

Bloodborne Pathogens Program

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1.0 INTRODUCTION

Northwestern University is required to comply with the Occupational Safety and Health Administration (OSHA) Occupational Exposure to Bloodborne Pathogens Standard found in Title 29, Code of Federal Regulations, Part 1910.1030.

This document contains the Exposure Control Plan for University employees who may have an occupational exposure to human blood, blood products, and other potentially infectious materials.

The OSHA standard applies to employees who have occupational exposure to the following

- Blood, meaning human blood, human blood components, and products made from human blood
- The following human body fluids
 - semen
 - vaginal secretions
 - cerebrospinal fluid
 - synovial fluid
 - pleural fluid
 - pericardial fluid
 - peritoneal fluid
 - amniotic fluid
 - saliva in dental procedures
 - any body fluid that is visibly contaminated with blood
 - all body fluids in situations where it is difficult or impossible to differentiate between body fluids
- Any unfixed tissue or organ (other than intact skin) from a human, living or dead
- Human Immunodeficiency Virus (HIV)-containing cell or tissue cultures, organ cultures, and HIV- or hepatitis B Virus (HBV)-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Occupational exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral (piercing mucous membrane or skin barrier) contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

This document serves as a general guide. Principal investigators and supervisors should obtain and consult the original text of the standard and its preamble (available from the Office of Research Safety, ORS) for compliance details that may not be covered by this guide.

2.0 RESPONSIBILITIES

General responsibilities relating to health and safety at the University are described in Chemical and Biological Safety in Laboratories, which is distributed to deans, department heads, center directors, and principal investigators.

Laboratory supervisors and principal investigators are responsible for implementing the standard within their work areas. In non-research departments, department heads implement the standard. ORS coordinates the program.

3.0 REQUIREMENTS

3.1 Written Exposure Control Plan Required

The standard requires a written Exposure Control Plan(ECP)-designed to eliminate or minimize employee exposure-if employees have an occupational exposure. This document serves as the University-wide ECP. The Safety Plan for individual laboratories is the laboratory-specific portion of the ECP. Safety Plans are required for all research and research support facilities. For non-laboratory personnel, this document serves as the ECP

3.2 Accessibility of ECP

The ECP shall be maintained in the laboratory Safety Desk Book. The ECP is an integral part of the University's safety program. The Safety Desk Book is a compilation of all the laboratory's safety documents and is a valuable resource for all laboratory personnel. Non-laboratory departments shall maintain the ECP in a location easily accessible to affected employees.

3.3 Required Elements of the Plan

The ECP shall consist of

- an exposure determination-this should be made without regard to the use of personal protective equipment. The exposure determination shall contain
 - a list of job classifications in which all employees in those job classifications have occupational exposure
 - a list of job classifications in which some employees have occupational exposure
- the procedure for the evaluation of circumstances surrounding exposure incidents

3.4 Maintenance and Review

The OSHA standard requires review and updating of the ECP at least annually and whenever necessary to reflect new or modified tasks and procedures that affect occupational exposure and new or revised employee positions with occupational exposure. Non-laboratory departments shall review this document annually at a minimum. The principal investigator or supervisor is responsible for reviewing and updating the laboratory-specific information by revising the Safety Plan for the laboratory when necessary and annually by the completion of the Safety Plan Annual Review.

4.0 SAFETY PLAN

In addition to maintaining this document, principal investigators and supervisors in departments that have research or teaching laboratories are required to complete a Safety Plan if they use

hazardous materials including human blood, blood products, and other potentially infectious materials. In short, both plans are required for research and teaching laboratories.

Two sections of the Safety Plan are applicable to work with biological materials: the Human Blood, Blood Products, and Other Potentially Infectious Materials section and the Biological Agents at Biosafety Level 2 Containment section.

The questions and statements in the human blood section are derived from the Centers for Disease Control (CDC)/National Institutes of Health (NIH) publication Biosafety in Microbiological and Biomedical Laboratories; in general, they reiterate the Biosafety Level 2 criteria.

If you work with

- a. Human blood and other potentially infectious materials
- b. Human blood and other potentially infectious materials and other biological materials for which BL2 criteria apply
- c. Other biological materials for which BL2 criteria apply

You should complete the

- Blood section
- Blood section and BL2 section
- BL2 section

5.0 CHEMICAL AND BIOLOGICAL SAFETY IN LABORATORIES

Chemical and Biological Safety in Laboratories is the University's general chemical hygiene plan, as required by the OSHA Laboratory Standard, just as this document is the general ECP. Chemical and Biological Safety in Laboratories provides information and guidance to help you conduct your laboratory work safely and in compliance with environmental health and safety regulations and University policy. Principal investigators and other supervisory personnel will find it to be a useful training resource.

6.0 HIV and HBV RESEARCH LABORATORIES AND PRODUCTION FACILITIES

In the OSHA standard, an HIV or HBV research laboratory is defined as a laboratory using research-laboratory-scale amounts of HIV or HBV. A laboratory working with human blood or other potentially infectious materials that contain clinical levels of HIV or HBV is not considered to be an HIV/HBV research laboratory. Although they must comply with most requirements of the standard, most laboratories will not be subject to the additional requirements for HIV/HBV research laboratories.

A production facility is defined as a facility engaged in industrial-scale, large-volume, or high-concentration production of HIV or HBV.

HIV and HBV research laboratories and production facilities are subject to more stringent regulations. Consult the OSHA standard or contact ORS for more information about additional requirements for these facilities.

7.0 EXPOSURE CONTROL PLAN

7.1 Date

Date of this Exposure Control Plan: November 1998

7.2 Scope

This document is the written Exposure Control Plan for Northwestern University as required by the OSHA Occupational Exposure to Bloodborne Pathogens standard.

7.3 Universal Precautions

7.3.1 Definition

Universal precautions is an approach to infection control in which **all** human blood and other potentially infectious materials are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens (see appendix 4 for more examples of bloodborne pathogens).

Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. When it is difficult or impossible to differentiate between fluid types, universal precautions shall be observed.

7.4 Engineering and Work Practice Controls

7.4.1 Definitions

Engineering controls are controls that isolate or remove the bloodborne pathogens hazard from the workplace. Examples are sharps containers and self-sheathing needles.

Work practice controls are controls that reduce the likelihood of exposure by altering the manner in which a task is performed. If there remains a likelihood of occupational exposure even when engineering and work practice controls are in place, then personal protective clothing shall also be used.

7.4.2 Controls to be Used

7.4.2.1 Handwashing

Readily accessible hand washing facilities shall be provided, or, if this is not feasible, an appropriate antiseptic hand cleanser and clean cloth or paper towels. In any case, employees shall wash hands with soap and running water as soon as feasible after removal of gloves or other personal protective equipment.

The principal investigator or supervisor shall ensure that employees wash hands immediately, or as soon as feasible after removing gloves or other personal protective equipment, and also shall ensure that employees wash hands and any other skin with soap

and water or flush mucous membranes with water immediately, or as soon as feasible, following contact of such body areas with potentially infectious materials.

7.4.2.2 Needles and Sharps

Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted below. Shearing or breaking of contaminated needles is prohibited.

Contaminated needles and sharps shall be recapped or removed **only** when no alternative is feasible or when it is required by a specific medical procedure. Any recapping or removal must be accomplished through the use of a mechanical device or a one-handed technique. The recapping or removal of contaminated sharps is actively discouraged under any circumstances because of the high potential risk of injection.

Immediately after use, contaminated sharps shall be placed in sharps containers that are puncture-resistant, labeled or color-coded, and leakproof.

7.4.2.3 Eating, Drinking, Smoking, Etc.

Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure. Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, or on countertops or bench tops where blood or other potentially infectious materials are present.

7.4.3.4 Splashing, Spraying, Spattering

All procedures involving blood or other potentially infectious materials shall be performed so as to minimize splashing, spraying, spattering, and generation of droplets.

7.4.2.5 Mouth Pipetting

Mouth pipetting of blood or other potentially infectious materials is prohibited.

7.4.2.6 Specimen Containers

Specimens of blood or other potentially infectious materials shall be placed in a container that prevents leakage during collection, handling, processing, storage, transport, or shipping. Secondary containers are used when the outside of the primary container may be contaminated and when puncture of the primary container is possible. Storage, transport, or shipping containers are closed and labeled; the label should include the biohazard symbol. Color-coded containers should be red or orange.

7.4.2.7 Potentially Contaminated Equipment

Any equipment to be serviced or shipped that may be contaminated shall be examined prior to servicing or shipping and shall be decontaminated as necessary. If decontamination is not feasible, then the equipment shall be clearly labeled as to which

portions remain contaminated. The laboratory is obligated to clearly communicate this information to employees, service personnel, and manufacturers as appropriate.

7.4.2.8 Other Engineering Controls

Other engineering controls include biological safety cabinets and chemical fume hoods. Engineering controls shall be examined and maintained on a regular schedule.

Chemical fume hoods used for containment of potentially infectious material are inspected by ORS according to a regular schedule. Facilities Management inspects and maintains chemical fume hood fan and duct systems.

The principal investigator or supervisor is required to ensure that biological safety cabinets used to protect workers from hazardous biological agents shall be tested and certified after installation, whenever they are moved, and annually. Certification shall be in accordance with National Sanitation Foundation Standard Number 49.

7.5 Personal Protective Equipment

7.5.1 Responsibility

The principal investigator or supervisor shall provide or ensure provision of appropriate personal protective equipment to each employee who is subject to occupational exposure to human blood or potentially infectious material. The equipment is provided at no cost to the employee. Examples of such equipment include gloves, gowns, laboratory coats, head and foot coverings, face shields, masks, eye protection, resuscitation bags, pocket masks, or other ventilation devices.

The principal investigator or supervisor shall ensure that each employee uses personal protective equipment when warranted.

Each principal investigator in charge of a **laboratory** with employees covered under the Bloodborne Pathogens Standard shall complete a Safety Plan that documents the use of personal protective clothing and equipment in detail.

7.5.2 Availability

Protective equipment in appropriate sizes shall be available in the work area or issued to employees. Hypoallergenic gloves or similar alternatives shall be readily available to those allergic to the normal gloves provided.

7.5.3 Cleaning and Repair

The principal investigator or supervisor shall ensure that personal protective equipment shall be cleaned, laundered, or disposed of at no cost to the employee. Personal protective equipment shall be repaired or replaced as needed to maintain its effectiveness.

7.5.4 Wear in Work Areas Only

All personal protective equipment shall be removed prior to leaving the work area.

7.5.5 Gloves

Gloves shall be worn when it is reasonably anticipated that employees may have hand contact with blood, other potentially infectious materials, mucous membranes, and nonintact skin. Gloves shall be worn when performing vascular access procedures and when handling or touching contaminated items or surfaces.

Disposable gloves shall be replaced as soon as practical when contaminated, torn, punctured, or otherwise compromised in their ability to function as a barrier.

Utility gloves (nondisposable gloves) may be decontaminated for reuse provided the integrity of the glove is not compromised. They must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration.

There are specific regulations related to phlebotomy. See the OSHA standard or contact ORS for details.

7.5.6 Masks, Eye Protection, and Face Shields

Masks in combination with eye protection devices (such as goggles or glasses with solid side shields) or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious material may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

7.5.7 Gowns, Aprons, and Other Protective Body Clothing

Appropriate protective body clothing shall be worn in occupational exposure situations. When gross contamination can be anticipated, surgical caps or hoods and shoe covers should be worn.

7.6 Housekeeping

7.6.1 Responsibility

The principal investigator or supervisor is responsible for ensuring that the work area shall be maintained in a clean and sanitary condition. A written schedule for cleaning and method of decontamination is required.

7.6.2 Cleaning

All equipment and environmental and working surfaces shall be cleaned and decontaminated with an appropriate disinfectant after contact with blood or other potentially infectious material. Contaminated work surfaces shall be decontaminated after completion of procedures, immediately or as soon as feasible, after any contamination of

surfaces, or after any spill of blood or other potentially infectious materials, and at the end of the work shift if the surface may have become contaminated since the last cleaning.

Protective coverings such as plastic-backed absorbent paper shall be removed and replaced as soon as feasible when they become overtly contaminated or at the end of the work shift if they may have become contaminated during the shift.

All bins, pails, cans, and similar receptacles intended for reuse that have a reasonable likelihood of becoming contaminated shall be inspected and decontaminated on a regularly scheduled basis. They shall be cleaned or decontaminated immediately or as soon as feasible if there is visible contamination.

Environmental surfaces (e.g., floors) are routinely cleaned either by Facilities Management personnel or by an outside contractor under the direction of Facilities Management. The schedule and method of implementation are presented in their departmental procedures.

NOTE: Facilities Management or Housekeeping **do not** clean contaminated floors. If floors are overtly contaminated or suspected of being contaminated, department personnel shall clean and decontaminate the floors using appropriate procedures.

The principal investigator or supervisor shall ensure routine cleaning of work surfaces and equipment as well as cleaning and disinfecting of equipment, environmental surfaces, and work surfaces that have been in contact with human blood or other infectious materials.

Chemical disinfectants are summarized in Table 1 and Table 2 with their usage parameters, applications and the organisms for which they are effective. Any of the disinfectants listed are effective for bloodborne pathogens. Purchased disinfectants are recommended if their parameters meet those described.

7.6.3 Broken Glassware

Broken glassware that may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means, such as a brush or dustpan, a vacuum cleaner, tongs, or forceps.

7.7 Waste Disposal

7.7.1 Contaminated Sharps

Contaminated sharps shall be discarded immediately or as soon as feasible in containers that are closable, puncture-resistant, leakproof, and labeled or color-coded. Sharps containers shall be easily accessible to employees and located close to the immediate area where sharps will be used. Sharps containers shall be kept upright throughout use, be replaced routinely, and not be allowed to be overfilled.

Before sharps containers are removed from the work area, they shall be closed securely. If leakage is possible, a closable, sturdy, leakproof, and labeled or color-coded secondary container shall be used.

Principal investigators or supervisors are responsible for ensuring that appropriate sharps containers and other biohazardous waste containers are made available and are used.

7.7.2 Other Biohazardous Wastes

Other waste containers that contain blood or other potentially infectious material shall be closable, able to contain all contents, leakproof, labeled and/or color-coded, and closed securely prior to removal. If the primary waste container is contaminated on the outside, a closable, sturdy, leakproof, and labeled or color-coded secondary container shall be used, and it shall also be closed prior to removal.

7.8 Laundry

7.8.1 Instructions

Contaminated laundry shall be handled as little as possible with a minimum of agitation. It shall be placed into bags or containers at the point of use. It shall not be sorted or rinsed in the location of use. The bags or containers shall be labeled with the biohazard symbol or color-coded (red/orange). The bag or container shall be constructed to prevent soak-through or leakage.

The principal investigator or supervisor shall ensure that employees who handle contaminated laundry shall wear protective gloves and other appropriate personal protective equipment.

Current University policy on the handling of contaminated laundry requires that it be autoclaved or disinfected **prior** to laundering. This enhances the protection of those individuals who have to handle the laundry after it leaves the laboratory and simplifies the laundry handling procedures in the facility which cleans it.

Contaminated sharps shall never be included with laundry. Contaminated laundry is never washed with an individual's personal belongings or sent to a laundry service not aware of the hazards.

7.9 Hepatitis B Vaccination and Postexposure Evaluation and Follow-up

7.9.1 Responsibility

The principal investigator or supervisor is responsible for making the hepatitis B vaccine and vaccination series available to all employees who have occupational exposure. Postexposure evaluation and follow-up shall be made available to all employees who

have sustained an exposure incident. All laboratory tests shall be conducted by an accredited laboratory at no cost to the employee.

Vaccine, vaccination, and all medical evaluations and procedures

- shall be made available at no cost to the employee
- shall be made available at a reasonable time and place
- shall be performed by or under the supervision of a licensed physician or other licensed healthcare professional
- shall be provided according to the recommendations of the U.S. Public Health Service at the time the evaluations and procedures take place, except as noted below

7.9.2 Hepatitis B Vaccination

Hepatitis B vaccination shall be made available. The vaccination shall be provided/scheduled **after** the employee has received the training required in the training section of this document, and within 10 working days of initial assignment to any employee who has occupational exposure **unless** the employee has previously received the complete hepatitis B vaccination series, and antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons. Participation by the employee in a prescreening program shall not be a prerequisite for receiving hepatitis B vaccination.

An employee who accepts vaccination shall complete and sign the Consent/Waiver form.

An employee may decline vaccination but decide to accept it at a later date in accordance with Section 7.9.1 above. If an employee declines vaccination, the employee shall sign the statement also found in the Consent/Waiver form.

Any booster doses that may be recommended by the U.S. Public Health Service at a later date shall be made available in accordance with the vaccination requirements of this section.

The healthcare professional responsible for the employee's hepatitis B vaccination shall be provided with a copy of the OSHA Occupational Exposure to Bloodborne Pathogens Standard. The written opinion for hepatitis B vaccination shall depend on whether hepatitis B vaccination is indicated and if the employee has received the vaccination.

Acceptable methods of compliance with the vaccination requirement include in-house vaccination for departments having healthcare professionals on the staff and at the University Health Service (available to Evanston campus employees and to students on both campuses). Chicago campus employees should contact their supervisor for vaccination information. Contact ORS for information on recommended health care providers or health care providers with whom the University contracts to provide such services.

7.9.3 Postexposure Evaluation and Follow-up

7.9.3.1 Required Elements

Following a report of an exposure incident, the principal investigator or supervisor shall ensure that a confidential medical evaluation and follow-up are made available to the exposed employee. The evaluation shall include

- documentation of the route of exposure and the circumstances under which the exposure incident occurred
- identification and documentation of the source individual unless it is not feasible or prohibited by law
- collection and testing of the exposed employee's blood for HBV and HIV serological status
- collection of an exposed employee's blood as soon as feasible and testing after consent is obtained: Testing may take place at a later date if the employee chooses, provided it is within 90 days of the exposure incident.
- postexposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service
- counseling
- evaluation of reported illnesses

See Appendix 3 for procedures, or contact ORS for more information on where to obtain postexposure exams and follow-up care.

7.9.3.2 Notification Requirement

When an exposure incident occurs, notify the Claims Manager regarding workers' compensation if the exposed individual is an employee. All incidents shall be reported to ORS using an Incident Report form for review by the Chemical and Biological Safety Committee. In keeping with the confidentiality requirement of the University AIDS policy, the names of persons involved in the incident and other identifying information may be omitted from the incident report.

7.9.3.3 Information Provided to the Healthcare Professional

The principal investigator or supervisor shall ensure that the following information is supplied to the evaluating healthcare professional. See Section 7.15 for the form to be used.

The information shall include

- a copy of the OSHA Occupational Exposure to Bloodborne Pathogens Standard
- a description of the exposed employee's duties as they relate to the exposure incident
- documentation of the route of exposure and circumstances under which the exposure occurred
- results of the source individual's blood testing, if available
- all medical records relevant to the appropriate treatment of the employee including vaccination status that the department head is responsible for maintaining.

7.9.3.4 Written Opinion Requirement

The principal investigator or supervisor is required to obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

The healthcare professional's written opinion shall be limited to whether hepatitis B vaccination is indicated for the employee and, if the individual has received such vaccination, a statement that the individual has been informed of the results of the evaluation and that the individual has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials that require further evaluation or treatment. All other findings or diagnoses shall remain confidential and shall not be included in the written report.

All laboratory tests shall be conducted by an accredited laboratory. The employer must be able to document (e.g., by certificate) that the laboratory is accredited by a national accrediting body (such as CDC or College of American Pathologists) or equivalent state agency that participates in a recognized quality assurance program.

7.9.4 Medical Records

An accurate medical record for each employee with occupational exposure is maintained. The record includes

- name and Social Security number of the employee
- a copy of the employee's hepatitis B vaccination status, including the dates of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination
- a copy of all results of examinations, medical testing, and follow-up procedures
- a copy of the healthcare professional's written opinion

- a copy of the information provided to the healthcare professional

Employee medical records shall be kept confidential and shall not be disclosed or reported without the employee's express written consent to any person except as required by the OSHA standard and by law. If the employer has contracted with a clinic or other healthcare facility to provide the follow-up programs, the confidentiality requirements must be part of the contract.

When an exposure incident occurs, the results of the source individual's testing become a part of the confidential medical record and must be made available to the employee. Employees must be afforded unrestricted access to their medical records.

Employee medical records shall be maintained for at least the duration of employment plus 30 years.

7.10 Communication of Hazard to Employees: Labels

7.10.1 Labels

Warning labels are required on containers of biohazardous waste (unless the waste is placed into red/orange bags), refrigerators and freezers containing blood or other potentially infectious material, and other containers used to store, transport, or ship blood or other potentially infectious materials. The labels shall include the biohazard symbol and the word "biohazard." The principal investigator or supervisor shall ensure, either through inspection or delegation to supervisory staff, that appropriate labels are in place. Labels may be obtained from ORS.

7.11 Communication of Hazard to Employees: Information and Training

7.11.1 Responsibility

Principal investigators or supervisors are responsible for ensuring that all employees with occupational exposure participate in a training program, which must be provided during working hours at no cost to the employee.

7.11.2 Training Program Available

ORS maintains a training program on file on each campus that, when supplemented by site-specific information and presented in accordance with the criteria detailed below, can satisfy the training requirement of the standard.

The training program may be checked out by trainers for preview and presentation, and for copying of program documents.

The training program consists of

- a 24-minute video entitled "OSHA'S Bloodborne Pathogens Standard for Laboratories." This video covers, in a general format, OSHA regulations, protective equipment, and safe methods of performing job duties
- a trainer's guide. The guide includes training tips, video outlines and scripts, and self-tests and test keys
- video outlines for distribution to trainees
- self-test for trainees
- a handout entitled "Training Information for the Bloodborne Pathogens Compliance Program." This general training guide was developed by the Interinstitutional Safety Task Force, a safety and health working group with representatives from the member institutions of the McGaw Medical Center.

The University Health Service employs health educators who can provide training to employees. Contact the Health Service for details, including fee information.

7.11.3 Schedule

Training shall be provided at the time of initial assignment to tasks where occupational exposure may take place and at least annually thereafter. Annual training shall be provided within one year of previous training.

7.11.4 Additional Training

Principal investigators or supervisors shall ensure that employees receive additional training when changes, such as modifications of tasks and procedures or institution of new tasks or procedures, affect the employee's occupational exposure.

7.11.5 Language, Literacy, and Educational Level

Training shall consist of material appropriate in content and vocabulary to the educational level, literacy, and language of employees. If an employee is proficient in a foreign language only, the trainer or an interpreter must convey the information in that language.

7.11.6 Content

As a minimum, the training program shall contain

- an accessible copy of the standard and an explanation of its contents
- a general explanation of the epidemiology and symptoms of bloodborne diseases
- an explanation of the modes of transmission of bloodborne pathogens

- an explanation of the Exposure Control Plan and how to obtain a copy of the written plan
- an explanation of how to recognize tasks and activities that may involve exposure to blood and other potentially infectious materials
- an explanation of the use and limitations of methods that will prevent or reduce exposure, including appropriate engineering controls, work practices, and personal protective equipment
- information on the types, proper use, location, removal, handling, decontamination, and disposal of personal protective equipment
- an explanation of the basis for the selection of personal protective equipment
- information on the hepatitis B vaccine
- information on appropriate actions to take and persons to contact in an emergency
- an explanation of the procedure to follow if an exposure incident occurs
- information on postexposure evaluation and follow-up
- an explanation of the signs and labels and/or color coding
- an opportunity for interactive questions and answers

Common bloodborne diseases other than HIV and HBV, such as hepatitis A and syphilis, must be described. Uncommon diseases do not need to be described in detail unless employees work with particular bloodborne pathogens.

7.11.7 Records

Training records shall be maintained by the principal investigator or supervisor and shall include the following information. Records shall include

- dates of training sessions
- contents or summary of the training sessions
- names and qualifications of persons conducting the training
- names and job titles of all persons attending the training sessions

Training records shall be maintained for three years from the date on which the training occurred. Training records shall be provided on request for examination and copying to employees and to employee representatives.

7.11.8 Implementation

The principal investigator or supervisor shall ensure that all employees who are occupationally exposed receive training according to the requirements of the OSHA standard.

Training may be provided through the use of a combination of videotapes, handouts, pre- and post-tests, and personal presentations. Each training session shall include an opportunity for employees to ask questions. Training employees solely by means of a film or video is not permitted unless the required site-specific information is presented and a trainer is available to answer questions.

The person conducting the training is required to know the subject matter covered by the training program, including site-specific information. Possible trainers include a variety of healthcare professionals such as infection control practitioners, nurse practitioners, registered nurses, physician's assistants, or emergency medical technicians.

Non-healthcare professionals such as industrial hygienists, epidemiologists, or professional trainers may conduct the training provided they can demonstrate evidence of specialized training in the area of bloodborne pathogens.

7.12 First Aid Provision

First aid providers whose primary job is not first aid administration do not have to be offered pre-exposure hepatitis B vaccination, according to OSHA. If the so-called secondary first aid providers are exposed to human blood or other potentially infectious materials on the job, the vaccine must then be offered within 24 hours of the incident. In addition, appropriate postexposure evaluation, prophylaxis, and follow-up must be provided to employees who have an exposure incident.

If you have secondary first aid providers in your department, your written ECP must address this issue. It must include

- a reporting procedure for incidents
- a list (a log) of first aid incidents
- documentation of employee training in the specifics of the reporting procedure. Exposure incidents must be reported before the end of the same shift during which the exposure incident occurred.

Technically, the failure to offer pre-exposure hepatitis B vaccination is still a violation. As a matter of policy, OSHA considers it a *de minimis* violation and citations will not be issued.

**NORTHWESTERN UNIVERSITY
HEPATITIS B VACCINATION CONSENT/WAIVER FORM**

Name (Please Print): _____

Date of Birth: ____ / ____ / _____ Social Security Number ____ - ____ - _____

A. Consent for Hepatitis B Vaccine

I, _____ consent to be immunized against hepatitis B.

I acknowledge the following:

1. I have been informed that I am at risk of acquiring hepatitis B because of the nature of my professional responsibilities.
2. I have read the information sheet that lists the indications, benefits, and presently known side effects of hepatitis B vaccine, have had an opportunity to ask questions, and have had them answered to my satisfaction.
3. I must receive three (3) doses of vaccine over a period of six (6) months to confer optimal immunity.
4. I understand, however, as with all medical treatment, there is no guarantee that I will become immune or that I will not experience an adverse reaction to the vaccine.
5. In the event that I experience any adverse side effects or do not become immune from the vaccine I hereby hold Northwestern University harmless from any and all liability to the extent permitted under the law.
6. In the event that I should terminate employment at Northwestern University prior to receiving all three (3) doses of hepatitis B vaccine, I understand that it will be my responsibility to complete the vaccination series on my own initiative and at my own expense.

Employee Signature	Department	Date
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Are you currently pregnant or breast feeding? Yes _____ No _____.

Dose / site / Lot# / Initials: _____/_____/_____/_____

B. Previous Immunization with Hepatitis B Vaccine

I, _____, have previously completed a three-dose series of the Hepatitis B Vaccine at _____ in 19_____.

Employee Signature	Department	Date
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C. Refusal to Receive Hepatitis B Vaccine

I, _____, understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Signature	Department	Date
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7.13.1

Information About Hepatitis B and Hepatitis B Vaccine for University Employees

THE DISEASE

Hepatitis B is a viral infection caused by hepatitis B virus (HBV), which causes death in 1% to 2% of patients. Most people with HBV recover completely, but approximately 5 to 10% become chronic carriers of the virus. Most of these people have no symptoms but can continue to transmit the disease to others. Some may develop chronic active hepatitis and cirrhosis. HBV also appears to be a causative factor in the development of liver cancer. Hepatitis B may be transmitted from a pregnant woman to the fetus. Thus, immunization against HBV can prevent acute hepatitis and also reduce the sickness and death from chronic active hepatitis, cirrhosis, and liver cancer. Hepatitis B vaccine will **not** prevent hepatitis caused by other agents, such as other viruses known to infect the liver.

THE VACCINE

The recombinant hepatitis B vaccine is a noninfectious viral vaccine derived from HBV surface antigen (the viral coating material) produced in yeast cells. A portion of the hepatitis B virus gene is cloned into yeast, and the vaccine is produced from cultures of this recombinant yeast strain. This vaccine is **not** produced from human blood or blood products. The safety and effectiveness are similar to the previously available vaccine derived from human plasma. **The vaccine itself cannot cause hepatitis B.**

Immunization requires three doses of vaccine over a six-month period, although some people may not develop immunity even after three doses. The second and third doses are given one month and six months after the first dose and must be taken on time or the series will be discontinued. If in the future you want to receive the hepatitis vaccine, you must start over again with the first dose. Clinical studies have shown that the vaccine produces protective levels of immunity in greater than 90% of healthy individuals when the three-dose regimen is administered. The duration of the protective effect is unknown at present. The need for booster doses is not yet defined.

POSSIBLE VACCINE SIDE EFFECTS

The literature indicates that hepatitis B vaccine is generally well tolerated. No serious reactions have been reported. Some injection site soreness has been reported. Less common local reactions have included redness, swelling, warmth, or induration. These are generally well tolerated and usually subside within two days of vaccination. Low-grade fever occurs occasionally and is usually confined to a 48-hour period following vaccination. Other complaints such as malaise, headache, dizziness, and muscle and joint aches are infrequent and have been limited to the first few days.

You may wish to consult with your personal physician about the potential risk/benefits of this vaccine and to consult current medical literature.

7.14

EXPOSURE CONTROL PLAN

INFORMATION PROVIDED TO THE HEALTHCARE PROFESSIONAL

The healthcare professional evaluating an employee after an exposure incident shall be provided with a copy of the OSHA Occupational Exposure to Bloodborne Pathogens standard as well as the information on this form.

Date_____

Name of Exposed Employee_____

Department_____

1. Describe the exposed individual's duties as they relate to the exposure incident.

2. Describe the route(s) of exposure and circumstances under which exposure occurred.

3. Provide the results of the source individual's blood testing, if available.

4. Provide all medical records relevant to the appropriate treatment of the employee, including vaccination status. These are the department head's responsibility to maintain (attach copies).

7.15

HEALTHCARE PROFESSIONAL'S POSTEXPOSURE EVALUATION

The postexposure evaluation of an exposure incident involving an employee includes a written opinion from a healthcare professional. The department head shall obtain and provide the employee with a copy of this opinion within 15 days of the completion of the evaluation.

This opinion shall be limited to the following:

Employee Name _____

Department _____

Statement:

1. The above-named individual has been informed of the results of the postexposure evaluation.
2. The above-named individual has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials that require further evaluation or treatment.

All other findings or diagnoses shall remain confidential.

Signature of Healthcare Professional

Date

Appendix 1: Aerosols, Respiratory Protection, and Biological Safety

The OSHA standard requires that all procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of those substances. This requirement decreases the chances of direct employee exposure and reduces contamination of surfaces.

OSHA has also reviewed whether aerosols require control measures. Aerosols are solid or liquid particles, ranging in size from submicrometer to multi-micrometer, that are suspended in a gas (the gas could be air). The suspension can last from a few seconds to a day or more. Aerosols of blood can be generated by a number of processes in healthcare and research settings. Sources are surgical power tools, removal of rubber tops from evacuated blood collection tubes, blood spills, and automatic pipetting instruments. Concerns have been raised about the generation of aerosols during centrifugation.

There is disagreement over whether respiratory protection should be used to protect against aerosol inhalation, and collateral questions about critical concentration values and monitoring. Some investigators have suggested that airborne transmission may exist, while CDC and NIOSH have stated that there are no cases traceable to airborne transmission. OSHA recognizes that the matter requires further study and has referred the matter to NIOSH. In the absence of sufficient information, OSHA has not required employers to control exposures to aerosols.

There is a hierarchy of controls to prevent exposure that must be implemented, beginning with universal precautions and including engineering controls and work practices. These should be implemented before relying on personal protective equipment such as respirators.

University policy states that human blood, blood products, and other potentially infectious materials are to be handled at Biosafety Level 2 (BL2) as defined in the CDC/NIH publication Biosafety in Microbiological and Biomedical Laboratories. Under BL2, biological safety cabinets or other appropriate personal protective or physical containment devices are to be used whenever procedures with a high potential for creating infectious aerosols are conducted. These procedures may include, but are not limited to, centrifuging, grinding, blending, vigorous shaking or mixing, sonic disruption, and opening containers of infectious materials whose internal pressures may be different from ambient pressures.

Materials may be centrifuged in the open laboratory if sealed rotor heads or centrifuge safety cups are used and if these rotors or safety cups are opened only in a biological safety cabinet or other appropriate physical containment devices such as chemical fume hoods.

Other physical containment devices could include chemical fume hoods. Care should always be taken to ensure that centrifugation or other procedures inside a hood or safety cabinet do not interfere with the airflow characteristics of the device, thereby increasing the potential for material to be carried out of the device. Bench-top shields may be effective in protecting against splashing, spraying, spattering, and generation of droplets. Working in a chemical fume hood may also be effective provided the protective windows are manipulated both to maintain proper airflow and provide a physical barrier.

Appendix 2: Authorized Healthcare Providers

The Bloodborne Pathogens Standard is a performance standard; employers are informed of the requirements, and it is their responsibility to develop the methods of compliance. University departments are likewise given latitude in developing their programs and are free to obtain independently the services of healthcare providers. This supplement provides guidance on the qualifications of healthcare providers hired to perform services required by the standard.

The OSHA standard requires that all medical evaluations and procedures, including the hepatitis B vaccine and vaccination series and postexposure evaluation and follow-up, including prophylaxis, are provided by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional.

Licensed healthcare professional is defined as "a person whose legally permitted scope of practice allows him or her to independently perform the activities required by paragraph (f)." Paragraph (f) is the previous paragraph in this document.

The legal scope of practice for this professional must allow the independent performance of all the procedures related to vaccination and postexposure evaluation and follow-up. A variety of healthcare professionals may perform these functions. For example, in addition to licensed physicians, the majority of states have laws that enable advanced nurse practitioners to provide medical services independently. Nurse practitioners and clinical nurse specialists are registered nurses prepared through a formal, organized education program and certified for an advanced practical role. This group of registered nurses provides primary healthcare that includes traditional medical services as well as nursing care.

Vaccination protocols require oversight by the licensed healthcare professional. The hepatitis B vaccination must be given in the standard dose and through the standard route of administration as recommended in the USPHS/CDC guidelines. The results of any pre-vaccination antibody testing must be reviewed to determine if the employee is immune. Any contraindications must be fully characterized before vaccination is provided.

Appendix 3: Postexposure Evaluation and Follow-Up Procedure

In the rare occurrence of an employee or student being exposed to blood or other potentially infectious material, follow the procedures described below. In the event of an exposure incident, it is the department head's responsibility to ensure that a confidential medical evaluation and follow-up is made available to the exposed person.

STUDENTS

Students should notify their supervisor, call the University's Health Service (491-8100 in Evanston, 908-8134 in Chicago--available 24 hours), and consult with a physician. The physician will determine what course of treatment is appropriate for the exposure incident. The physician's evaluation should include the required elements listed in your Exposure Control Plan. If the exposure is coupled with life threatening circumstances, call the University Police at 456 immediately.

EMPLOYEES

Evanston Campus Employees

Employees should notify their supervisor and call Occupational Medicine Evanston/Glenbrook Association (OMEGA) (847) 657-7466, which the University has designated as the primary medical care facility for work-related injuries and illnesses. After normal working hours, employees should seek medical attention at Evanston Hospital's emergency room. It is important that injured employees taken to Evanston Hospital should themselves as Northwestern University OMEGA patients.

Chicago Campus Employees

Employees should notify their supervisor and call Northwestern Memorial Hospital Employee Health HOT-LINE pager at 5-7804. The health care professional carrying the pager will evaluate the exposure. Do not go to the emergency department unless instructed by the healthcare professional answering the page.

Again, if the exposure incident is coupled with life threatening circumstances, call the University Police immediately at 456. UP will contact fire department paramedics and direct them to the injured person for treatment and transportation to the hospital emergency room.

For incidents occurring on either campus, notify the Office of Risk Management, Safety and Loss Prevention Division, at 1-3253, regarding workers' compensation if the exposed individual is an employee.

All incidents shall be reported to ORS for review by the Chemical and Biological Safety Committee.

Appendix 4: Training Information for the Bloodborne Pathogens

FOREWORD

This document provides basic training information that applies to all employees who are at risk of exposure to human blood, blood products, and other potentially infectious materials.

Under the University's bloodborne pathogens program, each department is responsible for ensuring that all employees who are at risk of occupational exposure in that department receive training. Specific training information for your work area may be found in your department's Exposure Control Plan or Safety Plan.

This information was prepared by the Interinstitutional Safety Task Force, a safety and health workers group with representatives from the member institutions of the

McGaw Medical Center

Northwestern University

Northwestern Medical Faculty Foundation

Northwestern Memorial Hospital

Rehabilitation Institute of Chicago

VA Lakeside Medical Center

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1. OSHA'S OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS STANDARD

The Occupational Safety and Health Administration (OSHA) has developed a compliance standard to protect employees who may be occupationally exposed to human blood or other potentially infectious materials. The standard is found in Title 29, Code of Federal Regulations, Part 1910.1030. It was originally published in the Federal Register, vol. 56, no. 235, December 6, 1991, pp. 64175-64182.

The requirements include

- universal precautions
- engineering and work practice controls
- personal protective clothing and equipment
- housekeeping
- hepatitis B vaccination
- postexposure evaluation and follow-up
- labels and signs
- training
- record keeping

Copies of the OSHA standard are available for viewing or copying in the Office of Research Safety on each campus.

2. OCCUPATIONS WITH POTENTIAL EXPOSURE

Many persons within the University may have exposure to human blood or other potentially infectious materials as part of their work, including, but not limited to

- blood bank workers
- dentists
- dental hygienists
- dental students
- hemodialysis personnel
- housekeeping staff

- house staff (interns and residents)
- laboratory staff (clinical)
- laboratory staff (research)
- laundry workers
- medical students
- medical technicians
- nurses
- phlebotomists
- physicians
- podiatrists
- safety and security personnel

3. EXPOSURE CONTROL PLAN

An Exposure Control Plan covering your work area or job duties has been prepared by your department. It includes information on whether your job involves an exposure to human blood or other potentially infectious materials. The Exposure Control Plan also includes ways you may protect yourself from exposure as well as prevent the spread of infection to others.

4. POTENTIALLY INFECTIOUS MATERIALS

The following list represents the potentially infectious materials that are regulated by OSHA and which require careful management and control.

- human blood, blood components, and blood products
- semen
- vaginal secretions
- cerebrospinal fluid
- synovial fluid
- pleural fluid
- peritoneal fluid

- amniotic fluid
- saliva in dental procedures (frequently contains blood)
- any body fluid visibly contaminated with blood
- all body fluids in situations where it is difficult or impossible to differentiate between body fluids
- any unfixed tissue or organs (other than intact skin) from a human (living or dead)
- HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions
- blood, organs, or other tissues from experimental animals infected with HIV or HBV

5. BLOODBORNE DISEASES

There are two bloodborne diseases that merit serious concern for everyone with occupational exposure to human blood or other potentially infectious materials. They are transmitted by two viruses: Hepatitis B Virus (HBV) and the Human Immunodeficiency Virus (HIV).

A number of other pathogens may be transmitted through contact with human blood include non-a/non-b hepatitis, delta hepatitis, syphilis, malaria, babesiosis, brucellosis, leptospirosis, arboviral infections, and cytomegalovirus. By following the universal precautions described in this document you can minimize or prevent the transmission of all bloodborne diseases.

5.1 Hepatitis B Virus (HBV)

Hepatitis is an inflammation of the liver that can be caused by infectious agents, medications, or toxins. Viruses are the most common cause of hepatitis. Of the four hepatitis viruses prevalent in the United States, hepatitis B virus is the major infectious hazard to healthcare workers. It is also the most frequently occurring laboratory infection.

5.1.1 Transmission Of Hepatitis B Virus

Hepatitis B virus is found in blood, saliva, semen, vaginal secretions, and possibly other body fluids. Blood and blood-derived body fluids contain the highest quantities of virus and are the most likely routes for HBV transmission. The virus is usually found in small quantities in some other fluids such as urine.

Hepatitis B virus is transmitted by

- sexual contact with an infected person
- sharing needles

- contact with infected human materials, either
 - parenterally (direct inoculation through the skin, such as from needle sticks)
 - through mucous membranes (such as eyes and mouth)
 - through non-intact skin (such as a cut on a finger)
- infected mother to infant (perinatal)
- contact with recently contaminated surfaces in hemodialysis units
- contact with blood or body fluid spills on environmental surfaces
(**the virus can survive for several days in dried spills**)

Hepatitis B virus is not transmitted by

- casual contact
- touching or shaking hands
- eating food prepared by an infected person
- contact with drinking fountains, telephones, or toilets

5.1.2 Symptoms Of Hepatitis B Infection

Many persons never have symptoms when they become infected with hepatitis B virus, although they may transmit the disease to others. The symptoms of an acute infection usually are like the flu. They include fatigue, mild fever, muscle and joint aches, nausea, vomiting, loss of appetite, abdominal pain, diarrhea, and jaundice.

Hepatitis B is an unpredictable disease. Some infected persons have no apparent symptoms while others may be incapacitated for weeks or months. Severe cases may be fatal. About 5% to 10% of infected persons become chronic carriers who may spread the disease to others for an indefinite time. This group usually has no symptoms but may develop chronic hepatitis, cirrhosis, or liver cancer.

5.1.3 Risk Of Hepatitis B Infection

According to surveys by the Centers for Disease Control (CDC) in Atlanta, an estimated 8,700 American healthcare workers become infected with hepatitis B each year, resulting in nearly 200 deaths. Healthcare workers are about 20 times more likely to contract the virus than the general public. The table below shows a comparison of hepatitis B infection in the general adult population and in healthcare workers in this country.

Annual Estimates of the Number of Hepatitis B Virus Infections		
U.S. Adult Population & Healthcare Workers		
	U.S. Adults	Healthcare Workers
HBV infection	280,000	8,700
Clinical illness (25%)	70,000	2,175
Hospitalization (5%)	14,000	435
HBV carrier (5%-10%)	14,000-28,000	435-870
Chronic Hepatitis B (25% of the carriers)	3,500-7,000	109-218
All HBV-related deaths (2.225%)	6,230	194
Source: <u>Federal Register</u> , vol. 56, no. 235, December 6, 1991, 64028		

5.1.4 Hepatitis B Vaccine

A vaccine to protect you against hepatitis B infection is available. This vaccine is both safe and effective. It is available to employees without charge if you are at risk of occupational exposure to human blood or other potentially infectious materials.

Three shots of vaccine given in the upper arm will usually provide protection. The most common side effects of vaccination are soreness, swelling, and redness at the vaccination site.

Newer vaccines are not made from blood products. Blood-derived vaccines are processed to inactivate completely HIV and known viral groups. Vaccinated persons do not develop HIV antibodies and may donate blood unless other contraindications are present.

Hepatitis B vaccination is strongly encouraged. You may accept vaccination at any time following your training. You may decline vaccination, but if you do, you are required to sign a declination form.

5.2 Human Immunodeficiency Virus (HIV) And Acquired Immune Deficiency Syndrome (AIDS)

Acquired immune deficiency syndrome (AIDS) is caused when the human immunodeficiency virus (HIV) invades the body, damages the immune system, and allows other infectious agents to invade the body and cause disease.

5.2.1 Transmission Of HIV

HIV is spread through human body fluids, most commonly blood and semen. It has also been transmitted less frequently by vaginal secretions and breast milk. Although it has been isolated from saliva, tears, urine, cerebrospinal fluid, and amniotic fluid, some of these fluids, such as urine, have not been implicated in the transmission of HIV.

HIV is transmitted by

- sexual intercourse with an HIV-infected person
- using HIV-contaminated needles
- contact with infected human materials (see Section 4),
 - parenterally (direct inoculation through the skin or mucous membranes)
 - through mucous membranes (such as eyes and mouth)
 - through non-intact skin (such as a cut on a finger)
- transplants of HIV-infected organs and tissues, such as bone marrow
- transfusions of HIV-infected blood
- mothers to newborn infants (perinatally and breastfeeding)
- semen used for artificial insemination

HIV is not transmitted by

- casual contact with an infected person
- touching or shaking hands
- personal interactions expected of family members such as hugging or kissing on the cheeks or lips
- eating food prepared by an infected person
- sharing food, eating utensils, plates, drinking glasses, or towels

- contact with:
 - drinking fountains
 - telephones or toilets
 - other environmental surfaces
- insects or other animals

HIV is not easy to catch in the workplace. The routes of transmission in the workplace include

- needle sticks or skin punctures from sharp items contaminated with blood or other potentially infectious materials
- extensive contact, splashing, or generation of droplets of blood or other potentially infectious materials into mucous membranes or onto broken skin

The virus concentration has been observed to drop 90% to 99% on environmental surfaces within several hours.

5.2.2 Symptoms Of HIV Infection

Most persons infected with HIV display no symptoms. Infected persons with advanced HIV infection progress to AIDS. Symptoms may include fungal infections, fatigue, or weight loss. AIDS is diagnosed when a person develops an opportunistic infection. These infections occur when the immune system is severely depressed. Opportunistic infections associated with AIDS include Pneumocystis carinii pneumonia or a rare malignancy called Kaposi's sarcoma.

5.2.3 Risk Of AIDS

The first reports of AIDS in the United States came in 1981. The Centers for Disease Control reported 428,480 cases of Americans with AIDS as of October 1995 and estimate 1 to 1.5 million persons are carriers of the HIV virus.

The extent of HIV infection in general is difficult to assess accurately, and the risk of occupational exposure to HIV cannot be quantified. Infection from HIV represents a small but real hazard to persons handling human blood or other potentially infectious materials as part of their job.

5.2.4 HIV Treatment And Vaccination

AIDS is managed by treating the HIV infection, providing means of preventing infection, and treating infections or cancers when they occur.

There is currently no vaccine to prevent HIV infection. Prevention is the only way to control transmission of this disease.

6. RECOGNIZING TASKS AND ACTIVITIES INVOLVING EXPOSURE TO BLOOD

OSHA defines an occupational exposure as "reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties."

OSHA's definition of occupational exposure excludes exposures that are not reasonably expected. It also excludes exposures that are not a required part of your normal job.

If you are unsure about whether an activity may involve exposure to blood or other potentially infectious materials, ask your supervisor.

7. UNIVERSAL PRECAUTIONS

It is not possible to recognize all persons infected with HIV, or to know if blood or other materials are actually infectious. The use of **universal precautions** is therefore mandatory.

According to the concept of universal precautions, **all** human blood and other potentially infectious materials are treated **as if known to be infectious** for HBV, HIV, and other bloodborne pathogens.

Always observe universal precautions for blood and other materials. Use proper safety procedures and personal protective equipment when contacting blood or other potentially infectious materials in all circumstances.

8. GENERAL PERSONAL PROTECTIVE PRACTICES

The following work practices are universal and are intended to protect you from the risk of infection from contact with human blood and other potentially infectious materials. They must always be followed.

- a. Wash your hands immediately after removal of your gloves or other personal protective equipment and after hand contact with blood or other potentially infectious materials.
- b. Remove your protective equipment/clothing immediately when leaving your work area or as soon as possible if it is visibly contaminated.
- c. Place your protective equipment immediately in the location designated by your supervisor for storage, disinfection, or disposal.
- d. Place used needles and any sharp items only in designated, color-coded sharps containers. Never resheath, shear, bend, break, or recap a needle. Never remove used needles from disposable syringes.

- e. Never eat, drink, smoke, apply cosmetics or lip balm, or handle contact lenses in areas with potential exposure to blood or other potentially infectious materials.
- f. Refrain from habits such as face-touching, ear-pulling, or scratching.
- g. Never store food or drink in refrigerators, freezers, or cabinets where blood is stored or in areas of potential exposure to blood or other potentially infectious materials.
- h. Always minimize splashing, spraying, and generation of droplets of blood or other potentially infectious materials. When these are anticipated, wear personal protective equipment, such as gloves, safety goggles, face mask, and protective clothing.
- i. Never mouth pipette.

Additional protective practices are presented in the exposure control plan for your department or work area.

9. PERSONAL PROTECTIVE EQUIPMENT

You **must** use personal protective equipment when you handle human blood or other potentially infectious materials. Such protective equipment is designed to protect you from contact with these materials and may include

- gloves
- gowns, laboratory coats, or other protective clothing
- fluid-proof aprons
- head or foot coverings
- face shields, safety goggles, or other eye protection
- face masks

The selection and types of equipment available will be made by your supervisor in conjunction with your department and the Office of Research Safety.

Each person must evaluate individual situations and anticipate likely exposures and protective equipment needed. The Exposure Control Plan or Safety Plan for your work area or job will describe appropriate protective equipment.

10. SIGNS, LABELS, AND COLOR CODING

Red bags or containers are to be used for infectious wastes. Containers used for blood or other potentially infectious materials are to be labeled as shown:

Background: Red or Orange-Red

Word and Symbol: Contrasting

11. HIV AND HBV RESEARCH LABORATORIES AND PRODUCTION FACILITIES

Additional labeling, training, and protective practices and equipment are required by OSHA in research laboratories and production facilities engaged in the culture, production, concentration, and manipulation of HIV and HBV. These additional requirements do not apply to clinical or diagnostic laboratories engaged in the analysis of blood, tissues, or organs.

12. EMERGENCY PROCEDURES

The University has policies and procedures to assist you if you are exposed to human blood or other potentially infectious materials as part of your job. Follow-up includes antibody or antigen testing, counseling, illness reporting, and safe and effective postexposure prophylaxis according to standard medical practices. Emergency procedures are included with your department's Exposure Control Plan.

13. BIBLIOGRAPHY

Centers for Disease Control Recommendations for Prevention of HIV Transmission in Health-Care Settings. MMWR. 1987; 36 (Supplement No. 2S).

Chicago Department of Health. Surveillance Program: Office of AIDS Prevention, AIDS Chicago. Fourth Quarter Edition, December, 1990.

Richardson, J.H., and W.E. Barkley, eds. Biosafety in Microbiological and Biomedical Laboratories. 2nd Edition. May, 1988, U.S. Department of Health and Human Services. HHS Publication No. (NIH) 88-8395.

U.S. Department of Health and Human Services. Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Healthcare and Public Safety Workers. A Response to P.L. 100-607, The Health Omnibus Programs Extension Act of 1988. Centers for Disease Control, Atlanta, Georgia, 1989.

U.S. Department of Labor, Occupational Safety and Health Administration. Occupational Exposure to Bloodborne Pathogens, 29 CFR Part 1910.1030, Federal Register, Vol. 56, No. 235, December 6, 1991.

U.S. Department of Labor, Occupational Safety and Health Administration. Worker Exposure to AIDS and Hepatitis B. OSHA 3102, 1988.

TABLE 7.1 (A) SUMMARY OF PRACTICAL DISINFECTANTS

CATEGORY	DILUTION	CONTACT TIME IN MINUTES		IRRITANT TYPE		
		<u>LIPOVIRUS</u>	<u>BROAD SPECTRUM</u>	<u>SKIN</u>	<u>EYE</u>	<u>RESPIR.</u>
Quaternary ammonia cpds. (l)	0.1-2.0%	10	Not effective	Yes	Yes	No
Phenolic cpds. (l)	1.0-5.0%	10	Not effective	Yes	Yes	No
Chlorine cpds. (l)	**500 ppm	10	30	Yes	Yes	Yes
Iodophor cpds. (l)	25-1,600 ppm	10	30	Yes	Yes	No
Ethyl alcohol (l)	70-85%	10	Not effective	No	Yes	No
Isopropyl alcohol (l)	70-85%	10	Not effective	No	Yes	No
Formaldehyde (l)	0.2-8.0%	10	30	Yes	Yes	No
Glutaraldehyde (l)	2%	10	30	Yes	Yes	No
Ethylene oxide (g)	8-23 g/ft ³	60	60	Yes	Yes	Yes
Paraformaldehyde (g)	0.3 g/ft ³	60	60	Yes	Yes	Yes

l = liquid; g = gas
 **Commercially available chlorine bleach is 5.25% chlorine (52,200 ppm). A dilution of 1 to 100 will yield a 525 ppm solution, which is suitable for disinfecting purposes.

Source: Laboratory Safety Monograph, U.S. Department of Health, Education, and Welfare, Public Health Service, and National Institutes of Health, 1979.