SECTION 3
RISK IDENTIFICATION OF HEALTHCARE ASSOCIATED INFECTIONS

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3 Risk identification of HAIs

"Risk assessment is one of the cornerstones of infection prevention and control …."
The Joint Commission, 2010 (65)

ESTABLISH THE CONTEXT

IDENTIFY INFECTION RISKS

ASSESS THE RISK OF INFECTION

CONTROL THE RISK OF INFECTION

REVIEW EFFECTIVENESS OF CONTROL MEASURES

Where possible, HOs should use existing risk identification strategies and adopt the principles outlined in this section.

NSW Health
Health Risk Assessment

A HAI may occur if a susceptible person acquires a sufficient quantity of a microorganism from either:

- another person;
- the environment; and/or
- from another site on the body.

It is important to initially determine and continually review any risks that promote the transfer and spread of microorganisms and any risks that promote the acquisition of an infection by a susceptible person. As new and emerging evidence identifies infection risks to patients and whether they increase the risk of HAIs, these must be considered when assessing the effectiveness of control measures. Infection risks may be associated with:

- the individual patient;
- shared patient care equipment;
- contaminated foods, medications or water sources;
- inadequately reprocessed reusable medical device;
- cleaning of the functional area;
- the providing care; and
- the patient's family, carer or visitors.

3.1 Risk assessing the patient

The patient may be:

- the source of an infection and may promote the transfer of infectious material or
- the target of an infection (i.e. a susceptible host) and have risk factors that promote the acquisition of an infection

Infectious diseases and the risks:

- determine if the patient is suspected, probable or confirmed as having an infectious disease that is communicable
- review the period of communicability and the way the infectious diseases are transmitted to others at risk
- determine the type of room accommodation e.g. single room with ensuite
- determine the type of precautions required and the duration of these precautions
- determine patient education requirements to prevent transmission to others

It is important to determine whether a patient is a source of infection as early as possible to prevent the spread of infection to others. The following questions could be used to establish whether the patient is at risk of transmitting infection to others and the environment:

- Is the patient known or suspected of being colonised or infected with an MRO or communicable disease or risk of classical Creutzfeldt Jacob disease (CJD)?
- Has the patient been screened for a MRO previously?
- Has the patient recently received or is currently taking antimicrobials?
- Is the patient coughing and/or has a fever and /or have a rash?
- Is the patient vomiting or has diarrhoea?
- Does the patient have any open wounds?
- Does the patient have any invasive devices?
- Is the patient a resident of a residential care facility?
- Is there a history of recent overseas travel or overseas hospitalisation?

A patient's susceptibility to an infection is affected by a number of factors. To establish whether a patient is susceptible to infection, clinicians should consider the following risk factors:

- **Age:** In general, immunity is less effective in infants (<2 years) and the elderly (> 65 years). Therefore, these individuals are less likely to mount a strong antibody response to counter an infection.
- **Presence of wounds, ulcers, burns or exfoliative skin conditions:** Skin is a physical defence against infection. Breaches to the skin provide an access portal for infection.
- **Invasive devices:** Invasive devices are an access portal for microorganisms. The longer the dwell time for an invasive device, the greater the risk of infection acquisition.
- **Co-morbidities:** Certain conditions and behaviours, such as immunodeficiency, diabetes and smoking, impair the immune response and increase the propensity for infection.
- **Medications:** Medications, such as chemotherapy and immunosuppressant medications, preclude normal immune responses.
- **Nutrition and body mass index (BMI):** Malnourished and nutrient deficient individuals, as well as individuals with a high BMI, have an increased susceptibility to infection.
- **Personal hygiene:** Failure to practise hand hygiene may promote contact transmission. Poor perineal hygiene may promote contamination of the urinary tract.
- **Physical contact:** Behaviours that involve intimate physical contact, can increase the likelihood of contact transmission.
- **Exposure to infectious diseases:** Prior exposure or vaccination may protect the patient from the establishment of infection. In some cases, vaccination may also reduce the severity of illness.
- **Travel and medical tourism:** The treating clinician should consider recent travel to an area where communicable diseases or MROs are endemic, including medical tourism.

3.2 Risk assessing the functional area

Functional area is defined as the classification of an area (department/unit/specialty) based on the activity conducted and associated risks.

The transfer and spread of microorganisms to a patient in a specific healthcare environment is largely influenced by the clinical procedures that are taking place and susceptibility of the individual.

When allocating, mixing or moving patients between different functional areas, clinicians should be mindful that the risk assessment for one setting may not be applicable in another setting and additional consideration may be required of the impact and suitability.

Review of the regular auditing program of environmental cleaning, cleaning of shared patient care equipment and actioning any identified gaps should be undertaken when risk assessing the functional area.

Consider adapting the **ACSQHC Aseptic Technique Risk Matrix** to determine the functional area risk rating.

To establish whether a functional area is likely to promote the establishment or spread of a HAI, each functional area in hospitals should be risk assessed with specific consideration to the following matters (32):

- **Procedures:** Performing a highly invasive procedure that breaches the skin and exposes normally sterile body substances and tissue may increase susceptibility to infection.
- **Patient mix:** Consider whether there are certain patients that may be more susceptible to infection than others.
- **Physical environment**: Certain procedures should be carried out in fit-for-purpose settings in order to minimise the risk of transmission (e.g. catheter labs, interventional radiology (IR), operating theatres).
- **Patient Movement:** Constant moving of patients through variable functional areas contributes to the potential for increasing the risk of infection and complicates strategies for control and contain (66).

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3.2.1 Community settings

In the community setting, care may be provided in a clinical environment like community health or oral health clinics or in a non-clinical environment like a private home, residential aged care facility, group home or community hall.

To establish whether the environment is likely to promote the establishment or spread of infection, the following risk factors need to be considered:

- **Procedures:** Performing a highly invasive procedure that breaches the skin and exposes normally sterile body substances and tissue may increase susceptibility to infection.
- **Cleanliness:** Cluttered, unkempt or unhygienic environments are more likely to be a stimulus for development of reservoirs for organisms and a build-up of bioburden. This increases the risk of microorganism transmission and possible infection.
- **Equipment and stock:**
    - Single-use equipment including sharps must be used once only. Where an incomplete portions or sets are used, remaining parts should be disposed of according to current waste management procedures.
    - Sterile products or equipment are to be stored in a manner to maintain their sterility.

    - Single- patient- use devices and equipment can be used multiple times on the same patient following manufacturer's instructions for cleaning between uses
    - Reusing single-use or contaminated sterile equipment and stock increases the risk of infection.
    - Event related sterility applies to all sterile stock (refer to Section 8)
    - During transport and storage, sterile stock should be stored in an environment that maintains the integrity of sterile stock.
    - When storing sterile stock there should be a process for stock rotation to ensure the oldest manufactured date is at the front/top so that it is used first.
    - Do not over stock. Keep storage containers clean, dry and in good condition.
- **Reprocessing of reusable clinical and non-clinical equipment:** Failure to clean and/or reprocess reusable medical devices prior to use on a patient and after use will increase the risk of subsequent transmission.
- **Waste management:** Inappropriate clinical waste disposal may promote the spread of infection.
- **Contacts:** The type of contact between patient or their family and HW, may increase the possibility of microorganism transmission. This is particularly the case if there is poor personal and environmental hygiene.
- **Individual:** Consider whether there are certain individuals that may be more susceptible to infection than others.

This assessment should be done initially before the delivery of any care and then reviewed routinely if ongoing care needs to be provided in the setting.

Case study 5: Elizabeth's story - risk assessing in community settings

Elizabeth, a community nurse, receives a referral to provide daily wound care to Dorothy, an 84 year old lady who lives alone with no carers or family. Dorothy has chronic leg ulcers on both lower legs and has been referred by her general practitioner (GP) who took wound swabs when he visited the previous day. The GP was unable to provide Dorothy's medical history as he has just taken over this patient, however, he states Dorothy reported that she had "golden staph" in her leg ulcers a while ago, and the ulcers are getting worse again. She is now finding it very difficult to do the dressings.

On arrival, Elizabeth observes that Dorothy walks with the aid of a walking stick, and her house is extremely cluttered and unkempt. Elizabeth also observes that Dorothy's bandages are dirty and have unravelled. Her legs appear very wet from wound exudate. The house also has a malodourous smell. Dorothy leads Elizabeth into the lounge room where there doesn't appear to be anywhere suitable for Elizabeth to attend the wound care, place her equipment bag, or set up her dressing equipment.

Elizabeth needs to risk assess the situation using the 5 key actions:

1. **Establish the context**
   - Remember this is a home, not a hospital, and environmental cleaning and waste management may not be frequently attended.
   - Determine whether there are other residents in Dorothy's home.
   - Define the task: removal of the wound dressings and cleaning and redressing of the ulcer.
2. **Identify infection risks**
   - Continuing to use wet and dirty bandages will promote microbial growth and infection.
   - Because of her history of ulcers, Dorothy is susceptible to an infection in her leg.
   - Elizabeth is at risk of being exposed to pathogens and other microorganisms that are present in this environment.
3. **Assess the risk of infection**
   - There is a high risk of a severe infection for Dorothy associated with the wet and dirty wound dressings.
   - There is a moderate risk of transmission of microorganisms if Elizabeth does not comply with infection prevention and control standards when she is attending to Dorothy.
   - The most likely way that either Dorothy or Elizabeth will come in contact with microorganisms and be at risk of an infection is via contact transmission.
4. **Control the risk of infection**
   - To eliminate the risk of Dorothy acquiring an infection, Elizabeth needs to perform the following
     - Hand Hygiene as per Five Moments
     - Remove soiled dressings and dispose appropriately
     - Clean wound area
     - Apply clean dressings as per clinical care standards
     - Ensure the procedure is carried out aseptically
   - To mitigate the risk of exposure to body substances for Elizabeth, she should don appropriate PPE.
   - To prepare for an aseptic procedure it is important that Elizabeth prepare a suitable space (e.g. a coffee table that is cleared and cleaned) Elizabeth will need to perform hand hygiene and set up her aseptic field on a drape on the table.
   - Elizabeth provided education to Dorothy on the importance of hand hygiene, infection prevention and control and how to keep the wound dressing clean as possible.
   - Elizabeth provided feedback to Dorothy's GP that Dorothy may require home assistance as her leg wound is restricting her movements and she does not have any assistance.
5. **Review effectiveness of control measures**
   - Elizabeth advised Dorothy to call her if she thought the dressing was dirty or wet.
   - Ongoing follow up and review to ensure there is no signs of infection.
   - Continued wound management and education
   - Organise home assistance while her leg wound was restricting her movements.
   - Develop escalation process for Dorothy and Elizabeth if condition deteriorates

3.2.2 Ambulance settings

The principles of infection prevention and control equally applies to paramedics and ambulance settings. Where compliance to infection prevention and control principles is hindered by the risk assessment and situation at hand, steps to mitigate the risk of any potential infection are to be applied as soon as practical.

Paramedic and ambulance care is provided in a variety of settings, and with varying degrees of urgency. The environment within an ambulance vehicle may be considered more controlled than that outside the vehicle. It may be difficult to control the transmission risks present outside the ambulance vehicle, however identification of the transmission risk factors should form part of scene safety and patient assessment processes.

To establish whether the environment is likely to promote the establishment or spread of microorganisms that potentially cause infection, the following risk factors need to be considered:

- **Procedures:** Performing a highly invasive procedure that breaches the skin and exposes normally sterile body substances and tissue may increase susceptibility to infection.
- **Cleanliness and hygiene of the environment**: Poor environmental cleanliness and hygiene may impact on the application of aseptic technique in this setting.
    - Cluttered, unkempt or unhygienic environments are more likely to be a stimulus for development of reservoirs for organisms and a build-up of bioburden. This increases the risk of microorganism transmission and possible infection.
- **Equipment and stock:** Certain equipment and stock must be used only if sterile. Maintenance of stock sterility in a crowded, mobile and temperature labile environment is difficult and this issue may increase the risk of infection if it is not managed adequately.
- **Reprocessing of reusable clinical and non-clinical equipment:** Failure to clean and/or reprocess reusable equipment after its use will increase the risk of subsequent transmission to patients as well as HWs.

3.2.3 Patient transport settings

Communal patient transport vehicles (i.e. transports more than one patient at a time) is considered as a community setting for the purposes of this Handbook. Communal patient transport vehicles are akin to outpatient clinic waiting rooms, as a varied mix of patients may be present at any given time. Infection risks in these settings should be identified in line with Section 3.2.1, *Community settings*. For transport of patients with specific MRO should refer to Section 7.18 *Transferring or transporting a patient with a MRO*

All other patient transport vehicles should be considered as similar to an ambulance setting and risk assessed in the same way as an ambulance setting is risk assessed See Section 3.2.2, *Ambulance settings.*

3.3 Risk assessing visitors

Visitors can potentially play a role in introducing pathogens to both patients and the healthcare environment. Visitors may also be at risk of exposure to infection causing pathogens (susceptible), particularly given the following factors:

- **Age:** Young children are often reservoirs of infectious material and should have limited access to functional areas where there are highly susceptible patients (i.e. those unable to mount an immune response).
- **Symptomatic illness:** For most infectious diseases, the shedding of infectious material is often associated with symptomatic illness. Assess visitors for symptoms of infectious

diseases; coughing, sneezing, vomiting, diarrhoea, open wounds or visible exudate particularly in high risk areas.

- **Physical contact**: Frequent and prolonged physical contact is likely to mediate the transfer of microorganisms from the visitor to the patient if personal hygiene is not practiced.
- **Exposure to infectious diseases:** Prior exposure or vaccination may protect the visitor from the establishment of infection. In some cases, vaccination may also reduce the severity of illness.

Risk minimisation strategies regarding visitors should include:

- Hand hygiene practices (see Section 4.1, *Hand hygiene*)
- Respiratory hygiene and cough etiquette (see Section 4.2, *Respiratory hygiene and cough etiquette*)
- Transmission-based precautions (see Section 5, *Risk mitigation: transmission-based precautions*)
- Delay or exclusion of the visitation (e.g. 48 hour delay of visit after cessation of gastroenteritis symptoms).