

## **Section 6: Occupational Health**

### **6.1 Prevention of Sharps Injury and Mucocutaneous Exposure to Blood and Body Fluids**

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**1. Introduction**

Health Care Workers (HCW) may acquire bloodborne pathogens, such as Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) or Hepatitis C Virus (HCV) via certain types of exposure like percutaneous injuries and mucosal exposures, from their workplace. All these infections have the potential for serious adverse outcomes like hepatocellular carcinoma, severe immunodeficiency, and even death. The CDC of the US estimates that there are 385,000 needlesticks and other sharps-related injuries sustained by hospital-based HCW every year which accounts for an average of 1,000 sharps injuries per day (1). From 1986 though 2001, CDC had received voluntary reports of 57 documented and 140 possible episodes of HIV transmission to healthcare personnel in US. In 1997, an estimated 500 HBV infections occurred in healthcare personnel (1). Patients with HBV, HCV or HIV infection may be asymptomatic, or with unknown status. As handling of blood and body fluids or contaminated sharps are common in health care settings, sufficient preventive measures must be in place to reduce the risk of occupational exposure and subsequent seroconversion to bloodborne pathogen.

## 2. Preventive Strategies

Exposure prevention remains the primary strategy for reducing occupational bloodborne pathogen infections. Effective preventive strategies include multi-component approaches, which encompass vaccination and staff immunization, Standard Precautions (SP), engineering control, work practices control, health care personnel education & training and etc.

### 2.1 Immunization and vaccination

#### 2.1.1 HCV and HIV

- Vaccine for Hepatitis C and HIV is currently not available.

#### 2.1.2 HBV

- Pre-exposure Hepatitis B vaccination with post-vaccination serological testing is recommended for HCW at risk of percutaneous injury and blood and body fluid exposures and it is important in guiding the post-exposure prophylaxis management (2-4).
- Both serological testing and vaccination should preferably be provided in schools of healthcare professions or in the early phase of career as risk is often higher during training periods.
- HCW who are non-responders should be considered susceptible to HBV and should be counseled regarding precautions to prevent HBV infection and need HBIG prophylaxis for any known or probable exposure to hepatitis B surface antigen (HBsAg) positive blood.

The following diagram stipulates the usual schedule of vaccination program recommended by the CDC (2), the Scientific Working Group on Viral Hepatitis Prevention of the Department of Health (3), and the addendum published in March 2004.

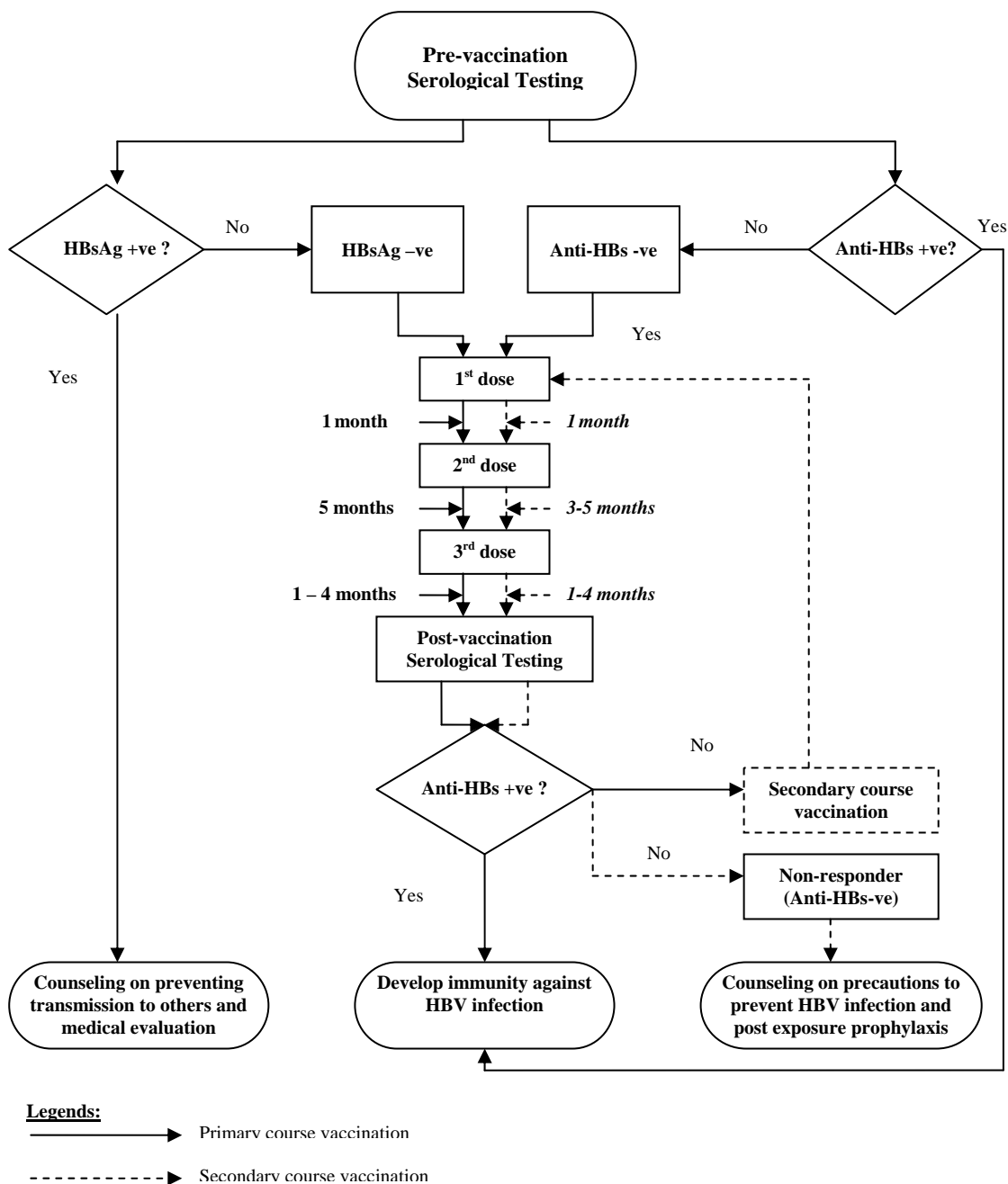


Figure 1. Recommended Hepatitis B Vaccination Programme

## 2.2 Standard precautions

Standard Precautions (SP) is the core practice recommended for HCW in all settings in relation to the prevention of bloodborne infection (4). SP includes a set of precautionary measures such as good hand hygiene practices, and the proper use of protective barriers during routine patient care, that should be practiced by HCW at all time (4).

All HCWs should wear personal protective equipment, such as gloves whenever the contact of blood or body fluid is anticipated. Apart from gloves, all HCWs should wear goggles and / or face shields when splashes of blood or body fluid are possible, especially during the cleaning of instrument and decontaminating spillage of blood and / or body fluids (5).

Please refer to standard precautions from the *Isolation Precautions of ICB Infection Control Guidelines*.

## 2.3 Engineering control

Engineering controls are often among the most effective approaches to reducing occupational hazards and they are important elements of a sharps injury prevention program (6). In the context of sharps injury prevention, engineering controls include sharps disposal containers and needles and other sharp devices with an integrated engineering sharps injury prevention feature (1). Overseas studies concluded that the use of safety devices could effectively reduce numbers of sharps injuries in health care settings (7-10). Therefore, use of new technology and safety devices to prevent sharps injury should be adopted whenever possible (4). Healthcare institutes should develop specific programs to select the most appropriate safety devices for their settings and evaluate the efficacies of various devices on reducing sharps injuries. Please refer to Appendix A for the desirable characteristics of devices with safety features.

## 2.4 Work-practice control

Work-practice controls are an important adjunct for preventing blood and body fluids exposures, including percutaneous injuries, because of the use of sharps and splashing of splatters may not be totally avoided in healthcare settings.

### 2.4.1 General good practices:–

- Wear a protective eye wear and / or face shield if encounter of splashes or splatter is anticipated in a procedure.
- Wear gloves and cover all wounds on hands properly when exposure to blood and body fluids from patients is anticipated.
- Avoid using of needles or sharp objects where safe and effective alternatives are available.
- Participate in selecting and evaluating devices with safety features.
- Use devices with safety features provided (e.g., retractable needles / lancet).
- Avoid recapping needles. If recapping of needles is inevitable, use single hand techniques, e.g., scoop techniques, or needle recapping device provided.
- Plan for safe handling and disposal before beginning any procedure using sharps.
- Discard used needles or sharps promptly in appropriate sharps disposal containers.
- Report all mucosal contacts of blood and body fluids, needlestick and other sharps-related injuries promptly to ensure that appropriate follow-up is received.
- Report any hazards from sharps observed in the work environment.
- Participate in infection control training on isolation precautions and follow recommended infection prevention practices, including hepatitis B vaccination.
- Maintain a good record keeping for immunization and vaccination history of health care workers.

### 2.4.2 Before the beginning of a procedure:–

- Ensure that equipment necessary for performing a procedure is available within

arms reach.

- Identify the location of the sharps disposal container; if moveable, place it as near the point-of-use as appropriate for immediate disposal of the sharps. If the sharp is reusable, determine in advance where it will be placed for safe handling after use.
- Choose a sharps disposal container, which is so designed that the HCW needs not to place hands or fingers into the container to facilitate disposal of a device.
- Keep sharps disposal containers securely in safe and upright position so as to prevent them from being toppled over.
- Assess working environment for adequate lighting and space to perform the procedure.
- Well organize working area (e.g. procedure tray) so that the sharp object is always pointed away from the operator, if multiple sharps will be used during a procedure.
- Assess the potential for a patient to be uncooperative, combative, or confused. Obtain assistance from other staff or a family member to assist in calming or restraining a patient as necessary.
- Inform a patient of what the procedure involves and explain the importance of avoiding any sudden movement that might dislodge the sharps, for successful completion of the procedure as well as prevention of injury to healthcare personnel.

#### 2.4.3 During a procedure:-

- Maintain visual contact with the procedures site and location of the sharp device.
- Be aware of other staff in the immediate environment and take steps to control the location of the sharp to avoid injury to oneself and other staff when handling any sharps.
- Do not hand-pass exposed sharps from one person to another; use a predetermined neutral zone or tray for placing and retrieving used sharps/ verbally announce when sharps are being placed in a neutral zone.
- If the procedure necessitates reusing a needle multiple times on the same patient (e.g., giving local anesthesia), use one-handed technique to recap the needle, or

use a fixed device that enables one-handed recapping of needles between steps.

- Activate the safety feature immediately after using the sharps, observing for audio or visual cues that the feature is locked in place when using an engineered sharps injury prevention device.

2.4.4 During clean-up following a procedure:-

- Inspect procedure trays, or other surfaces (including patient beds) containing waste materials used during a procedure, for the presence of sharps that may have been left inadvertently after the procedure.
- Transport reusable items in a secure container while perform clean-up procedure.
- HCW should wear goggles and / or face shield to prevent mucosal contacts with blood and body fluid during the cleaning of instruments.

2.4.5 During disposal:-

- Inspect the sharps disposal container for hazards caused by overfilling.
- Make sure the sharps disposal container being used is large enough to accommodate the entire device.
- Prior to disposing any sharps into a sharps disposal container, observe if, and be aware of any sharps protruding from or in close proximity to an opening of the container.
- Dispose any sharps with caution. Never throw the sharps into the sharps disposal container.
- Do not shake or rock a sharps disposal container.
- Avoid overfilling a sharps disposal container. The container should be disposed when it is 3/4 full or having its content reached the demarcated level.
- Keep the hands behind the sharp tip when disposing the device.
- Be aware that the tubing can recoil and lead to injury; maintain control of the tubing as well as the needle when disposing sharps with attached tubing (e.g., winged steel needle).

2.4.6 After disposal:-

- Monitor fill levels of sharps disposal containers frequently and routinely and change the containers before they are overfilled.
- Keep filled sharps disposal containers awaiting final disposal in a secure area.
- Use mechanical device, such as forceps, to assist picking up or handling of any sharps disposed improperly.
- Handle all linen with minimum agitation to avoid aerosolisation of pathogenic microorganisms. Linen heavily contaminated with blood or other body fluids should be bagged and transported in a manner that will prevent leakage and accidental mucosal exposure.

2.4.7 Controls measures in operating theatre:-

- Use instruments, rather than fingers, to grasp needles, retract tissue, and load / unload needles and scalpel;
- Give verbal announcements when passing sharps;
- Use a tray or neutral zone and avoid hand-to-hand passage of sharp instruments
- Use alternative cutting methods such as blunt electrocautery and laser devices when appropriate;
- Substituting endoscopic surgery for open surgery when possible;
- Using round-tipped scalpel blades instead of pointed sharp-tipped blades

2.5 Administrative control

Experts agree that safety devices and work practices alone will not prevent all sharps injuries. Significant declines in sharps injuries also require multi-component prevention approaches (1).

- Education,
- A reduction in the use of invasive procedure
- A secure work environment , and
- An adequate staff to patient ratio

Administrator should develop safety culture and ensure that:

- Policies and standards for safety practice, isolation precautions, and use of appropriate personal protective equipment (PPE) are in place.

- Staff members are well equipped with knowledge and skill by receiving the appropriate training (6).
- Comprehensive reporting and documentation of any occupational exposure to bloodborne pathogens should be encouraged.

### 3. Care of an Exposure Site

Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; for exposure to mucous membranes, e.g., spillage into the eyes, the exposed part should be washed immediately and liberally with running water (11).

The injured or exposed person should seek medical advice for proper wound care and postexposure management. Please refer to postexposure management from the *Management of Sharps Injury and Mucocutaneous Exposure to Blood and Body Fluid of ICB Infection Control Guidelines*.

### 4. Surveillance

A surveillance system, which collects and analyzes data of injuries and exposure events, should be in place to enhance evaluation of the effectiveness of sharps injury prevention program in healthcare settings (4).

For details of the surveillance system, please refer to 'Monitoring and Surveillance' on *Management of Sharps Injury and Mucocutaneous Exposure to Blood and Body Fluids of the ICB Infection Control Guidelines*.

## Appendix A

### **Desirable Characteristics of Devices with Safety Features (6)**

Engineering controls are regarded as the most effective strategies in reducing sharps injuries in healthcare settings. These controls include eliminating the unnecessary use of needles and implementing devices with safety features with the following characteristics:

- The device is needleless
- The safety feature (e.g., retractable, protective shield, and etc.) is an integral part of the device
- The device preferably works passively (i.e. it requires no activation by the user). If user activation is necessary, the safety feature can be engaged with a single-handed technique and allows the worker's hands to remain behind the exposed sharp
- The user can easily tell whether the safety feature is activated
- The safety feature cannot be deactivated and remains protective through disposal
- The device performs reliably
- The device is easy to use and practical
- The device is safe and effective for patient care

Each device must be considered on its own merit and ultimately on its ability to reduce workplace injuries. The desirable characteristics listed here should thus serve only as a guideline for device design and selection.

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