Issues Surrounding Exposure to Blood Borne Pathogens

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WHAT ARE UNIVERSAL PRECAUTIONS?

Universal precautions are infection control guidelines designed to protect workers from exposure to diseases spread by blood and certain body fluids. Always assume that all "blood and body fluids" are infectious for blood-borne diseases such as HBV (hepatitis B Virus), HCV (hepatitis C Virus) and HIV (human immuno-deficiency virus).

The Laboratory Centre for Disease Control, Health Canada and the U.S. Centers for Disease Control have developed the strategy of "Universal Precautions" to prevent contact with patient blood and body fluids. Universal precautions stress that all patients should be assumed to be infectious for bloodborne diseases such as AIDS and hepatitis B.

CRITERIA FOR UNIVERSAL PRECAUTIONS

In the workplace, universal precautions should be followed when workers are exposed to blood and certain other body fluids, including:

- semen
- vaginal secretions
- synovial fluid
- cerebrospinal fluid
- pleural fluid
- peritoneal fluid
- pericardial fluid
- amniotic fluid
- saliva (only in the dental setting, where saliva is likely to be contaminated with blood)

Universal precautions do not apply to:

- feces

- nasal secretions
- sputum
- sweat
- tears
- urine
- vomitus
- saliva (unless in dental tx, where saliva is likely to be contaminated with blood)

Universal precautions should be applied to all body fluids when it is difficult to identify the specific body fluid or when body fluids are visibly contaminated with blood.

STANDARD PROTOCOL TO PREVENT EXPOSURE

1. Barriers are used for protection against exposure to blood and certain body fluids.

    - Gloves
    - Protective eyewear when necessary

2. Recognize the potential hazards:

    - blood and body fluids

3. Know your roles and responsibilities for personal safety:

    - Protective Barriers, i.e. gloves
    - Cleanup
    - Disposal

4. Be familiar with proper techniques

    - How to clean up blood/body fluid spills
    - How to dispose of contaminated materials
    - Proper hand washing techniques

DENTAL CLINICS

In addition to general recommendations the following should be considered.

- The risk of exposure to bloody saliva in dental work necessitates special attention since there is high risk of glove puncture (e.g. from teeth, wire bands, ligatures).
- Blood and saliva should be thoroughly and carefully cleaned from equipment used in the mouth, including irrigation equipment, before high-level disinfection or sterilization.
- Equipment that comes in contact with gloved hands, e.g. mirrors and lamps, should be cleaned and disinfected.
- Instruments that enter sterile spaces must be cleaned and sterilized between patients. In addition, instruments or equipment that have the potential for transmitting blood or fluids capable of transmitting bloodborne pathogens must be sterilized (e.g. high-speed handpieces and other intraoral devices).

- In addition to wearing gloves for contact with oral mucous membranes of all patients, dental workers should wear surgical masks and protective eye wear or chin-length plastic face shields during procedures in which splashing or spattering is likely.
- Gloves should be removed immediately after their intended use. Hands must be washed after gloves are removed.

DENTAL SURGERY FACILITIES

In addition to the general recommendations the following should be considered.

- Identification of high-risk areas and procedures followed by development and implementation of protocols, surveillance, training and provision of equipment designed to decrease risk of exposures are critical in decreasing occupational exposures to bloodborne pathogens.
- Risk should be reduced through scheduling and assignment of tasks (e.g. minimize the number of staff participating in an operation).
- Operating theatre personnel should wear face protection, gloves and fluid-resistant gowns, depending on the specific procedure. Reinforced masks with plastic face shields or masks used with solid side shield glasses, plastic sleeves, double gloves, trauma overalls and knee-high boots offer additional protection. Shoe covers may be considered to protect shoes, but are not useful in reducing infection.
- Hands-free, no-pass, or no-touch techniques of instrument passing minimize risk. Intentions should be announced and actions coordinated when several individuals are working in the same area with sharp items.
- Gloves should be removed immediately after use. Hands must be washed after gloves are removed.

PREVENTING THE SPREAD OF BLOODBORNE PATHOGEN

GENERAL PROTOCOL

- All clients should be treated as high risk.
- After treatment of each patient/client and at the end of daily work activities, all potentially contaminated work surfaces should be cleaned. Clean immediately if contamination or a spill occurs.
- Health care workers who have had a previous significant exposure or who have personal risk factors (e.g. high-risk sexual behaviour, injection drug use) should seek testing for HIV, HBV and HCV. Disclosure of an infected worker's serologic status to an employer or patient/client is not permissible without the HCW's consent.
- The patient/client should be notified when he or she has had a significant exposure to blood or fluid capable of transmitting bloodborne pathogens. Disclosure of the source of the exposure and of the serologic status of the HCW is not permissible without the HCW's consent. The patient/client should be counseled about protective practices to be followed before the results are known (e.g. precautions with intercourse, avoidance of breast-feeding, and not donating blood, plasma, organs, tissue or sperm).
- Workers who have an infectious disease that could put a patient at risk are encouraged to seek medical evaluation with respect to the potential for transmission of the infection to patients/clients. Seeking medical evaluation is a fundamental ethical principle for workers infected with HIV, HBV or HCV.
- An infected worker may choose to be medically evaluated by his/her primary care physician. Such physicians who care for HIV, HBV or HCV-infected workers are encouraged to seek advice on assessing the worker's practice and the potential risk for transmission of infection in the health care setting.

- Supportive non-threatening programs through licensing and professional organizations should be developed to assist seropositive workers whose practices are modified because of their infection status. Career counselling and, if necessary, job retraining should be encouraged to promote the use of the worker's skills and knowledge.
- The criteria used to assess fitness for practice of infected workers should include medical evaluation (including mental condition), knowledge, application of infection prevention and control measures, and risk of injuries from sharp objects in the context of the individual's occupation. Restriction of the HCW's ability to work should be based on mental and physical competence and specific practice, not seropositivity alone.
- HCWs infected with HIV, HBV or HCV are responsible for seeking counselling to assist them in assessing the risk that their infective status poses to their patients/clients. In any situation in which a worker is uncertain about the potential risks or proper procedures to minimize the risk to patients/clients, he or she should consult with an employee health/infection control practitioner/patient safety group responsible for the quality of care or an expert panel established by professional organizations for the purpose of assessing infected HCWs.

PERSONAL PROTECTIVE EQUIPMENT

PPE includes gloves, lab coats, gowns, shoe covers, goggles, glasses with side shields, masks, and resuscitation bags. The purpose of PPE is to prevent blood and body fluids from reaching the workers' skin, mucous membranes, or personal clothing. It must create an effective barrier between the exposed worker and any blood or other body fluids.

When exposure to blood or fluids capable of transmitting bloodborne pathogens is anticipated, appropriate personal protective equipment should be worn.

One study concluded that among surgical personnel, the use of face shields, waterproof gowns and waterproof boots could have prevented more than half of the observed cutaneous exposures involving sites other than the hand. Gloves are available in a variety of materials, including latex, vinyl, nitrile, neoprene, copolymer, and polyethylene.

Masks and protective eye wear (e.g. goggles, safety glasses) or face shields should be worn to protect mucous membranes, non-intact skin and conjunctiva during procedures that are likely to generate splashes of blood or fluids capable of transmitting bloodborne pathogens. Wherever there is possibility for exposure to blood or fluid capable of transmitting bloodborne pathogens, masks and protective eye wear should be worn during dental procedures.
Policies for use of personal protective equipment should be based on the risks inherent in each procedure (e.g. any treatment where blood or saliva is existent carries a considerable risk). Policies will require periodic evaluation to ensure consistency with changing knowledge, epidemiology and experience.
Face shields, eye protection, masks, gloves, gowns and aprons should be readily accessible and in sufficient quantity, sizes and types to meet occupational needs.

Gloves

The incidence of HCWs contacting blood is lower among those who wear gloves. The volume of blood from a needle stick injury may be reduced by at least 50% when the needle passes through a glove. In some hepatitis B outbreaks, requiring HBV-infected HCWs to wear gloves decreased or eliminated HBV transmission to patients undergoing surgical or dental procedures.

- Medical gloves should be worn for all procedures that might involve direct skin or mucous membrane contact with blood or fluid capable of transmitting bloodborne pathogens.
- Disposable, good quality, medical gloves made of vinyl, nitrile, neoprene, copolymer and polyethylene serve as adequate barriers to bloodborne pathogens, particularly when latex allergies in workers or patients are a concern.
- Non-sterile medical gloves are appropriate for examinations and some other non-surgical procedures. The decision to use sterile or non-sterile medical gloves will depend on the procedure. Medical gloves are manufactured in both industrial and medical grades. Only gloves labeled for medical use (e.g. sterile surgical gloves, non-sterile medical examination gloves) should be used to protect against the transmission of bloodborne pathogens during patient/client care activities.
- Workers who have dermatitis or non-intact skin should wear medical gloves when direct contact with blood or fluid capable of transmitting bloodborne pathogens might occur. Additional barriers, i.e. occlusive dressings, over non-intact skin in addition to gloves further reduces potential exposure. Persons with intact skin need not wear medical gloves when there is little chance of direct contact with blood.
- When the risk of percutaneous injury is high, double gloving has been shown to decrease the volume of blood involved in needle stick exposures and, therefore, double gloving may be practised, depending on the level of risk of the procedure (e.g. surgery).
- Gloves must be changed during lengthy procedures (before the development of punctures or tears, or when tears or perforations are suspected).
- Gloves must be changed immediately after use, and after contact with one individual is complete before care is provided to another. Gloves may need to be changed between procedures on one individual.
- Medical gloves must be discarded after single-patient use and not washed or disinfected. Microorganisms adhere to gloves and are not easily washed off. Washing with surfactants (soaps or detergents) may enhance penetration of liquids through undetected holes. Disinfectants can cause deterioration of the glove material.
- After use, gloves should be removed carefully and disposed of appropriately. Use of gloves does not eliminate the need for hand washing. Hands should be washed whenever gloves are removed, since studies suggest that HCWs cannot accurately assess when glove leaks occur.
- For housekeeping activities, instrument cleaning and decontamination procedures, general-purpose household gloves (e.g. neoprene, rubber, butyl) are appropriate. These can be washed and reused but should be discarded when they become peeled, cracked or discoloured, before to the development of punctures or tears.

Note: The Canadian General Standards Board (CGSB) operates a program to certify examination gloves and surgical gloves to national standards that specify glove quality levels that exceed the minimum set by the Health Protection Branch (HPB). The CGSB certification program may aid purchasers in their evaluation of glove quality (see Appendix). In Canada, the Medical Devices Bureau, HPB, Health Canada, produces information on the quality of gloves and on latex allergies, a compendium of non-latex gloves, and the results of tests on glove protein levels.

NEEDLE PROTOCOL

- Patient and operator safety is of primary concern when administering all injectable medications.
- Single-use (disposable) needles should be discarded after one use. However, in special circumstances, disposable needles may be reused on the same patient/client (e.g. reinjecting during the current tx).
- Safeguards must be in place and continually monitored to ensure that no possibility exists for reuse of disposable needles and sharps on different patients/clients.
- All syringes must be appropriately cleaned and sterilized between patients/clients.
- The user of the sharp is responsible for ensuring its safe disposal.

SAFEGUARDING SHARPS

- Occupational acquisition of bloodborne pathogens occurs most frequently following percutaneous injury from needles and other sharp instruments.
- Used disposable syringes and needles, scalpel blades, and other sharp items should be placed in appropriate puncture-resistant containers located as close as is practical to the area in which the items are used. Bending or breaking of needles before disposal is not recommended. Lancet and scalpel blades should be removed from holders with cotton pliers or hemostat rather than with fingers.
- Used needles should never be recapped or otherwise manipulated using both hands, or by any other technique that involves directing the point of a needle toward any part of the body. If recapping cannot be avoided, either a one-handed "scoop" technique or a mechanical device designed for holding the needle sheath should be employed. Needles on non-disposable aspirating syringes should be recapped by one of these two methods before removing from the syringe. If multiple injections must be given to the same individual with a single needle, the needle should be placed in a clean, safe position where it cannot be contaminated or cause accidental injury, or covered with a safe re-sheathing device.

HANDWASHING

Hand washing is the most important procedure for preventing the transmission of bloodborne pathogens.

- Hands must be washed immediately after unprotected exposure to blood or fluids capable of transmitting bloodborne pathogens.

- Hands must be washed after a glove tear or suspected glove leak.
- Hands must be washed after removing gloves.
- Hands must be washed after handling materials that may be contaminated with blood or fluids capable of transmitting bloodborne pathogens.
- Hands must be washed before leaving a work area (e.g. the laboratory).

STERILIZATION AND DISINFECTION

Standard sterilization and disinfection procedures for health and personal care equipment currently recommended for use in a variety of health care settings (i.e. hospitals, medical and dental clinics and offices) are adequate against bloodborne pathogens when performed correctly to sterilize or disinfect instruments.

- Items contaminated with blood or fluids capable of transmitting bloodborne pathogens should be placed and transported in clearly marked containers that prevent leakage.
- Medical devices must be thoroughly cleaned of all organic debris before reuse or exposure to disinfection or sterilization processes. The manufacturer's instructions for the use of germicides should be followed. It is also important that the manufacturer's specifications for compatibility of the medical device with chemical germicides be closely followed.
- Recommended standards for sterilization methods, sterilization process monitoring, and reprocessing items must be followed in all health care and personal care settings.
- Instruments or devices that enter sterile tissue or the vascular system should be sterile and be single-use or sterilized before reuse. Devices or items that contact intact mucous membranes should be sterile or receive high-level disinfection.
- Counter tops and surfaces that may have become contaminated with blood or fluid capable of transmitting bloodborne pathogens should be cleaned using an appropriate cleaning agent and water as necessary (e.g. after each procedure, after treatment of each patient/client, at the completion of daily

work activities, and after any spill). Surfaces then should be disinfected with a suitable chemical germicide. Loose or cracked work surfaces should be replaced.

- Accessible parts of equipment requiring repair should be cleaned and disinfected prior to being shipped to the manufacturer for repair. Commercially available chemical germicides (e.g. 70% isopropyl alcohol, glutaraldehyde, quaternary ammonium compound, iodophor, 1% formalin) are effective and may be more compatible with certain medical devices that might be corroded by repeated exposure to sodium hypochlorite (household bleach), especially at 1:10 dilution.

LAUNDRY

Soiled linen may contain large numbers of pathogenic microorganisms, but the risk of disease transmission with appropriate practices is negligible.

- HCWs providing patient care must ensure that sharps are not accidentally discarded in the laundry.
- Wet linen should be placed in bags that prevent leakage and transferred to the cleaning area.
- Linen soiled with blood or fluid capable of transmitting bloodborne pathogens should be transported and cleaned by standard procedures for all wet linen.
- Clothing contaminated with blood or body fluids can be cleaned through regular laundering.

MEDICAL WASTE

- After use, disposable needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal; these containers should be located as close as practical to the use area. In acute care facilities the puncture-resistant containers must be disposed of according to regulations pertaining to waste disposal in the institution. In home care and other non-institutional settings, the puncture-resistant containers can be disposed of with other waste according to local or provincial regulations.
- Reusable sharps/sharp instruments should be placed in a puncture-resistant container for transport to the reprocessing area.
- Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down drains (avoiding contact and splashes) connected to the sanitary sewer system.
- Waste should be bagged for transport to autoclaving, incineration or a sanitary landfill in a manner that prevents leakage and that complies with institutional and provincial regulations.

CLEANING UP BLOOD/BODY FLUIDS

Studies have shown that HIV is inactivated rapidly after being exposed to commonly used chemical germicides at concentrations much lower than those used in practice. HBV is also inactivated by common chemical disinfectants, including 500 ppm sodium hypochlorite (1:10 dilution of household bleach) and some quaternary ammonium compounds. Other chemical disinfectants (e.g. iodophors, phenols) may also be effective against HBV.

- Disposable gloves should be worn during the cleanup.
- If the possibility of splashing exists, the worker should wear a face shield and gown. For large blood spills, overalls, gowns or aprons, as well as boots or protective shoe covers should be worn. Personal protective equipment should be changed if torn or soiled, and always removed prior to leaving the location of the spill.
- Wipe up blood or body fluids with absorbent paper towels
- Place contaminated paper towels in a new plastic garbage bag

- The surface must be cleaned of obvious organic material before applying a disinfectant because hypochlorites and other germicides are substantially inactivated by blood and other organic materials. Then clean and rinse area with usual disinfectant
- Wipe the surface with a 1:10 dilution of household bleach in water. This concentration can be achieved by mixing 1 ounce of household bleach with 9 ounces of tap water (1:10 dilution). This disinfectant will have a shelf life of one shift ONLY.
- Dispose into the same plastic garbage bag: the cloths used to wipe up and your gloves, removing gloves last.
- Secure bag with tie
- Dispose of plastic garbage bag as per your department's instructions
- Wash hands
- Wash hands thoroughly with soap and water for 5 minutes.
- Rinse under running water. Dry hands.