

WNC Policies and Procedures Manual

Procedure: **BIOSAFETY MANUAL**

Policy No.: 11-22-0

Department: Environmental Health and Safety

Contact: EH&S Officer

Policy:

The purpose of the WNC Biosafety Manual is to define policies and procedures that when implemented, will minimize risks to personnel, facilities, and the environment resulting from the use of biological agents during teaching, and clinical activities at WNC. The work practices, procedures and policies specified in this manual are based on current regulatory requirements and accepted good biosafety practices. Implementation of these measures will reduce the likelihood that an incident involving a biological agent will occur, and will fulfill regulatory biosafety expectations. Laboratory microbiological work usually involves exposure not only to biological hazards, but to chemical hazards as well. Consequently, this manual should be used in conjunction with the WNC Chemical Hygiene Plan.

Each individual laboratory must supplement this manual with laboratory specific policies, procedures and training that will minimize the specific risks present in the laboratory.

Key Words:

Animal Tissue
Biohazard
Bloodborne Pathogens
Glass
Microorganisms
Sharps
Spills
Transportation

Section 1. Scope, and Responsibilities

A. Scope

1. This manual applies to all WNC activities involving biological agents. All WNC faculty, staff, students, visitors, and employees of industry partners when working on WNC sponsored projects or at WNC facilities, are included in the scope of this manual.
2. Biological agents include all infectious microorganisms (bacteria, chlamydia, fungi, parasites, prions, rickettsias, viruses, etc.) that can cause disease in humans, or significant environmental or agricultural impact, and toxins derived from such organisms.

Research projects are not covered by this manual. Please see your division chair or EH&S department if you are doing research at WNC facilities. It may be necessary to augment this manual depending on the biological agents used.

3. In some cases WNC faculty and students may work with biological agents off-campus. In such instances, WNC personnel should use the manual for guidance; but they must comply with the Biosafety Program of the of campus facility.

B. Applicable Regulations and Guidelines

1. Centers for Disease Controls and Prevention (CDC) and the National Institutes of Health (NIH): Biosafety in Microbiological and Biomedical Laboratories (BMBL).
2. Occupational Safety and Health Administration (OSHA): Bloodborne Pathogens.
3. Title 42 CFR, Part 73. (Biological select agents and toxins)
4. Title 9 CFR, Part 121.
5. Title 7 CFR, Part 131. (Biological select agents and toxins)
6. U.S. Patriot Act

C. Responsibilities

The responsibility for biosafety at WNC is a team effort requiring the direct involvement of the WNC EH&S Advisory Committee (EH&SAC), the WNC biosafety officer(s) and Environmental Health and Safety Department (EH&S), laboratory supervisors, other faculty and staff and laboratory workers including students.

1. WNC EH&S Advisory Committee:

- a. Develop biosafety policies applicable to WNC activities, including work practices, biohazardous waste, and medical surveillance of personnel.
- b. Review and approve new research proposals in accordance with CDC/NIH guidelines.
- c. Investigate significant violations of WNC biosafety procedures or policies, and significant accidents or illnesses involving biological agents.

2. WNC Biosafety Officer(s)

The WNC biosafety officer (5) (BSO) is responsible for providing guidance on safe handling of biological agents and overall management of the biosafety program within their division. The BSO shall be a faculty member from Nursing and Allied Health and Science, Math and Engineering division. Specific responsibilities of the BSO include:

- a. Providing technical advice to the EH&S and Lab Supervisors on biosafety protocols.
- b. Developing emergency response plans for accidental spills and personnel contamination, and investigating incidents involving biological agents.
- c. Making periodic inspections of laboratories to assess biosafety issues.
- d. Keeping the EH&SAC informed of pertinent biosafety issues and program status.
- e. Providing general biosafety training for WNC personnel on a regular basis.

3. Laboratory Supervisors

Laboratory supervisors are responsible for the health and safety of all personnel in their laboratory. Specific responsibilities of the lab supervisor include:

1. Ensuring that specific laboratory hazards are effectively communicated to laboratory personnel and that controls are in place to minimize risks associated with these hazards.
 - a. Developing laboratory-specific standard operating procedures (SOPs) that cover the hazards and activities (both routine activities and unusual events) relevant to the laboratory.
 - b. Ensuring that engineering controls are available, are in good working order, and are used appropriately to minimize exposure to biohazardous agents.
 - c. Ensuring that appropriate personal protective equipment is available and used by laboratory personnel.

2. Ensuring that all laboratory personnel receive general biosafety training conducted by EH&S or their division as well as specific training on the hazards, procedures, and practices relevant to the laboratory they are working in. All training must be documented and records maintained.
3. Ensuring that laboratory workers are provided immunizations and medical surveillance prior to exposure to biohazardous agents as appropriate (based on current recommendations of the Centers for Disease Control and Prevention and EH&SAC recommendations).
4. Notifying the appropriate BSO and EH&S of any spills or incidents involving biological agents that result in exposure to laboratory personnel or the public, or release to the environment.
5. Ensuring that biological agents are disposed of as outlined in this manual.
6. Ensuring that biohazardous materials to be transported are packaged and shipped in accordance with regulations.
7. Ensuring that an accurate inventory of biological agents is maintained.
8. Ensuring that periodic assessments of the laboratory are conducted to self-identify health and safety weaknesses, and that identified weaknesses are remedied in a timely manner.

4. Laboratory Workers, Faculty and Staff and Students

Laboratory workers are the most important element in developing and maintaining a safe laboratory environment. All laboratory workers are responsible for their own health and safety, as well as that of their coworkers. Specific responsibilities include:

1. Following procedures and practices established by the College and the laboratory;
 - a. Using accepted good laboratory practices to minimize exposures to biological agents, and to avoid other incidents (such as fire, explosion, etc.);
 - b. Attend biosafety and other laboratory safety training as required;
 - c. Reporting unsafe laboratory conditions to the Lab Supervisor, EH&S, or other responsible party;
 - d. Utilize control measures and personal protective equipment to prevent exposure to biological agents, and contamination of personnel and facilities;

5. Environmental Health and Safety Department

- a. Provide biosafety training as required;
- b. Update procedures to ensure that the biosafety program keeps pace with WNC's changing educational programs;
- c. Performing periodic inspections of the biological facilities and laboratories;

Section 2. Biological Safety

Microbiological and biohazard laboratories are special work environments that may pose special infectious disease risks to persons in or near them. Personnel have contracted infections in the laboratory throughout the history of microbiological and biohazard research. A number of cases have been attributed to carelessness or poor technique in the handling of infectious materials.

The term "containment" is used in describing safe methods for managing infectious agents in the laboratory environment where they are being handled or maintained. Primary containment, the protection of personnel and the immediate laboratory environment from exposure to infectious agents, is provided by good microbiological technique and the use of appropriate safety equipment. The use of vaccines may

provide an increased level of personal protection. Secondary containment, the protection of the environment external to the laboratory from exposure to infectious materials, is provided by a combination of facility design and operational practices. The purpose of containment is to reduce exposure of laboratory workers and other persons, and to prevent escape into the outside environment of potentially hazardous agents. The three elements of containment include laboratory practice and technique, safety equipment, and facility design.

1. Laboratory Practice and Technique

The most important element of containment is strict adherence to standard microbiological practices and techniques. Persons working with infectious agents or infected materials must be aware of potential hazards and must be trained and proficient in the practices and techniques required for safely handling such material. The lab supervisor or faculty member is responsible for providing or arranging for appropriate training of personnel.

When standard laboratory practices are not sufficient to control the hazard associated with a particular agent or laboratory procedure, additional measures may be needed. The laboratory supervisor is responsible for selecting additional safety practices, which must be in keeping with the hazard associated with the agent or procedure.

Each laboratory should develop or adopt an operations manual that identifies the hazards that will or may be encountered and specifies practices and procedures designed to minimize or eliminate risks. Personnel shall be advised of special hazards and shall be required to read and follow the required practices and procedures. A scientist with training and knowledge in appropriate laboratory techniques, safety procedures, and hazards associated with handling infectious agents must direct laboratory activities. Laboratory personnel, safety practices and techniques must be supplemented by appropriate facility design and engineering features, safety equipment and management practices.

- a. Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness;
- b. Employees shall wash their hands immediately or as soon as possible after removal of gloves or other personal protective equipment and after hand contact with blood or other potentially infectious materials;
- c. All personal protective equipment shall be removed immediately upon leaving the work area or as soon as possible if overtly contaminated and placed in an appropriately designated area or container for storage, washing, decontamination or disposal;
- d. Used needles and other sharps shall not be sheared, bent, broken, recapped, or re-sheathed by hand. Used needles shall not be removed from disposable syringes;
- e. Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a potential for occupational exposure;
- f. Food and drink shall not be stored in refrigerators, freezers, or cabinets where blood or other potentially infectious materials are stored or in other areas of possible contamination. Food and drink are not permitted in labs;
- g. All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, and aerosolization of these substances, and shall comply with WNC's Bloodborne Pathogens Exposure Control Program;

2. Safety Equipment (Primary Barriers)

Safety equipment includes biological safety cabinets and a variety of enclosed containers. The biological safety cabinet is the principal device used to provide containment of infectious aerosols generated by many laboratory procedures (there are currently no biological safety cabinets in WNC Facilities).

An example of an enclosed container is the safety centrifuge cup, which is designed to prevent aerosols from being released during centrifugation.

Safety equipment also includes items for personal protection such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, and safety glasses. These personal protective devices are often used in combination with biological safety cabinets and other devices which contain the agents, animals, or materials being examined. In some situations in which it is impractical to work in biological safety cabinets, personal protective devices may form the primary barrier between personnel and the infectious materials. Examples of such activities include certain animal studies, animal necropsy, production activities, and activities relating to maintenance, service or support of the laboratory facility.

3. Personal Protective Equipment

When there is a potential for occupational exposure, the employer shall provide and assure that the employee, and students use appropriate personal protective equipment such as, but not limited to, gloves, gowns, fluid-proof aprons, laboratory coats, head and foot coverings, face shields or masks, eye protection, mouthpieces, resuscitation bags, pocket masks, or other ventilation devices.

- a. The employer shall assure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the work site or issued to employees, hypoallergenic gloves shall be readily accessible to those employees who are allergic to the gloves normally provided;
- b. The employer shall provide for the cleaning, laundering or disposal of personal protective equipment;
- c. The employer shall repair or replace required personal protective equipment as needed to maintain its effectiveness;
- d. Gloves shall be worn when the employee or student has the potential for the hands to have the direct skin contact with blood, other potentially infectious materials, mucous membranes, non-intact skin, and when handling items or surfaces soiled with blood or other potentially infectious material;
 - Disposable (single-use) gloves such as surgical or examination gloves shall be replaced as soon as possible when visibly soiled, torn, and punctured or when their ability to function as a barrier is compromised. They shall not be washed or disinfected for re-use.
 - Utility gloves may be disinfected for re-use if the integrity of the glove is not compromised, however, they must be discarded if they are cracked, peeling, discolored, torn, punctured, or exhibit other signs of deterioration.
- e. Masks and eye protection or chin-length face shields shall be worn whenever splashes, spray, spatter, droplets, or aerosols of blood or other potentially infectious materials may be generated and there is a potential for eye, nose, or mouth contamination;
- f. Appropriate protective clothing shall be worn when the employee has potential for occupational exposure. The type and characteristics will depend upon the task and degree of exposure anticipated;
 - Gowns, lab coats, aprons or similar clothing shall be worn if there is a potential for soiling of clothes with blood or other potentially infectious materials.

- Fluid resistant clothing, surgical caps or hoods shall be worn if there is a potential for splashing or spraying of blood or other potentially infectious materials.
- Fluid-proof shoe covers shall be worn if there is a potential for shoes to become contaminated and/or soaked with blood or other potentially infectious materials.

4. Housekeeping

The work site shall be maintained in a clean and sanitary condition. All equipment, environmental enclosures and working surfaces shall be properly cleaned and disinfected after contact with blood or other potentially infectious materials.

- Work surfaces shall be decontaminated with an appropriate disinfectant after completion of procedures; when surfaces are overtly contaminated; immediately after the spill of blood or other potentially infectious materials; and at the end of the work shift or class;
- Protective coverings such as plastic wrap, aluminum foil, or imperviously-backed absorbent paper may be used to cover equipment and environmental surfaces. These coverings shall be removed and replaced at the end of the work shift or when they become overtly contaminated;
- Equipment which may become contaminated with blood or other potentially infectious materials shall be checked routinely and prior to servicing or shipping and shall be decontaminated as necessary;
- All bins, pails, cans, and similar receptacles intended for re-use which have a potential for becoming contaminated with blood or other potentially infectious materials shall be inspected, cleaned, and disinfected on a regularly scheduled basis and cleaned and disinfected immediately or as soon as possible upon visible contamination;
- Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means such as a brush and dust pan, tongs, cotton swabs or forceps;
- Specimens of blood or other potentially infectious materials shall be placed in a closable, leak-proof container labeled or color-coded bag prior to being stored or transported. If outside contamination of the primary container is likely, then a second leak-proof container that is labeled or color-coded shall be placed over the outside of the first container and closed to prevent leakage during handling, storage, or transport. If puncture of the primary container is likely, it shall be placed in a leak-proof puncture-resistant secondary container;
- Reusable items contaminated with blood or other potentially infectious materials shall be decontaminated prior to washing and/or reprocessing;

5. Infectious Waste Disposal

All infectious waste destined for disposal shall be placed in closable, leak-proof containers or bags that are color-coded or labeled.

- If outside contamination of the container or bag is likely to occur then a second leak-proof container or bag which is closable and labeled or color-coded shall be placed over the outside of the first and closed to prevent leakage during handling, storage, and transport.
- Disposal of all infectious waste shall be in accordance with procedures found in chapter – of this manual.

- c. Immediately after use, sharps, i.e., broken glass, needles, pipettes, etc., shall be placed in closable, labeled or color-coded leak-proof, puncture resistant (typically hard plastic), disposable containers.
- d. These containers shall be easily accessible to personnel and located in the area of use.

6. Biosafety Levels

There are four bio-safety levels, which consist of combinations of laboratory practices and techniques, safety equipment, laboratory facilities appropriate for the operations performed and the hazard posed by the infectious agents, and for the laboratory function or activity.

- a. Biosafety Level 1:
Practices, safety equipment, and facilities are appropriate for facilities in which work is done with defined and characterized strains of viable microorganisms not known to cause disease in healthy adult humans. *Bacillus subtilis*, *Naegleria gruberi*, and infectious canine hepatitis virus are representative of those microorganisms meeting these criteria. Many agents not ordinarily associated with disease processes in humans are, however, opportunistic pathogens and may cause infection in the young, the aged, immunodeficient or immunosuppressed individuals. Vaccine strains which have undergone multiple in-vivo passages should not be considered virulent simply because they are vaccine strains;
- b. Biosafety Level 2:
Practices, equipment, and facilities are applicable to clinical facilities in which work is done with the broad spectrum of indigenous moderate-risk agents present in the community and associated with human disease of varying severity. With good microbiological techniques, these agents can be used safely in activities conducted on the open bench, provided the potential for producing aerosols is low. Hepatitis B virus, the *Salmonellae*, and *Toxoplasma* spp. are representative of microorganism assignment to this containment level. Primary hazards to personnel working with these agents may include accidental autoinoculation, ingestion, and skin or mucous membrane exposure to infectious materials. Procedures with high aerosol potential that may increase the risk of exposure to personnel must be conducted in primary containment equipment or devices;
- c. Biosafety Level 3:
Practices, safety equipment, and facilities are applicable to facilities in which work is done with indigenous or exotic agents where the potential for infection by aerosols is real and the disease may have serious or lethal consequences. Autoinoculation and ingestion also represent primary hazards to personnel working with these agents. Examples of such agents for which bio-safety Level 3 safeguards are generally recommended include *Mycobacterium tuberculosis*, St. Louis encephalitis virus and *Coxiella burnetii*;
- d. Biosafety Level 4:
Practices, safety equipment, and facilities are applicable to work with dangerous and exotic agents which pose a high individual risk of life threatening disease. All manipulations of potentially infectious diagnostic materials, isolates, and naturally or experimentally infected animals pose a high risk of exposure and infection to laboratory personnel. Lassa Fever virus is representative of the microorganisms assigned to Level 4.

Work with known agents shall be conducted at the bio-safety level recommended by the Centers for Disease Control (CDC) or the National Institute of Health (NIH), unless specific information is available to suggest the virulence, pathogenicity, antibiotic resistance patterns, and the other factors are significantly altered to require more stringent or allow less stringent practices to be used.

Clinical laboratories, and especially those in health care facilities or disease diagnostic labs, receive clinical specimens with requests for clinical support services. Typically, clinical laboratories receive specimens without pertinent information such as patient history or clinical findings which may be suggestive of an infectious etiology. Furthermore, such specimens are often submitted with a broad

request for microbiological examination for multiple agents (e.g., sputum samples submitted for "routine," acid fast, and fungal cultures).

It is the responsibility of the laboratory supervisor to establish standard procedures in the laboratory which realistically address the issue of ineffective hazard of clinical specimens. Except in extraordinary circumstances (e.g., suspected hemorrhagic fever) the initial processing of clinical specimens and identification of isolates can be and are safely conducted using a combination of practices, facilities, and safety equipment described as bio-safety level 2. Biological safety cabinets (Class I or II) should be used for the initial processing of clinical specimens when the nature of the test is requested or other information is suggestive that an agent readily transmissible by infectious aerosols is likely to be present. Class II biological safety cabinets are also used to protect the integrity of the specimens or cultures by preventing contamination from the laboratory environment.

Segregating clinical laboratory functions and limiting or restricting access to laboratory areas are the responsibility of the laboratory supervisor.

7. Additional Procedures for Working with Human Blood or Other Potentially Infectious Material

Departments with employees who have occupational exposure to blood or other potentially infectious material must follow the WNC Bloodborne Pathogen Exposure Control Plan in compliance with the OSHA Bloodborne Pathogen Standard. Contact EH&S for assistance with compliance.

8. Working with Human Tissues

All human tissue are to be assumed to be infectious (the concept of “Universal Precautions”) and must be handled using Biosafety Level 2 (BSL2) practices and procedures. Persons who are exposed to these materials in the laboratory are considered to have potential exposure to bloodborne pathogens such as human immunodeficiency virus (HIV) and hepatitis B virus (HBV), and must be included in the WNC Bloodborne Pathogens Exposure Control Preplan These persons must be offered the hepatitis B vaccination (they do not have to accept) and receive annual bloodborne pathogens training.

Section 3. Biohazardous Waste

Biohazardous waste includes waste materials derived from cultures and stocks of infectious agents, human pathological wastes, contaminated animal carcasses and body parts, all sharps, and human blood and blood products.

Proper handling and disposal of biohazardous waste is necessary to prevent infection of personnel (laboratory workers, custodians, laboratory visitors, etc.) and release to the environment. OSHA and county regulations require that biohazardous waste be properly labeled, stored, and disposed

1. Labeling of Biohazardous Waste

At a minimum, all biohazardous waste must be labeled with the universal biohazard symbol. Additional information such as the type of waste (such as “sharps”, or “liquid waste”) and origin of the waste is recommended.

2. Handling and Disposal of Biohazardous Waste

a. Sharps

Sharps include **all** syringes, lancets, scalpels, contaminated broken glass and other similar medical instruments (whether contaminated or not), as well as contaminated Pasteur pipettes, and other instruments or materials that can cut or puncture personnel;

Sharps must be collected in rigid containers that are leak proof and resistant to puncture from the sharps. Sharps containers must be designed so that sharps can be safely introduced into the container but not easily retrieved. Containers must be labeled with the universal biohazard symbol;

The Nursing and Allied Health division dispose of sharps containers through Waste Management. The Science, Math and Engineering division autoclave sharps and dispose of the autoclaved properly labeled rigid puncture resistant sealed containers in campus dumpster. The Divisions shall use a sterilization indicator and shall keep a log to confirm that the sharps were properly autoclaved;

b. Uncontaminated Laboratory Glassware and Broken Glass

Collect uncontaminated laboratory glassware and broken glass in rigid containers (separate from other waste) that will prevent cuts and punctures to personnel. Sealed rigid puncture resistant sealed containers should be labeled "broken glass." Broken glass is to be disposed of as ordinary trash (in the dumpster);

c. Solid Biohazardous Waste

Solid biohazardous waste includes microbial agents, tissue culture, and contaminated material (such as Petri dishes, pipettes, gloves, towels, etc.). Biohazardous waste **can** be autoclaved prior to disposal and a visual steam sterilization indicator (such as autoclave strips or tape) must be included on **every** biohazard bag. After autoclaving, the waste is considered non-infectious and can be disposed of as ordinary trash; however, it is required that the material be (typically hard plastic) marked non-infectious;

Nursing and Allied Health dispose of solid biological waste (un-autoclaved through Waste Management);

d. Liquid Biohazardous Waste

Liquid biohazardous waste includes all blood and liquid waste from humans or animals, and all other liquid biohazardous waste (such as microbial cultures). Collect liquid waste in closeable, rigid plastic, leak proof containers labeled with the universal biohazard symbol;

Human and animal blood and body fluids can be disposed of by flushing directly to the sanitary sewer (wear laboratory coat, safety glasses and face shield, and gloves, and be careful to minimize splashing). All other liquid waste must be autoclaved or treated with a disinfectant prior to disposal. Liquid waste treated with small quantities of bleach or other household disinfectants can be disposed of by flushing directly to the sanitary sewer. Liquid waste treated with other chemical disinfectants or containing formaldehyde or other preservatives must be disposed of as hazardous chemical waste through EH&S;

Liquid wastes generated or commercially preserved carcasses and specimens will contain formaldehyde and other preservatives and must be disposed of as hazardous waste through EH&S.

e. Animal Carcasses, Body Parts, and Tissue

Non-infectious commercially preserved carcasses are to be placed inside a double opaque plastic bag and the bag taped shut with duct tape to prevent leakage. All metal and sharps must be removed. All preserved carcasses will be sent off campus for rendering or incineration. Contact EH&S for collection. Non-preserved, carcasses or animal specimens are not permitted at WNC.

f. Handling and disposal of chemical wastes that may contain biohazard waste.

All hazardous and chemical wastes must be disposed of through Environmental Health and Safety (EH&S). Please contact EH&S when you generate such wastes. Many times hazardous materials may be commingled in other wastes, including biohazard wastes in these situations proper disposal can become more complex. Please contact EH&S for disposal assistance.

Section 4. Biohazardous Spill Response

1. Preplanning for Biohazardous Spill Cleanup

All spills of biohazardous materials do not represent the same risk to personnel and the environment, making each spill somewhat unique. Nevertheless, preplanning of spill response will lower the risk of cleaning up a spill and will increase the likelihood that the spill is handled appropriately. Laboratory supervisors should prepare their laboratory for typical spill scenarios expected in the laboratory. Laboratory workers should be informed of the hazards of the biological agents used in the laboratory, the risk associated with these agents during spill scenarios, how to safely cleanup the agents, and properly dispose of cleanup materials.

Each laboratory area should have spill cleanup materials available to respond to the largest spill anticipated for that area. It is recommended that as a minimum, the following spill cleanup materials be available in the laboratory:

- Gloves - thick chemical resistant gloves or double pair of thin, nitrile gloves recommended
- Safety goggles - face shield is strongly recommended to avoid splashes to the nose and mouth
- Lab coat or smock to protect clothing and body
- Absorbent pads
- Disinfectant appropriate for the agents used in the laboratory
- Forceps or other devices to pick up contaminated material (especially sharps)
- Sharps disposal container
- Autoclavable biohazard bags

Additional items needed for cleanup of biohazardous agents can be added to your chemical spill kit in order to customize it for your laboratory.

2. Biohazardous Spill Cleanup General Procedures

There are several factors that must be considered when assessing the risk that a spill represents. These factors include:

- Volume and concentration of the spilled material
- The infectious dose of the spilled material and routes of exposure
- Location of the spill
- Degree of aerosolization of the agent resulting from the spill
- Susceptibility of the spilled material to disinfection
- Nature of the affected surface(s) and its ability to “hide” organisms from disinfection
- Immune status of immediate personnel

As with any spill scenario (biological, chemical, or radiological), **the safety of personnel is the most important consideration**. Cleanup is to begin only after it is determined that the personnel who will cleanup the spill have appropriate knowledge, training, and equipment.

The following are general biohazardous spill cleanup procedures that are appropriate for most spill scenarios; however, the appropriate response to any spill is based on an assessment of the risk associated with that particular situation.

3. Biohazardous Spills in the Laboratory

- a. If a BSL1 agent (or less than 100 ml of a BSL2 agent) is spilled, proceed to step 4.
- b. If the spill involves a BSL3 agent, or greater than 100 ml of a BSL2 agent, immediately evacuate all personnel from the affected area. Wait for aerosol to settle (usually a minimum of 30 minutes) before entering the spill area. **Exception:** If the laboratory is not under negative pressure, cleanup should begin as soon as possible to minimize the spread of aerosols.
- c. First, call 911. If it is felt that the spill can not be managed. Then notify EH&S at 445-3327 and the lab supervisor as soon as possible for assistance with the cleanup. In addition, call Public Safety to secure the effected area and Facilities to deal with building heating, ventilating, air conditioning (HVAC) and other issues that could spread the contamination.
- d. Remove any contaminated clothing and place in a biohazard waste bag for autoclaving, and wash all areas affected by skin contact with soap and water. (make sure that personnel in the lab when the spill occurred are not spreading the contamination).
- e. Wear a long-sleeved gown or lab coat (disposable recommended), shoe covers, safety glasses (face shield also recommended), and gloves (appropriate for biological agent and disinfectant). For cleanup of a BSL3 agent, a HEPA filtered respirator may be required.
- f. Place absorbent pads over the spill (to absorb liquid), then place a second layer of disinfectant-soaked absorbent pads over the spill.
- g. Pour additional disinfectant around the spill, being careful to minimize aerosolization, and work from the periphery toward the center, ensuring thorough contact of the spill with the disinfectant. Disinfect all items in the spill area.
- h. Allow a minimum of 20 minutes contact time (or as directed by manufacturer's directions) with the disinfectant.
- i. Wipe down all equipment, tools, etc. with disinfectant.
- j. Place contaminated items in an appropriate container (biohazard waste bag, sharps container, or autoclavable pan with lid for reusable items) for autoclaving.
- k. Remove protective clothing and place in a biohazard waste bag for autoclaving.
- l. Thoroughly wash hands, forearms, and face with soap and water. It is recommended that cleanup personnel shower as soon as possible.

4. Biohazardous Spills inside a Centrifuge

- a. Clear the area of all personnel and allow aerosol to settle (usually a minimum of 30 minutes) before re-entering the area.
- b. First, call 911. If it is felt that the spill can not be managed. Then notify EH&S at 445-3327 and the lab supervisor as soon as possible for assistance with the cleanup. In addition, call Public Safety to secure the effected area and Facilities to deal with building HVAC and other issues that could spread the contamination.
- c. Wear a laboratory coat (disposable recommended), safety glasses, and gloves during cleanup. For a BSL3 agent, a HEPA filtered respirator may be required.
- d. Using an appropriate disinfectant, thoroughly disinfect the inside of the centrifuge, and the rotor and buckets.
- e. Discard cleanup materials and protective clothing as biohazardous waste.
- f. Thoroughly wash hands, forearms, and face with soap and water.

5. Biohazardous Spills Outside the Laboratory During Transport

- a. Immediately clear the area of all personnel and secure the area.
- b. Cleanup should be initiated as soon as possible to prevent spread of aerosol. Attempt cleanup **only** if appropriate cleanup materials and protective clothing are available.
- c. First call 911. If it is felt that the spill can not be managed. Then notify EH&S at 445-3327 and the lab supervisor as soon as possible for assistance with the cleanup. In addition, call Public

Safety to secure the effected area and Facilities to deal with building HVAC and other issues that could spread the contamination.

Since it is impossible to prevent aerosolization when a spill occurs outside of the laboratory, the primary emphasis when transporting biological agents is on spill prevention. All biological agents are to be transported from the laboratory inside an unbreakable, well-sealed, primary container containing absorbent material that is contained inside of a second unbreakable, well sealed, secondary container. Both the primary and secondary containers must be labeled with the universal biohazard symbol and the identity of the agent.

Section 5. Animal Care and Use in University Research, Testing, and Education Programs

All animal use activities must be conducted in accordance with all applicable laws, regulations, and guidelines. In addition, College personnel responsible for the care or use of vertebrate animals are expected to strive to exceed minimal animal care guidelines, with the goal of providing optimal care.

Section 6. Packaging and Shipping Infectious Agents

The International Civil Aviation Organization (ICAO) is the entity within the United Nations that governs all international civil aviation matters. The ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* are the regulations that govern the shipping of dangerous goods. These technical instructions have been incorporated into US law and are an acceptable method of transport in the US (49 CFR 171.11).

Packaging and shipping biological materials involves certain risks with numerous potential liabilities. The International Air Transport Association (IATA), Dangerous Goods Regulations (DGR), latest edition, is the worldwide gold standard for shipping. The IATA regulations apply to all air transport, both domestic and international flights. By following IATA DGR you ensure that your package will also meet U.S Department of Transportation requirements for ground transport. **All responsibilities** for packaging and shipment of these agents have been assigned to the shipper.

Obtain permission from the EH&S Department prior to shipping infectious agents.