and in planning care that meets the needs of patients and their carers.

Identifying risk factors for hospital-acquired infections

Clinicians identify risk factors for hospital-acquired infections related to interventions and devices which include[3]:

- Age – premature babies and very sick children
- Age – the frail and the elderly
- Medical conditions, such as diabetes
- Immunosuppression
- Increased length of stay
- Invasive procedures and surgery
- Wounds due to incisions, burns and ulcers
- Medical devices such as urinary catheters, infusions, respiratory equipment and drainage tubes
- High-risk areas such as ICU
- Antibiotic use
- Hand-washing techniques and access to facilities.

Implement risk assessment screening

Clinicians use relevant screening processes at presentation to assess the risk of hospital-acquired infections and requirements for prevention strategies.

Clinical assessment

- Clinicians comprehensively assess:
  - conditions
  - medicines
  - risks identified through risk assessment process.
- Clinicians undertake routine clinical assessments for patients at risk of hospital-acquired infections and document these in the clinical record.

Informing patients with a high risk

Clinicians provide information for high-risk patients and their carers about prevention and management of hospital-acquired infection.

Planning in partnership with patients and carers

Clinicians inform patients, family and carers about the purpose and process of developing a hospital-acquired infection management plan and invite them to be involved in its development.

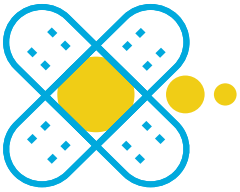
Collaboration and working as a team	Medical, nursing, pharmacy and allied health staff work collaboratively to perform hospital-acquired infection risk assessment and clinical assessment.
Documenting and communicating the care plan	Clinicians document in the clinical record and communicate: • The findings of the risk assessment process • The findings of the clinical assessment process • The infection prevention and management plan.

Delivering comprehensive care

to prevent and manage hospital-acquired infections

Safe care is delivered when the individualised care plan, that has been developed in partnership with patients, carers and family, is followed.

Collaboration and working as a team	Medical, nursing, pharmacy staff and allied health staff collaborate to deliver prevention and management of hospital-acquired infections.
Delivering infection prevention strategies in partnership with patients and carers	Clinicians work in partnership with patients and carers to use the comprehensive care plan to deliver infection prevention strategies where clinically indicated, for example by: • Practising standard precautions • Practising excellent hand hygiene • Practising aseptic technique during interventions • Utilising appropriate personal protective equipment • Implementing strategies to prevent and control transmission.
Delivering infection management in partnership	Clinicians work in partnership with patients and carers to ensure patients who have hospital-acquired infections are managed according to best-practice guidelines.
Monitoring and improving care	Clinicians: • Monitor the effectiveness of these strategies in preventing hospital-acquired infections and reassess the patient if they develop an infection • Review and update the care plan if it is not effective or is causing side effects • Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.



Minimising specific patient harm

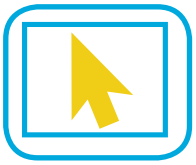
Patients at risk of specific harms are identified, and clinicians deliver targeted strategies to prevent and manage these harms.

Nutrition and hydration

Ensure the nutritional and fluid requirements of the patient are planned, delivered and adjusted as appropriate and the patient's intake is monitored.

Note on data

The data used in this sheet are for hospital-acquired complications recorded during overnight acute episodes of care in Australian public hospitals in 2015-16. Data are included where hospitals were able to identify that the complication had arisen during an admission using the condition onset flag. Figures reported by the Independent Hospitals Pricing Authority (IHPA) may differ due to the IHPA's methodology, which applies different inclusion/exclusion criteria.



Additional resources

Australia:

Principle resource in Australia:

National Health & Medical Research Council, Australian Commission on Safety and Quality in Health Care. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: Commonwealth of Australia; 2010.

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Surgical site infection

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