

Universal Precautions

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Introduction

Universal precautions refer to the set of precautions designed to prevent the transmission of blood-borne pathogens when administering first aid or healthcare by avoiding contact with a patient's bodily fluids. Under universal precautions, blood and other bodily fluids of all patients are considered potentially infectious for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and other blood-borne pathogens. These precautions have gained wide acceptance because they prevent exposures to infection by both healthcare workers and patients.¹ Nevertheless, ample evidence indicates that adherence to universal precautions by healthcare workers is far from consistent. This article also discusses treatments in case of exposure to viral pathogens.

What are Universal Precautions?

Universal precautions emphasize the active, individual application of preventive measures, including the use of personal barrier precautions, frequent hand-washing, and the careful manipulation of sharp instruments to minimize the chance of skin and mucus membrane exposure to the patient's blood and other bodily fluids.² Universal precautions include the following actions:

- Wear gloves when your hands are likely to be in contact with blood or other bodily fluids; mucous membranes; skin that has open abrasions, cuts or sores; or items or surfaces contaminated with blood or other bodily fluids; and when performing venipuncture and other vascular access procedures.
- Wash hands routinely before and after contact with patients, contaminated items or surfaces, and after taking off gloves. Wash hands and other skin surfaces immediately and thoroughly if contaminated with blood or other bodily fluids. Effective hand-washing requires scrubbing for at least 15 seconds after applying soap.
- Wear masks and protective eyewear or face shield during procedures that may generate droplets or splashes of blood or other bodily fluids.
- Wear a protective gown or apron when you may have contact with materials that may carry pathogens.
- Clean protective items regularly and after any contamination by blood or other bodily fluids.
- Take precautions to prevent injuries caused by needles, scalpels and other sharp instruments and devices during procedures; when cleaning used instruments; and during disposal of used needles. Do not recap, bend or break needles by hand, remove them from disposable syringes, or otherwise manipulate them by hand. After they are used, place disposable syringes and needles, scalpel blades, and other sharp items in puncture-resistant containers for disposal. The puncture-resistant containers should be located as close as practical to the use area. Place large-bore reusable needles in a puncture-resistant container for transport to the reprocessing area.
- If resuscitation is required, use mouth pieces, resuscitation bags, or other ventilation devices to minimize the need for emergency mouth-to-mouth contact.

Although saliva has not been implicated in HIV transmission, it does carry other viral and bacterial pathogens.

- If you have exudative lesions or weeping dermatitis, refrain from all direct patient care and from handling patient-care equipment.

Coughing and sneezing can spread both viral and bacterial respiratory infections, including H1N1 influenza and tuberculosis. The following measures to contain respiratory secretions are recommended, especially for individuals with signs or symptoms of a respiratory infection:

- Cover the nose and mouth when coughing or sneezing.
- Use tissues to capture respiratory secretions and then dispose of them in the nearest waste receptacle. Tissues and no-touch receptacles should be conveniently available in waiting areas and exam rooms.
- Wash hands with non-antimicrobial soap and water, alcohol-based hand rub, or antiseptic hand wash. (Antimicrobial soaps select for resistant strains of pathogenic bacteria.) Supplies should be easily accessible.

Why Are Universal Precautions Important?

The rationale behind universal precautions for blood and other bodily fluids is quite simple. In 1987, the U.S. Centers for Disease Control and Prevention (CDC) established that, since medical history and examination cannot reliably identify all patients infected with HIV or other blood-borne pathogens, it is imperative that blood and bodily fluid precautions be used consistently for all patients.³ The World Health Organization (WHO) has estimated that 40% of the global burden of Hepatitis B and Hepatitis C among healthcare workers is attributable to occupational exposure.⁴ Hand-washing has proven to be an essential precaution to prevent the spread of infections like Methycillin Resistant Staph Aureus (MRSA). The importance of universal precautions thus cannot be underestimated.

Pregnant healthcare workers are not known to be at greater risk of contracting HIV infection than healthcare workers who are not pregnant; however, if a healthcare worker develops HIV infection during pregnancy, the infant is at risk of infection resulting from perinatal transmission. Because of this risk, pregnant healthcare workers should strictly adhere to precautions to minimize the risk of HIV transmission.⁴

Limitations of Universal Precautions

Various studies have found that policies for universal precautions do not work as effectively as hoped.^{5,6,7} This shortcoming reflects the limitations of a safety approach that relies on active compliance by individuals, rather than on passive environmental controls.

Numerous studies indicate that compliance with universal precautions is poor. One study found that compliance was strongly correlated with factors like perceived organizational commitment to safety; perceived conflict of interest between workers' need to protect themselves and their need to provide medical care to patients; risk-taking personality; perception of risk; knowledge regarding routes of HIV transmission; and training in universal precautions. Compliance rates correlated with certain demographic characteristics: female workers had higher overall compliance scores than did male workers; and overall compliance scores were highest for nurses, intermediate for technicians, and lowest for physicians.⁵

Another study found variations in compliance, depending on the type of barrier device used for protection. In this study, compliance rates were especially low for certain types of personal protective equipment, such as protective eyewear (55%), face masks (47%), and

protective clothing (34%). In contrast, compliance rates were highest for glove use (93%), waste disposal (90%), and sharps disposal (81%). The same study also found that compliance was positively associated with several work-related variables, including job satisfaction and perceived safety climate, i.e., management's commitment to infection control and the overall safety program. It was found to be inversely associated with security-related work constraints, job/task factors, adverse working conditions, workplace discrimination, and perceived work stress.⁶

Self-reporting of non-compliance with standard precautions is very low. When percutaneous injuries with sharp instruments occur, reporting is infrequent, especially among those who experience multiple injuries. Physicians, in particular, are more likely to sustain solid-needle injuries, to be injured repeatedly, and to fail to report injury or exposure.⁷

Management of Viral Exposure

First aid

There is no data on the effect of first aid treatment in reducing the risk of blood-borne viral (BBV) transmission following occupational exposure. Nevertheless, the rationale behind recommending first aid measures is to reduce the exposure below the threshold of an infectious dose. The following measures lower the risk of infection:

- In case of needlestick injury, express blood. Free bleeding of puncture wounds should be encouraged gently, but wounds should not be sucked.
- Wash immediately and thoroughly with soap and water. Treat the wound with a disinfectant with known activity against BBVs (e.g., 10% iodine solution or chlorine compounds).
- There is no evidence of efficacy of antiseptics against viruses, and their effect on local defences is unknown. However, they can be used to treat bacterial contamination.
- In case of mucosal contact, such as spillage into the eyes, wash immediately and liberally with running water, before and after removing any contact lenses.

Reporting

The injured person should immediately report the event to the relevant authorities in the healthcare institution and seek medical advice for proper wound care and post-exposure prophylaxis (PEP). The institution should ensure that a mechanism is in place to facilitate reporting and management of injuries. The Infection Control Team should be notified when appropriate.

Post-exposure prophylaxis (PEP)

PEP against HBV

Post-exposure prophylaxis for HBV needs assessment of various variables in the exposed and the source persons. HBV immunoglobulin and HBV vaccine are the mainstays of PEP against HBV. Booster doses of HBV vaccine are not necessary if a person has already developed positive antibody response previously after a full course of vaccination, or has developed immunity after natural infection. For the best protection, all healthcare staff who could be exposed to blood and other bodily fluids should already have received HBV vaccination. Table 1 shows the type of PEP needed against HBV.

PEP against HCV

Currently, there is no effective vaccine or chemo-prophylactic agent against HCV. However, early treatment of acute HCV infection has shown encouraging results in preventing progression to chronic HCV infection.⁸ Hence, early detection of infection is of utmost importance. Healthcare professionals should have blood taken for testing a few hours after exposure (to allow dispersal of any viral particles) and again at six months, or earlier if they develop symptoms suggestive of HCV infection. Unfortunately, early symptoms of HCV infection are non-specific, flu-like and include anorexia, weight loss, abdominal pain, myalgia, arthralgia and fatigue. Less common symptoms include fever and rash. Jaundice occurs in less than one-third of all patients.

PEP against HIV

The risk of needlestick occupational HIV transmission is lower than for HBV and HCV infection. Assess the source patient for risk of HIV infection. If the source patient is HIV antibody positive or is of unknown status, encourage the injured person to undergo baseline HIV testing. Counseling and consent are important in this situation. Monitor injured persons for at least six months. Blood testing should be performed soon after injury and again at six months after exposure. The use of Zidovudine (AZT) for post-exposure chemoprophylaxis is based on its demonstrated efficacy in reducing seroconversion rates by up to 79% and its efficacy in reducing vertical transmission during pregnancy.^{9,10} Currently, a triple combination regimen, usually employing zidovudine (Retrovir), lamivudine (Epivir), and indinavir (Crixivan) for four weeks, is believed to be at least as effective as AZT. In view of the possible side effects, clients should be adequately counseled before deciding on treatment.

Table 1. Guidelines for Post-Exposure Prophylaxis Against Hepatitis B

	Post-Exposure Prophylaxis				
	Previously Vaccinated			Unvaccinated	
	Known Responders	Known Non-responders	Unknown Response	HBV markers -ve _φ	HBV markers +ve _ψ
I. SOURCE KNOWN					
(a) HBsAg +ve	Nil	HBIG within 24 h repeat after 1 month	Dependent on anti-HBs* status of exposed person	HBIG + HB Vac	Nil
(b) HBsAg -ve	Nil	Nil	Nil	HB Vac	Nil
(c) HBsAg unknown	Nil	Dependent on source HbsAg status	Dependent on anti-HBs* status of exposed person	HBIG + HB Vac or HB Vac, depending on source HbsAg status	Nil
II. SOURCE UNKNOWN	Nil	as in I (a)	as in I (a)	as in I (a)	Nil

Notes on table:

1. Blood should be taken from the source and the exposed person whenever possible, particularly if the latter has not received hepatitis B vaccination before.

2. Where indicated, give one dose of HBIG (0.06 ml/Kg BW) within 24 hours of exposure, and preferably within 7 days. Draw blood before administering HBIG.
 3. If HBIG has been given, the first dose of vaccine can be delayed for up to 1 week after exposure, pending results of serological tests.
 4. Hepatitis B vaccination (HB Vac) is given IM into the deltoid at a dose of 10ug (B-Hepavac II) or 20ug (Engerix-B). Give the second and third doses one and six months afterwards. HBIG can be given at the same time but at a different site.
- * For a previously vaccinated person with unknown response, he/she should be tested for anti-HBs:
- (a) No treatment is required if anti-HBs is positive.
 - (b) HBIG and HB Vac can be offered if anti-HBs is negative.
- Φ means HBsAg -ve AND anti-HBs -ve
 Ψ means HBsAg +ve OR anti-HBs +ve

Conclusion

Given the inherent prevalence of infectious disease in healthcare facilities, consistent use of universal precautions are essential to prevent infection by healthcare workers and patients. Healthcare workers are responsible for protecting themselves, but broad compliance requires management to provide the necessary protective items, train and motivate personnel, and monitor and track compliance.

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