B1.3 Handling and disposing of sharps

B1.3.1 What are the risks?

The use of sharp devices exposes healthcare workers to the risk of injury and potential exposure to bloodborne infectious agents, including hepatitis B virus, hepatitis C virus and human immunodeficiency virus (HIV) (CDC 2001; Do et al 2003).

Sharps injuries can occur in any healthcare setting, including non-hospital settings such as in office-based practices, home health care and long-term care facilities. Injuries most often occur (CDC 2008):

• during use of a sharp device on a patient (41%);
• after use and before disposal of a sharp device (40%); and
• during or after appropriate or inappropriate disposal of sharp devices (15%).

There are many possible mechanisms of injury during each of these periods.

Hollowbore needles are of particular concern, especially those used for blood collection or intravascular catheter insertion, as they are likely to contain residual blood and are associated with an increased risk for bloodborne virus transmission. Non-hollowbore sharps such as glass vials and butterfly needles have also been involved in sharps incidents (ASCC 2008).

Table B1.9: Examples of sharps associated with sharps injuries in healthcare settings

<table>
<thead>
<tr>
<th>Examples of hollowbore sharps</th>
<th>Non-hollowbore sharps</th>
</tr>
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<tbody>
<tr>
<td>• Disposable needles/ syringes</td>
<td>• Glass vials</td>
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<tr>
<td>• Steel-winged (butterfly) needles</td>
<td>• Dental probes</td>
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<tr>
<td>• Intravenous catheter styles</td>
<td>• Scalpel blades</td>
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<tr>
<td>• Multi-sample blood collection needles</td>
<td>• Suture needles</td>
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<tr>
<td>• Arterial blood collection syringe needles</td>
<td>• Retractors</td>
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<tr>
<td>• Aspiration needles</td>
<td>• Skin or bone hooks</td>
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<tr>
<td>• Injector pen needles</td>
<td>• Sharp electrosurgical tips</td>
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</tbody>
</table>

A survey of occupational exposures in Australian nurses (ASCC 2008) found that in the 12 months prior to the survey, 11.2% of nurses had sustained at least one needlestick or other sharps injury. Eliminating workplace hazard and risk is a fundamental principle of all occupational health and safety (OH&S) legislation in Australia. To limit the risk of sharps injuries, the hierarchy of controls method is a well recognised approach to prevent sharps injuries (CDC 2008; NOHSC (2010 [2003])). The first priority is to eliminate and reduce the use of needles and other sharps where possible. Next is to isolate the hazard, thereby protecting an otherwise exposed sharp, through the use of an engineering control. When these strategies are not available or will not provide total protection, the focus shifts to work-practice controls and PPE. An organisational approach to reducing sharps injuries is discussed in Section C1.5.2 and sharps injuries and post-exposure prophylaxis (PEP) in Section C6.3.
B1.3.2 Handling of sharps

All healthcare workers should take precautions to prevent injuries caused by needles, scalpels and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures.

Standard measures to avoid sharps injuries include handling sharp devices in a way that prevents injury to the user and to others who may encounter the device during or after a procedure. Examples include (CDC 2008):

- using instruments, rather than fingers, to grasp needles, retract tissue, and load/unload needles and scalpels
- giving verbal announcements when passing sharps
- avoiding hand-to-hand passage of sharp instruments by using a basin or neutral zone
- using round-tipped scalpel blades instead of pointed sharp-tipped blades.

The extent to which gloves protect healthcare workers from transmission of bloodborne infectious agents following a needlestick or other puncture that penetrates the glove has not been determined (Siegel et al 2007). Although gloves may reduce the volume of blood on the external surface of a sharp (Mast et al 1993), the residual blood in the lumen of a hollowbore needle would not be affected; therefore, the effect on reduction of transmission risk is not quantifiable (Siegel et al 2007).

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**Recommendations**

<table>
<thead>
<tr>
<th></th>
<th>Safe handling of sharps</th>
<th>Grade</th>
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<tbody>
<tr>
<td>9</td>
<td>Sharps must not be passed directly from hand to hand and handling should be kept to a minimum. Needles must not be recapped, bent or broken after use.</td>
<td>D</td>
</tr>
</tbody>
</table>
Table B1.10: Reducing risks if a sharps injury is sustained

- Seek care immediately if you sustain a sharps injury.
- If skin is penetrated, wash the affected area immediately with soap and water. Alcohol-based handrub can be used to clean the area if soap and water are not available.
- Do not squeeze the affected area.
- Report the incident immediately to your supervisor.
- Ask about follow-up care, including post-exposure prophylaxis, which is most effective if implemented soon after the incident.
- Complete an accident/incident report form, including the date and time of the exposure, how it happened, and name of the source individual (if known).
- If a sharps injury happens to you, you can be reassured that only a small proportion of accidental exposures result in infection. Taking immediate action will lower the risk even further.

**Recommendation**

<table>
<thead>
<tr>
<th>10. Disposal of single-use sharps</th>
<th>Grade</th>
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<tbody>
<tr>
<td>The person who has used the single-use sharp must be responsible for its immediate safe disposal. Used disposable sharps must be discarded into an approved sharps container at the point-of-use. These must not be filled above the mark that indicates the bin is three-quarters full.</td>
<td>D</td>
</tr>
</tbody>
</table>

**B1.3.4 Safety-engineered devices**

A broad range of devices has been designed with built-in safety features that reduce the risk of injury involving a sharp. Examples include devices such as syringes with guards, sliding sheaths, shielded, blunting or retracting needles, blunt suture needles and surgical blades with protective covers.

The use of devices with safety-engineered protective features (e.g., safety or retractable devices) was mandated in the US in 2000 and is thought to have reduced the rate of incidence of needlestick injuries (Jagger et al 2008). Their use has recently been mandated in the UK and Europe, but not yet in Australia. Further research is required on their efficacy in reducing sharps injuries and their impact on patient safety.

**Needleless devices**

Needleless devices do not use needles for procedures such as the collection or withdrawal of body substances after initial venous or arterial access is established, or administering medication or fluids.

Since their adoption in healthcare facilities, needleless devices have contributed to a decrease in percutaneous injuries among healthcare workers (Jagger et al 2008). While it is difficult to assess the overall effect of needleless devices because of the wide variety of devices and systems that are in use, some studies have shown an increased risk of bloodstream infections (BSI) among patients (Rupp et al 2007; Salgado et al 2007).
Unfamiliarity with the use of these complex devices, together with inadequate disinfection procedures, may contribute to increased BSI rates. The CDC recommends that (O'Grady et al 2002):

- the needleless components are changed at least as frequently as the administration set
- caps are changed no more frequently than every 3 days or according to manufacturer's recommendations
- all components of the system are compatible to minimise leaks and breaks
- contamination risk is minimised by wiping the access port with an appropriate antiseptic and accessing the port only with sterile devices.

Disinfection of needleless connectors with chlorhexidine/alcohol or povidone-iodine has been shown to significantly reduce external contamination (Casey et al 2003).

Retractable devices

The use of retractable safety devices on sharps has been associated with a significant reduction in needlestick injury in healthcare settings (Rogues et al 2004; Tuna & Sepkowitz 2006), although their direct impact is difficult to determine because their introduction is often accompanied by other interventions (e.g. training and education, overarching hospital policies and other technologies) that in isolation could also cause a reduction in needlestick injuries (Whitby et al 2008).

Retractable technology is only one example of the broad range of safety-engineered medical devices that have been designed and produced to assist in reducing the risk of occupational exposure to bloodborne pathogens in healthcare.

Implementation of safety-engineered devices must be accompanied by appropriate training and education for healthcare workers in the use of the new technology to achieve successful reduction in percutaneous injury rates (Tuna & Sepkowitz 2006).

B1.3.5 Putting it into practice

Individual actions for reducing the risk

- Explain to patients the risks to healthcare workers and others involved in the use and disposal of sharps and the measures taken to reduce these
- Become familiar with facility protocols on handling and disposal of sharps
- Use the appropriate product for the situation and use it as directed
- Avoid using needles where safe and effective alternatives are available
- Before using any sharp medical device such as needles or scalpel, always plan for their safe handling and immediate disposal at the point-of-use
- Make sure every used sharp medical device such as needles, scalpels etc are disposed of properly in puncture-resistant sharps containers located at the point-of-use
- Report any needlestick or sharps-related injuries promptly as relevant (e.g. to infection control or occupational health and safety professional management, insurer) and ensure that you receive appropriate follow-up care
- Ensure that you are vaccinated against blood-borne viruses such as hepatitis B
- Participate in education sessions and professional development sessions on handling sharps, as well as those on new safety devices and how to use them
Involving patients in their care

The following information may be provided to patients to assist them in becoming involved in identifying and reducing risks related to the handling and disposal of sharps.

- Healthcare workers are at risk of injury and infection when using sharp equipment such as needles and scalpels.
- Healthcare workers take measures to handle sharp devices in a way that prevents injury to the user and to others who may encounter the device during or after a procedure.
- Special containers are used for the disposal of sharp devices.
- It’s okay to question a healthcare worker about the way in which they are handling or disposing of sharp devices.
- Patients will be educated before discharge from hospital about how to safely dispose of sharps used in the home so there is no risk of injury to community members.

Risk-management case study

Prevention of stick injury during surgery at a university hospital

As part of the revision of infection control policies at a university 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 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>
<thead>
<tr>
<th>Eliminating risks</th>
<th>Although the risk of injury varies for different healthcare team members, it is never zero and must be managed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying risks</td>
<td>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. 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 bloodborne infection to the patient.</td>
</tr>
<tr>
<td>Analysing risks</td>
<td>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. Other factors that would need to be included in the analysis are existing controls to mitigate risk (e.g., double gloving) and other possible causes (e.g., poor surgical technique increasing blood loss and procedure duration).</td>
</tr>
<tr>
<td>Evaluating risks</td>
<td>The balance of likelihood and consequences identify this as a ‘very high risk’ situation requiring immediate response.</td>
</tr>
<tr>
<td>Treating risks</td>
<td>Immediate measures may include providing staff education, use of blunt suture needles and a neutral zone for passing surgical equipment, and double gloving during long surgery. In the longer term, reviewing local policy on the prevention of needlestick injury and raising awareness of measures to reduce injury among staff members might also be considered.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Changes in adverse events could be evaluated by repeating the analysis after implementation of changes.</td>
</tr>
</tbody>
</table>
Bl.3.6 Resources

Standards

• AS 4031 Non-reusable containers for the collection of sharp medical items used in health care areas 1992 /AMDT 1 1996
• AS/NZS 4261 Reusable containers for the collection of sharp items used in human and animal medical applications 1994/AMDT 1: 1997

Legislation/codes of practice

• State/territory workplace/occupational health and safety legislation/regulation

Tools and web-based resources

• University of Virginia Health System Internal worker safety centre provides numerous resources on safety devices and the application of their use. http://www.healthsystem.virginia.edu/internet/epinet/about_center.cfm

Bl.3.7 References


### B1.4 Routine management of the physical environment

#### B1.4.1 What are the risks?

Infectious agents can be widely found in healthcare settings and there is a body of clinical evidence, derived from case reports and outbreak investigations, suggesting an association between poor environmental hygiene and the transmission of infectious agents in healthcare settings (Garner & Favero 1986; Dancer 1999). Transmission of infectious agents from the environment to patients may occur through direct contact with contaminated equipment, or indirectly, for example, in the acute-care setting, via hands that are in contact with contaminated equipment or the environment and then touch a patient (Dancer 2008).

Environmental surfaces can be safely decontaminated using less rigorous methods than those used on medical instruments and devices. The level of cleaning required depends on the objects involved and the risk of contamination—for example, surfaces that are likely to be contaminated with infectious agents (e.g. shared clinical equipment) require cleaning between patient uses,