

Preventing Disease Transmission, MSU Department of Chemistry

In the Department of Chemistry, transmission of disease to students or employees is a concern in the following activities:

1. Laboratory work involving blood or other body fluids.
2. Custodial tasks that might result in contact with contaminated waste.
3. Administration of first aid.

Persons with primary responsibility in these areas should be trained in the proper procedures for protection from disease transmission. Depending on the risk of exposure, the following guidelines are established.

The Murray State University exposure control plan is contained in Appendix A of the Bloodborne Pathogen Training manual issued by the office of Environmental Safety and Health. This document is available upon request from that office or in the office of the Laboratory/Safety/ Waste coordinator in the Department of Chemistry.

Minimal risk of exposure

This includes most faculty, staff, and student positions. These employees are not required to perform custodial tasks or administer first aid except in unusual circumstances. Knowledge of the general guidelines in this document should provide adequate training. These employees will be provided with additional training in preventing disease transmission if requested. In the event of an incident in which potential exposure to a pathogen occurs, these employees will receive blood tests for Hepatitis B and HIV and will be offered the Hepatitis B vaccination series if it has not been previously administered. These steps must occur within 24 hours of the exposure incident.

Moderate risk of exposure

This includes anyone with primary responsibility for administration of first aid, or with responsibilities that include handling laboratory waste receptacles. These employees will be provided with additional training in preventing disease transmission. This requirement may be met by viewing the film Preventing Bloodborne Disease, or by completing an approved Red Cross or other training program in preventing disease transmission. In the event of an incident in which potential exposure to a pathogen occurs, these employees will receive blood tests for Hepatitis B and HIV and will be offered the Hepatitis B vaccination series if it has not been previously administered. These steps must occur within 24 hours of the exposure incident.

High risk of exposure

This includes all students and employees working in laboratories that handle blood or other body fluids. These employees will be provided with additional training in preventing disease transmission.

This requirement may be met by viewing the film Preventing Bloodborne Disease, or by completing an approved Red Cross or other training program in preventing disease transmission. These employees will be offered the Hepatitis B vaccination series beginning with commencement of employment. The vaccination series *or* a declination statement if the employee chooses not to receive vaccinations must be completed for continued employment in this area. The employee will also be offered additional immunizations, including DPT (diphtheria, pertussis, tetanus), polio, MMR (measles, mumps, rubella), and influenza. In the event of an exposure incident, these employees will be offered medical evaluations within 24 hours. This will include blood tests for Hepatitis B and HIV and the Hepatitis B vaccination series for those who had previously declined.

Identification of diseases of primary concern

There are several serious diseases that may be transmitted by contact with blood or other body fluids containing the disease pathogens. These include hepatitis B (HBV) and HIV (which causes AIDS).

Transmission of Disease

Disease transmission depends on *all* of the following criteria being met:

1. A pathogen is present.
2. There is enough of the pathogen to cause disease.
3. A person is susceptible to the pathogen.
4. The pathogen passes through the correct entry site.

Elimination of at least one of these is sufficient to prevent disease transmission. In most cases, it is impossible to confirm either the presence or absence of a pathogen in materials contacted. Likewise, the level of pathogen present is rarely known. Thus, all potentially infectious materials should be treated as if they contain sufficient levels of pathogens to transmit a disease. For some diseases, vaccinations are available. Thus, current vaccinations are an important step toward prevention of transfer of many diseases. However, vaccinations are *not* available for some diseases, including HIV. Thus, precautions will focus primarily on preventing entry of the pathogen into the site required for transmission.

The primary routes for laboratory exposure to pathogens are through *direct* contact with blood or body fluids and through *indirect* contact with objects that have previously come in contact with blood or body fluids. The body's own primary defense system, the skin, offers good protection against exposure *if* it has not been damaged in any way. Cuts and scrapes render it vulnerable to exposure. Cuts or puncture wounds that occur *during* potential exposure (i.e., a skin prick with a contaminated needle) provide an enhanced opportunity for transmission.

Protection against disease transmission

Any contact with blood or body fluids is to be avoided. The following guidelines are recommended as minimum precautions for tasks in the Department of Chemistry that might result in exposure to these materials.

Laboratory procedures involving blood or other body fluids

The following precautions should be followed by persons working with blood or other body fluids or tissues as part of standard laboratory procedures.

1. All blood and other body fluids should be treated as if they contain pathogens for serious diseases. Likewise, all derivatives of these materials and other tissues should be handled as if they contained these pathogens.
2. All containers holding blood, other body fluids, or derivatives should be clearly labeled as biologically hazardous.
3. The supervising chemist should warn all students/employees of special hazards associated with specific samples.
4. If blood or body fluids may be inactivated for a laboratory procedure (using alcohol, formaldehyde, bleach, etc.), this step should be taken.
5. The laboratory operator should wear latex or vinyl gloves *at all times* when handling these materials. If splashing of blood or other body fluids is possible, the operator should wear goggles and/or a face mask. Normal chemistry laboratory guidelines will require use of goggles as a general safety precaution. If there is broken glass or any other sharp object involved that might tear or puncture the glove, the operator should wear *two* pairs of gloves, with heavier gloves (neoprene, for example) as the outside pair. The outside surface of the gloves should be considered contaminated. Thus, anything touched with the gloves must be disinfected or discarded as biohazardous waste. When removing gloves, avoid contact of the outside surface with bare skin. Decontamination of the gloves before removal will reduce the possibility of disease transmission.
6. All materials that come into contact with blood or body fluids must be treated as biologically hazardous. Appropriate disposal/decontamination procedures should be followed.
7. Clean and disinfect laboratory surfaces frequently. Clean up spills of all biological materials immediately, performing appropriate decontamination procedures.
8. Good general hygiene practices should be followed. Wash your hands frequently, preferably with an antibacterial soap.

Laboratory waste disposal

The following precautions should be followed by persons who must handle laboratory waste receptacles and contents.

1. Always wear gloves (preferably heavy neoprene) when handling waste.

2. When emptying laboratory solid waste receptacles, remove entire bag from trash can. Pick up bag by the *top*, never supporting or lifting from the bottom or sides. Secure the bag and place it in a suitable location for pick-up by a custodian. Never attempt to remove waste from the bag for disposal.
3. When replacing full broken glass containers, secure the top of the inside bag. Then, tape shut the box lid and transport entire box to trash dumpster.
4. Good general hygiene practices should be followed. Wash your hands after disposal is complete, preferably with an antibacterial soap.
5. Always use a broom or brush and dustpan to collect broken glass for disposal. Never sweep up glass with a bare *or* gloved hand.

Administration of First Aid

The following precautions should be taken when administering first aid or other emergency treatment to someone who is bleeding.

1. The first aid responder should wear latex or vinyl gloves *at all times*. If splashing of the blood is likely, the responder should wear goggles and/or a face mask. Normally, response to an accident in a chemistry laboratory will require use of goggles as a general safety precaution. If there is broken glass or any other sharp object involved that might tear or puncture the glove, the responder should wear *two* pairs of gloves. The outside surface of the gloves should be considered contaminated. Thus, anything touched with the gloves must be disinfected or discarded as biohazardous waste. When removing gloves, avoid contact of the outside surface with bare skin. Decontamination of the gloves before removal will reduce the risk of disease transmission.
2. If administering CPR or rescue breathing, you may wish to use a protective mask to minimize opportunity to contract contagious diseases.
3. All materials that come into contact with blood or body fluids must be treated as biologically hazardous. Appropriate disposal/decontamination procedures should be followed.
4. Clean and disinfect the accident site and the location where first aid was administered.
5. Good general hygiene practices should be followed. Wash thoroughly from your hands to your elbows after rendering first aid.

Exposure incident documentation and follow-up

Any accident, injury, or other incident that results in exposure to blood or other body fluids must be reported as follows.

1. The incident *must* be reported immediately.
2. Any person involved in the incident must be identified by name in the incident report. This includes all persons who provide first aid or other assistance that might result in exposure.
3. All persons with potential exposure in the incident must be tested within 24 hours for Hepatitis B and HIV.

4. All persons involved in the incident must be offered the full hepatitis B vaccination series as soon as possible (but no more than 24 hours after the incident occurs).
5. All persons involved in the incident must be offered follow-up medical evaluations.

Decontamination techniques

Commercial products may be used for disinfecting work surfaces or equipment contaminated by blood or other body fluids. Check the label information to confirm that the product will destroy HBV and HIV. Bleach, mixed 1:10 with water, may be used as a disinfecting agent. However, this solution must be prepared fresh daily to provide adequate protection against bloodborne diseases.

Biologically hazardous waste

If the waste may be rendered non-infectious by autoclaving or adding bleach, the treated material may be discarded in a standard sealed waste container. For large quantities of such waste, or in any instance where treatment is not a viable option, the material must be sealed in a clearly designated biohazardous waste container for off-site disposal. Any waste with multiple hazards (i.e., hazards listed in section I in addition to biological hazards) must be clearly labeled with all hazard categories identified, and prepared for off-site disposal. Waste containers for biologically hazardous materials must be puncture resistant if sharp items are present in the waste.