

Standard precautions and infection control

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The aim of this chapter is to provide:

- Detail about standard precautions and infection control guidelines for health care settings
- Guidance on the management of blood and body substance exposures and incidents

Introduction

The potentially infectious nature of all blood and body substances necessitates the implementation of infection control practices and policies. In Australia, infection control guidelines have been developed based on the United States Centers for Disease Control and Prevention model, in terms of 'standard precautions' and transmission based precautions. Standard precautions ensure a high level of protection against transmission of blood-borne viruses in the health care setting and the universal application reduces the potential for stigma and discrimination. Standard precautions are the minimum level of infection control required in the treatment and care of all patients to prevent transmission of blood-borne infections including HIV, HBV and HCV. Standard precautions should be implemented universally, regardless of information or assumptions about a patient's infection status. Additional precautions are further measures required to protect against transmission of infections such as tuberculosis.

This chapter provides a summary of the most recent Australian infection control guidelines endorsed by the Communicable Diseases Network of Australia (CDNA), National Public Health Partnership (NPHP) and Australian Health Ministers' Advisory Council (AHMAC): *Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting*¹. The CDNA guidelines describe in detail the practices and procedures necessary to prevent transmission of blood-borne infections, including HIV, HBV and HCV. Review of these guidelines is strongly recommended for clinicians and other health care workers implementing infection control procedures.

Implementation of standard precautions minimises the risk of transmission of blood-borne and other infections from health care worker to patient, from patient to health care worker and from patient to patient. Infection control guidelines are relevant in social and domestic contexts as well as occupational settings. The clinician should be ready to answer patients' questions about their clinic's infection control policies and provide advice for patients in relation to infection control in their daily environment.

Transmission of blood-borne viruses

The modes of transmission for blood-borne viruses are outlined in Table 13.1 and risk of transmission is discussed in more detail in Chapters 2 and 3.

Key points

- The potentially infectious nature of all blood and body substances necessitates the implementation of infection control practices and policies in the health care setting.
- The universal application of standard precautions is the minimum level of infection control required in the treatment and care of all patients to prevent transmission of HIV, HBV and HCV. These include personal hygiene practices particularly hand-washing, use of personal protective equipment such as gloves, gowns and protective eye wear, aseptic technique, safe disposal systems for sharps and contaminated matter, adequate sterilisation of reusable equipment and environmental controls.
- Vaccination is an important infection control strategy for HBV and HAV; all health care workers should be aware of their immune status and be vaccinated if appropriate.
- Clinicians and other health care workers who regularly perform exposure-prone procedures have a responsibility to be regularly tested for HIV, HCV and HBV if not immune. Health care workers who are aware that they are infected with HIV, HBV or HCV should not perform exposure-prone procedures.
- The current best practice guidelines for infection control procedures in Australian health care settings are outlined in *Infection Control Guidelines for the Prevention of Transmission of Infectious Diseases in the Health Care Setting* (2004).

TABLE 13.1 Precautions for preventing transmission of blood-borne viruses¹

Disease	Mode of transmission	Recommended precautions	Immunisation
HAV	Contact (oral-faecal route)	Standard precautions Additional precautions for incontinent patients	Immunise health care workers at high risk
HBV	Blood-borne (direct contact with blood or body substances)	Standard precautions	Immunise all health care workers. Test for seroconversion 4–8 weeks after 3rd dose of vaccine
HCV	Blood-borne (direct contact with blood)	Standard precautions	No vaccine available
HIV	Blood-borne (direct contact with blood or body substances)	Standard precautions. Additional precautions may be required in the presence of complicating condition (e.g. Tuberculosis)	No vaccine available

Transmission of HBV is approximately 100 times more efficient than transmission of HIV and approximately 10 times more efficient than HCV.

The risk of blood-borne virus transmission is dependent on a number of factors. Incidents involving blood-to-blood contact with infectious blood are associated with a high risk of infection when:

- There is a large quantity of blood, indicated by visible contamination
- There is insertion of a needle directly into a vein or artery or deep cavity
- The patient has advanced HIV disease and/or high HIV viral load; high levels of HBV DNA and detectable HBeAg; HCV RNA detected by PCR

Transmission of blood-borne viruses in the health care setting is generally associated with failure to comply with recommended infection control guidelines and/or cleaning and disinfection protocols. In the case of HCV, patient-to-patient transmission has been associated with endoscopic procedures. The risk of transmission of HIV is estimated to be approximately 0.3% after a percutaneous needlestick injury with HIV-infected blood and 0.09% after a mucous membrane exposure. Transmission of HBV in the health care setting can be prevented through health care worker, patient and community hepatitis B vaccination programs.

Standard precautions

Standard precautions ensure a high level of protection against transmission of infection including blood-borne viruses in the health care setting and are recommended for the care and treatment of all patients and in the handling of:

- Blood including dried blood
- All other body substances, secretions and excretions (excluding sweat) regardless of whether they contain visible blood
- Non-intact skin
- Mucous membranes.

The universal application of standard precautions is the minimum level of infection control required in the treatment and care of all patients to prevent transmission of blood-borne viruses. These include personal hygiene practices, particularly hand-washing; use of personal protective equipment such as gloves, gowns and protective eyewear; aseptic technique; safe disposal systems for sharps and contaminated matter; adequate sterilisation of reusable equipment and environmental controls.

Standard precautions should be implemented universally, regardless of information or assumptions about a patient's blood-borne virus status, and therefore assist to reduce potential stigma and discrimination in the health care setting.

Hand hygiene

Hand-washing is generally considered the most important hygiene measure in preventing the spread of infection. Clinicians should wash their hands before and after significant contact with any patient and after activities that may cause contamination.

Hand-washing should occur:

- Before and after each clinical contact with a patient
- Before and after eating
- After using the toilet
- Before and after using gloves
- After contact with used equipment
- Immediately following contact with body substances

It is important to note that gloves are not a substitute for effective hand-washing. A routine hand-wash should include removal of jewellery and use of a cleaning solution (detergent with or without disinfectant) and water for 15 to 20 seconds, followed by drying with a single-use towel.

Skin care is important because healthy, unbroken skin provides a valuable, natural barrier to infection. Skin breaks should be covered with a water-resistant occlusive dressing. Alcohol-based hand rubs can be used in the absence of appropriate washing facilities.

Gloves

Gloves are a form of personal protective equipment. Clinicians and other health care workers should wear gloves whenever there is a risk of exposure to blood or body substances, and should change their gloves and wash their hands after contact with each patient and during procedures with the same patient if there is a chance of cross contamination. Gloves must be used when:

- Handling blood and/or body substances
- Performing venepuncture
- Touching mucous membranes
- Touching non-intact skin
- Handling contaminated sharps
- Performing invasive procedures
- Cleaning body substances spills or any equipment (instruments) or materials (linen) or surface that may have been contaminated by body substances

For further information about the appropriate use of sterile, non-sterile and general purpose gloves refer to *Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting*.

Other personal protective equipment

Personal protective equipment should be readily available and accessible in all health care settings. The type of protective equipment required depends on the nature of the procedure, the equipment used and the skill of the operator. For example, the use of protective equipment is recommended in the following circumstances:

- Protective eyewear and face shields must be worn during procedures where there is potential for splashing, splattering or spraying of blood or other body substances
- Impermeable gowns and plastic aprons should be worn to protect clothing and skin from contamination with blood and body substances
- Footwear should be enclosed to protect against injury or contact with sharp objects

Needlestick or sharps injury prevention

Inappropriate handling of sharps is a major cause of accidental exposure to blood-borne viruses in health care settings. To minimise the risk of a needlestick or sharps injury, needles, sharps and clinical waste should be handled carefully at all times. Specifically, clinicians and other health care workers should:

- Minimise their handling of needles, sharps and clinical waste
- Not bend or recap needles or remove needles from disposable syringes

- Use safe needle-handling systems including rigid containers for disposal, which should be kept out of the reach of toddlers and small children
- Ensure 'sharps' containers are available at the point of use or in close proximity to work sites to aid easy and immediate disposal

Importantly, the person who has used a sharp instrument or needle must be responsible for the immediate and safe disposal of the sharp following its use.

Health care workers

Vaccination

Vaccination is an important infection control strategy to prevent the transmission of HBV and HAV. The *Australian Immunisation Handbook*² provides guidelines on the vaccination of health care workers. All clinicians and other health care workers who may come into contact with blood or body substances should be aware of their HBV vaccination status and be vaccinated if appropriate. Post-vaccination serological testing is recommended four to eight weeks after completion of the primary course, for people in the following categories:

- People at significant occupational risk (e.g. Clinicians and other health care workers whose work involves frequent exposure to blood and body substances)
- People at risk of severe or complicated disease (e.g. people with impaired immunity and people with pre-existing liver disease not related to HBV)
- People in whom a poor response to HBV vaccination is expected (e.g. patients undergoing haemodialysis)
- Sexual partners and household contacts of people with hepatitis B

If an individual's anti-HBs level is <10 IU/mL following the third dose of vaccine, the presence of HBsAg should be investigated. Individuals who are HBsAg negative are classified as a non-responder and should be offered further doses of HBV vaccine. These can be given as either a fourth dose or a further three doses administered monthly. Further testing should occur at least four weeks after the last dose. Health care workers who are non-responders after supplementary doses of HBV vaccine should be advised about the need for administration of Hepatitis B Immunoglobulin (HBIG) within 72 hours of a potential exposure to HBV.

Booster doses are no longer recommended in immunocompetent individuals after a primary course of HBV vaccine, as evidence suggests that a completed course of HBV vaccination provides long-lasting protection. This applies to children and adults, including health care workers.

Individuals at significant occupational risk who have a documented history of a primary course of hepatitis B vaccine, but unknown seroconversion status, and now have an anti-HBs level <10 mIU/mL, should be given a single booster dose of vaccine and have their anti-HBs level checked four weeks later. If the anti-HBs level is <10 mIU/mL, regard the individual as a non-responder, give two further doses of hepatitis B vaccine at monthly intervals, and re-test for anti-HBs levels at least four weeks after the last dose.

HAV vaccination is recommended for health care workers at increased risk of exposure to faecal contamination, including nursing and medical staff working with children, people with an intellectual disability and remote Aboriginal and Torres Strait Islander populations. Serology screening can be used to assist in the assessment of the need for HAV vaccination.

No vaccination is available to protect against transmission of HIV or HCV.

Testing

The mandatory testing of clinicians and other health care workers for HIV, HBV and HCV is not warranted due to the low risk of transmission if standard precautions are followed. Testing for blood-borne viruses should only be undertaken on the basis of clinical assessment or where testing is in the interest of patients and health care workers. Clinicians and other health care workers who regularly perform exposure prone procedures (refer to Table 13.2) have a responsibility to be regularly tested for HIV and HCV, and for HBV if they are not immune. The provision of confidentiality, privacy and consent for testing should be applied.

Occupational exposures

All clinicians and health care workers should have access to infection control guidelines that advise about the management of an occupational injury, including clear written instructions on the appropriate action to take in the event of a needlestick injury and other blood or body substance exposures involving either patients or health care workers. Clinicians and health care workers are encouraged to report occupational exposures immediately and all testing procedures and follow-up treatment should be fully documented. Confidentiality should be maintained.

In general, if an injury or incident occurs where blood or body substances come into contact with non-intact skin or membranes, the following action should be taken:

- Wash exposed membrane or injury with soap and water (an antiseptic could also be used on the skin)
- If eyes have been exposed, thoroughly rinse the eyes with tap water or saline while open

TABLE 13.2 Exposure-prone procedures

High-risk or exposure-prone procedures

- Any submucosal invasion with sharp, hand-held instruments or procedures dealing with sharp pathology and bone spicules, usually in confined spaces or where visibility is poor (e.g. orthopaedic surgery, trauma, internal cavity surgery)

Variable-risk procedures

- Minor dental procedures (excluding examination) and routine dental extractions
- Internal and instrument examination and biopsy (e.g. endoscopy, vaginal examination, laparoscopy)
- Minor skin surgery

Low-risk procedures

- Interview consultation and dental examination
- Non-invasive examinations or procedures (aural testing, electrocardiograph, abdominal ultrasound)
- Intact skin palpation (gloves not required)
- Injections and venipuncture (gloves required)

- If mouth has been exposed, thoroughly rinse the mouth with water and spit out
- Seek medical advice immediately for assessment of nature of the exposure, the risk of transmission of blood-borne viruses and the need for HIV or HBV post-exposure prophylaxis (PEP)
- If the exposure is significant and the source patient is known, their consent for HIV antibody, HCV antibody and HBsAg testing should be sought

For more information, contact the National Needlestick Injury Hotline (1800 804 823). The Hotline is a free 24-hour service for health care and emergency services workers who require assistance following a needlestick injury or other occupational exposure.

Post-exposure prophylaxis (PEP) in the health care setting

Depending on the nature of the exposure, PEP is available to health care workers to prevent infection with HIV and HBV. The sooner PEP is administered, the more likely it is to be effective in preventing infection. Clinicians should always refer to the most recent protocols and seek appropriate advice about administration of PEP because the area is constantly changing. Blood should be taken prior to or shortly after administration of PEP to check for prior exposure or infection.

Post-exposure prophylaxis for HIV in the health care setting

Post-exposure prophylaxis for HIV is a complex area. Currently HIV PEP consists of a combination of two to three drugs depending on the level of risk associated with the exposure and it is recommended that HIV PEP should be started between one and two hours after an exposure. Post-exposure prophylaxis for HIV is:

- Recommended for significant percutaneous exposure to blood or body substances involving a high risk of HIV transmission
- Offered (but not actively recommended) for ocular mucous membrane or non-intact skin exposure to blood or body substances
- Not offered for exposure to any non-bloody urine, saliva or faeces

Post-exposure prophylaxis for HBV in the health care setting

If the exposed person is not immune to HBV, or is unaware of their immune status, then HBIG should be given within 48–72 hours of exposure. For example:

- If the exposed person is not immune to HBV, or is of unknown immune status, HBIG should be administered within 72 hours of exposure
- If the exposed person is a non-responder to the HBV vaccine, HBIG should be given within 72 hours

There is currently no PEP available to prevent HCV infection.

Infected health care workers

Clinicians and other health care workers have a legal obligation to care for the safety of others in the workplace, which includes colleagues and patients. Clinicians and other health care workers infected with a blood-borne virus should consult State or Territory regulations to determine what restrictions are placed on their clinical practice. In general, it is recommended they do not perform procedures that carry a high risk of transmission of the virus from health care worker to patient, such as exposure-prone procedures (refer to Table 13.2).

Health care workers must not perform exposure-prone procedures if they are:

- Anti-HIV positive
- HBeAg positive and/or HBV DNA positive with high titres
- Anti-HCV positive and HCV RNA positive (by polymerase chain reaction).

Infection control in the primary care setting

*Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting*¹ provides detailed information relating to the application of infection control in an office or primary health care setting including: routine

cleaning; disinfectants and antiseptics; design and maintenance of health care premises; management of clinical waste and linen; and reprocessing of instruments and equipment. Specific procedures relating to the office practice and home and community care are included in the guidelines.

The general principles of infection control that apply to large health care settings also apply to office practices. Issues that relate to preventing transmission of blood-borne viruses include:

- All clinical waste such as dressings containing expressible blood, human matter (excluding hair, nails, urine and faeces) and blood sharps must be appropriately packed for transport and disposal according to local regulations
- Sharps are to be disposed of in yellow, rigid-walled containers containing the 'Biological Hazard' label and symbol
- Injecting equipment (including hypodermic syringes, needles, vials of local anaesthetic agent, dental local anaesthetic cartridges, dental needles, intravenous lines and giving sets) must be discarded after single use. Syringes used to hold single-use anaesthetic cartridges must be sterilised between patients
- Dressings, suture material, suture needles, scalpels, intracranial electrodes, pins or needles used for neurosensory testing, spatulas, electric clips and razor blades must also be discarded after single use
- Linen must be managed using standard precautions. Contaminated linen should have body substances removed with paper towels and cold running water, before being washed in cold or hot water. Drying at high temperature aids disinfection. Linen which is to be treated off-site must be packed in labelled, water-resistant, regulation bags
- Re-usable equipment and instruments should be re-processed and sterilisation/disinfection procedures followed in accordance with manufacturers' and national guidelines
- Sterile equipment must be used on critical sites (sterile tissue)
- Sterile equipment is generally recommended for semi critical sites (intact mucous membrane), except in the case of single-use clean tongue depressors and vaginal specula, which are used in procedures unlikely to penetrate the mucosa
- When steam or dry heat sterilisation is not suitable, other sterilisation systems such as ethylene oxide or automated, low-temperature chemical sterilisation may be used if acceptable to the instrument manufacturer

Management of blood and body substance spills in the health care setting

Management of blood and body substance spills depends on the nature of the spill, likely pathogens, type of surface and the area involved. The basic principles of spills management are:

- Standard precautions including use of personal protective equipment apply where there is a risk of contact with blood or body substances
- Spills should be cleaned up before the area is disinfected
- Generation of aerosols from spilled material should be avoided

All spills must be dealt with as soon as possible. In general cleaning blood and body substance spills should take into account the following factors:

- The nature of the spill (e.g. sputum, vomit, faeces, urine, blood or laboratory culture)
- The pathogens most likely to be involved in the spill
- The size of the spill (spot, small or large spill)
- The type of surface (e.g. carpet or impervious flooring)
- The area involved (i.e. whether the spill occurs in a contained area such as a microbiology laboratory or in a public area such as a hospital ward or outpatient area)
- The likelihood of bare skin contact with the soiled surface.

In the case of a small spill, wipe the area clean using a paper towel and then clean with detergent and warm water. A disposable alcohol wipe also may be used. Quarantine areas where soft furnishings are involved (carpet, curtains or seating) until dry. In the case of larger spills mop up with paper towel or use 'kitty litter' or granular chlorine, picking up the larger amount with cardboard.

In general, it is unnecessary to use sodium hypochlorite for managing spills because there is no evidence of any benefit from an infection control perspective. However, it is recognised that some health care workers may feel more reassured that the risk of infection is reduced through the use of sodium hypochlorite.

Legal and ethical issues

Legal liability may occur if inadequate care has been taken to prevent the transmission of infection in the health care setting. Regulatory authorities, including environmental protection services and Commonwealth, State/Territory and local governments, enforce laws and regulations relating to infection control and waste disposal. These regulations can vary considerably throughout Australia and such regulations should take precedence over the general information presented in this chapter. For further information contact State and Territory health departments and medical and other professional boards (refer to *ASHM Directory* available at www.ashm.org.au/ashm-directory). Legal issues are considered in greater detail in Chapter 14.

Summary

Standard precautions and infection control procedures protect against transmission of blood-borne viruses including HIV, HBV and HCV in the health care setting. Regardless of the perceived risk or assumptions about a patient's infection status, infection control procedures must be followed in all clinical settings to minimise the risk of transmission of blood-borne viruses.

References

- 1 Communicable Diseases Network of Australia (CDNA), National Public Health Partnership (NPHP), and Australian Health Ministers' Advisory Council (AHMAC). Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting. Canberra: Commonwealth Department of Health and Ageing; 2004. Available from <http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/icg-guidelines-index.htm>
- 2 Australian Government Department of Health and Ageing. Australian Immunisation Handbook, 9th Ed. Canberra; Commonwealth Department of Health and Ageing; 2008.

Further reading

The Royal Australian College of General Practice, *Infection Control Standards for Office-based Practices* (4th Edition) can be obtained from the RACGP Publications Department on (03) 8699 0495, or by downloading the order form at www.racgp.org.au/publications/orders and faxing back to (03) 8699 0400. The cost is \$88 for RACGP members and \$132 for non-members. For further information contact RACGP Publications on publications@racgp.org.au or standards@racgp.org.au