

Infection control and occupational health

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 current best-practice guidelines for infection control procedures in Australian health-care settings are outlined in the *Australian guidelines for the prevention and control of infection in healthcare (2010)* (1).
- 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 hepatitis B virus (HBV).
- Vaccination is an important infection control strategy for the prevention of HBV. All health-care workers should be vaccinated and be aware of their vaccination and immune status.
- Health-care workers who regularly perform exposure-prone procedures have a responsibility to be regularly tested for human immunodeficiency virus (HIV), hepatitis C virus (HCV) and HBV if they are not immune.
- Hepatitis B infection alone does not disqualify health-care workers with the infection from practice.
- Health-care workers with HBV can perform exposure-prone procedure if their HBV viral load is below 200 IU/mL, provided they have regular, 3 monthly, testing to monitor viral load.

Introduction

The aim of this chapter is to provide:

- details about standard precautions and infection control guidelines for health-care settings
- advice about hepatitis B prevention in health-care settings, and guidance on the management of blood and body-substance exposures and incidents.

Myths and facts about infection control

MYTH - Wearing gloves means you do not need to wash your hands

FACT - Gloves are not a substitute for effective hand washing

MYTH - Health-care workers should use transmission-based precautions (formerly referred to as additional precautions) when caring for a patient with HBV, to prevent transmission

FACT - Implementation of standard precautions ensures a high level of protection against transmission of HBV in the health-care setting

MYTH - Health-care workers need to have booster dose of hepatitis B vaccine every 5 years

FACT - Booster doses are no longer recommended in immunocompetent people after a primary course of HBV vaccine, because the evidence suggests that a completed course of HBV vaccination provides long-lasting protection

MYTH - Health-care workers with HBV must not have contact with patients because of the risk of transmission

Transmission

FACT – Health-care workers with HBV are generally advised to avoid performing exposure-prone procedures (EPP); however, they can still have non-invasive contact with patients. If performing EPP they should have confirmed HBV DNA < 200 IU/mL

HBV: hepatitis B virus

It is essential to maintain the safety of the health-care environment for patients and health professionals; this necessitates the implementation of infection control guidelines. The current best-practice guidelines for infection control procedures in Australia are outlined in the *Australian guidelines for the prevention and control of infection in healthcare (2010)* (1). State and territory health departments in Australia have adopted the principle of standard precautions. Such precautions ensure a high level of protection against transmission of infection in the health-care setting, and are required in the treatment and care of all patients to prevent transmission of blood-borne infections.

Infection control guidelines are relevant in social and domestic contexts, as well as in occupational settings. The implementation of infection control guidelines in social and domestic settings can help patients with HBV to reduce the risk of transmitting the virus to others who have not been vaccinated and those who are non-immune. Health-care workers should be able provide advice for patients in relation to infection control in their daily environment. This chapter provides an overview of the current Australian infection control guidelines and their relevance in treating patients with HBV.

Transmission

Modes of HBV transmission and risk of transmission are outlined in [Hepatitis B virus testing and interpreting test results](#).

The risk of blood-borne virus transmission depends on a number of factors. Incidents involving blood-to-blood contact with infectious blood are associated with a high risk of hepatitis B 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 high levels of HBV DNA and detectable hepatitis B e antigen (HBeAg)
- the HBV immunisation status of the exposed person is unknown.

Patient-to-patient transmission of HBV, although rare, has been associated with oral surgery, inadequate use or disinfection of medical devices (e.g. blood glucose finger-stick devices), and multidose vials (2-6).

Transmission of HBV in the health-care setting can be prevented through hepatitis B vaccination for health-care workers, patients and the community, and strict adherence to standard precautions.

Standard precautions

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 precautions include personal hygiene practices (particularly hand washing) before and after every episode of patient contact, use of personal protective equipment (e.g. gloves, gowns and protective eye wear), aseptic non-touch technique, safe disposal systems for sharps and contaminated matter, routine environmental cleaning, reprocessing of reusable medical equipment and instruments, ensuring that single-use items are only used once and disposed of after single use (including single use of multidose vials), respiratory hygiene and waste management.

Standard precautions should be implemented for all patients all of the time, regardless of information or

standard precautions should be implemented for all patients all of the time, regardless of information or assumptions about a patient's blood-borne virus status. This practice will help to reduce potential stigma and discrimination in the health-care setting.

Hand hygiene

Hand hygiene practices are generally considered the most important hygiene measure in preventing the spread of infection. However, hand hygiene alone is insufficient to prevent and control infection. It needs to be used as part of a multifactorial approach to infection control. Health-care workers should wash their hands or use an alcohol-based hand rub before and after contact with any patient, and after activities that may cause contamination.

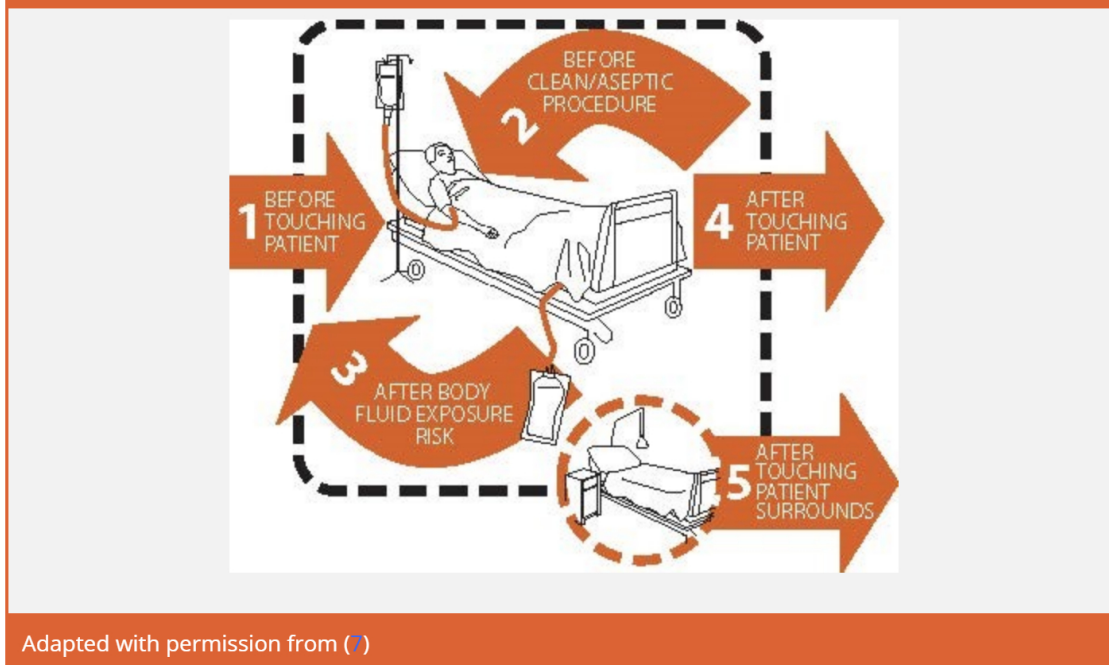
Hand hygiene must be performed before and after every episode of patient contact. This includes:

- before touching a patient
- before a procedure
- after a procedure or body-substance exposure risk
- after touching a patient
- after touching a patient's surroundings.

Hand hygiene must also be performed after the removal of gloves.

The five moments for hand hygiene approach shown in [Figure 12.1](#) was developed by the World Health Organization (WHO) ([7](#)) and adopted by Hand Hygiene Australia ([8](#)).

Figure 12.1 Five moments for hand hygiene ([7](#))



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 are more effective against most common infectious agents on hands than hand hygiene with plain or antiseptic soap and water.

Gloves

Gloves are a form of personal protective equipment. Health-care workers should wear gloves whenever there is a risk of exposure to blood or body substances. They 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 body substances
- performing venepuncture

- touching mucous membranes
- touching non-intact skin
- handling contaminated sharps
- performing invasive procedures
- cleaning body-substance spills or any equipment (instruments), materials (linen) or surface that may have been contaminated by body substances.

Gloves do not need to be used for every episode of patient contact unless the above points apply.

Further information about the appropriate use of gloves is given in the Australian guidelines (1).

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 should 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.

Occupational exposure

Prevention of occupational exposure (needle-stick or sharps injuries)

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 needle-stick or sharps injury, needles, sharps and clinical waste should be handled carefully at all times. Specifically, 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 (these should be kept out of the reach of children)
- ensure that sharps containers are available at the point of use or in close proximity to work sites, to aid immediate disposal.

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

Management of occupational exposures

All 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 needle-stick and other blood or body-substance exposure involving either patients or health-care workers. Health-care workers should be 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)

- Do not squeeze injury site
- If eyes have been exposed, remove contact lenses and thoroughly rinse the eyes with tap water or saline while open (for at least 30 seconds)
- If mouth has been exposed, thoroughly rinse the mouth with water and spit out
- Seek medical advice immediately for assessment of the exposure, the risk of transmission of blood-borne viruses and the need for HIV or HBV post-exposure prophylaxis.

If the exposure is significant and the source patient is known, their consent for HIV, HCV and HBsAg testing should be sought.

Hepatitis B immunoglobulin as post-exposure prophylaxis in the health-care setting

Initiation of hepatitis B immunoglobulin (HBIG) depends on the type of exposure, the source patient's HBsAg status and the exposed person's HBV immunisation history.

Unvaccinated person

In the case of an unvaccinated person who is exposed to HBV-infected blood or body substances, HBIG should be administered within 72 hours of the exposure, to prevent HBV infection. The first dose of the HBV vaccine should also be administered as soon as possible.

Vaccinated person

For people who have been vaccinated and who have ever had a documented protective response after vaccination (anti-HBs level ≥ 10 mIU/mL), HBIG is not recommended. If it has not previously been determined, the person's response to the vaccine should be established immediately. If there is no protection (i.e. anti-HBs level < 10 mIU/mL), the person should be offered a dose of HBIG and HBV vaccine.

People who do not respond to the hepatitis B vaccine (anti-HBs < 10 mIU/mL) 4 to 8 weeks after the third dose of vaccine, and do not have HBV infection, are referred to as non-responders to primary vaccination. There are multiple options for non-responders including a single booster dose (fourth dose) of vaccine to confirm non-response. If the person still does not have a serological response (anti-HBs > 10 mIU/mL) then a further two doses of hepatitis B vaccine should be administered at monthly intervals, and be retested for anti-HBs levels at least 4 weeks after the last dose. For further information about management of non-responders refer to the Australian Immunisation Handbook (9).

Issues for health-care workers

Vaccination

Vaccination is an important infection control strategy to prevent the transmission of HBV. For further information on the HBV vaccination regime and groups to be vaccinated, see: [Primary prevention of hepatitis B virus infection](#).

Testing

The mandatory testing of health-care workers for HBV, HCV and HIV 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 (e.g. a needle-stick injury) (1).

Health-care workers who regularly perform exposure-prone procedures have a responsibility to be regularly tested (at least annually) (10) for HIV, HCV and HBV. More frequent testing is recommended if the health-care worker has an increased risk of infection, whether through occupational or non-occupational, exposure (10) The provision of confidentiality, privacy and consent for testing should be applied.

Health-care workers with HBV infection

Health-care workers have a legal obligation to care for the safety of others in the workplace, including for colleagues and patients. Health-care workers with HBV infection should consult state or territory regulations to determine what restrictions are placed on their clinical practice. While the protection of public health is paramount, anti-discrimination, privacy and confidentiality must be safeguarded to protect the status and rights of the health-care worker (10).

HBV infection does not disqualify health-care workers from the practice or study of surgery, dentistry, medicine or allied health fields (11). Health-care workers with HBV can access antiviral treatment to suppress their HBV DNA viral load, even if they do not fulfil the typical indications for treatment, to reduce HBV transmission to patients during exposure-prone procedures (12). There have been no reported cases of HBV transmission from health-care worker to patient if the health care worker's HBV DNA level is below 200 IU/mL (12). This evidence supports an HBV viral load below 200 IU/mL as the threshold for health-care workers with HBV infection to perform exposure-prone procedures. Health-care workers taking antiviral treatment require regular 3-monthly testing to monitor their HBV DNA to ensure it remains below 200 IU/mL.

Health care workers with HBV performing exposure procedure who are not on antiviral treatment will need to be monitored and have viral load tested more frequently, due to potential fluctuations in viraemia (12).

Health-care workers with HBV infection can seek support from state and territory hepatitis organisations.

Infection control in the primary-care setting

The general principles of infection control that apply to large health-care settings also apply to office practices; specific issues related to office practices are outlined in the *Australian guidelines for the prevention and control of infection in healthcare (2010)* (1) and the Royal Australian College of General Practice (RACGP) infection control standards (13).

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, 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
- the spill should be confined and contained, and visible matter should be cleaned with disposable absorbent material, and the used cleaning materials discarded in the appropriate waste container
- generation of aerosols from spilled material should be avoided.

Use of chemical disinfectants such as sodium hypochlorite should be based on assessment of risk of transmission of infectious agents from the spill.

Prompt removal of spots and spills of blood and body substances, followed by cleaning and disinfection of the area contaminated, is sound infection control practice and meets occupational health and safety requirements. Further information about management of blood or body fluid spills is given in the *Australian guidelines* (1).

Legal and ethical issues

Legal liability may occur if inadequate care has been taken to prevent the transmission of infection. Regulatory authorities (e.g. environmental protection) and the Australian Government, states or territories, and local governments enforce laws and regulations relating to infection control and waste disposal. These

regulations can vary considerably throughout Australia, and should take precedence over the general information presented in this chapter. Further information can be obtained from state and territory health departments, and from medical and other professional boards. Legal issues are considered in greater detail in [Privacy, confidentiality and other legal responsibilities](#).

Privacy confidentiality and legal responsibilities

Conclusion

Standard precautions and infection control procedures protect against transmission of blood-borne viruses, including HBV, in the health-care setting. Regardless of the perceived risk, infection control procedures must be followed in all clinical settings, to minimise the risk of accidental transmission of blood-borne viruses. Health-care workers should be vaccinated against HBV, and should know their vaccination and immune status. Exposures to blood and body substances should be reported immediately and monitored.

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