

UNIVERSITY

OF

MANITOBA

BIOSAFETY GUIDE

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BIOSAFETY GUIDE

University of Manitoba

March 2005

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EMERGENCY CONTACTS

24 HOUR EMERGENCY

(Fire, Security, Medical, Maintenance):

From University phones (474- and 789-)

Dial direct 555

All other phone exchanges

Dial 474-9341 or 911

Safety Related Emergencies during normal office hours :

Contact:

Environmental Health and Safety Office at 474-6633



HUMAN BLOOD/BODY FLUIDS

POST-EXPOSURE TREATMENT PROTOCOL

Exposure to Human Blood/Body Fluids includes not only a puncture wound due to a contaminated needle or sharp instrument, but also exposure by way of a splash of Blood/Body Fluids into the eyes, mouth or non-intact skin including bites and/or scratches.

PROCEDURE – NEEDLESTICK / SPLASH INJURY

1. Get immediate **First Aid**
 - a) If puncture injury,
 - ⇒ encourage bleeding of injury site
 - ⇒ wash injury site thoroughly with soap and water
 - ⇒ cover area with sterile dressing if necessary
 - b) If eye/mucosa splash - flush with water for 15 minutes
2. Report incident to supervisor
3. Seek Medical Advice bringing with you your immunization record if possible, within 1 – 2 hours as follows:

BANNATYNE CAMPUS STAFF	
Call DOEM (787-3312) stating circumstances of the exposure.	Occupational Health Nurse Dept. of Occupational & Environmental Medicine (DOEM) NA618 - 700 McDermot Ave. (behind Health Sciences Centre) Monday to Friday: 8:30 am - 4:30 pm
If Exposure Occurs outside the above stated hours: Call DOEM. Leave message stating name, faculty or department phone number and exposure circumstances. Proceed to HSC Emergency Clinic for assessment.	

FORT GARRY CAMPUS STAFF	
Call the Occupational Health Coordinator at (474-6633) stating circumstances of the exposure.	Occupational Health Coordinator Environmental Health and Safety Office 191 Frank Kennedy Building Monday to Friday: 8:00 a.m. to 4:00 p.m.
If Exposure Occurs outside the above stated hours: Report directly to Misericordia Hospital Emergency Department, 99 Cornish Avenue. Contact the Occupational Health Coordinator the next business day.	

UNIVERSITY OF MANITOBA STAFF/STUDENTS LOCATED AT ST. BONIFACE GENERAL HOSPITAL/ST. BONIFACE RESEARCH CENTRE	
Call St. Boniface Occupational Health and Safety Office (237-2439) stating circumstances of the exposure.	Occupational Health Nurse St. Boniface General Hospital Occupational Health and Safety Monday to Friday: 7:30 a.m. to 4:00 p.m.
If Exposure Occurs Outside the above stated hours: Report to St. Boniface General Hospital Emergency Department immediately. Contact the St. Boniface General Hospital Occupational Health and Safety the next business day.	

Introduction:

The Environmental Health & Safety Office works on behalf of the University of Manitoba to address all aspects pertaining to environmental health and safety. This includes ensuring that all users are aware of all relevant legislation and establishment of policies and procedures to protect the health and safety of the staff, students and visitors. To assist the University in the establishment of policies and procedures, a series of advisory committees has been established. The Biological Safety Advisory Committee is responsible for providing advice and direction on all aspects pertaining to the use of biologically hazardous agents at the University of Manitoba.

The use of biohazardous materials must comply with the Workplace Hazardous Material Information System (WHMIS) – Bill C70 that became law on October 31, 1988.

RESPONSIBILITIES UNDER THIS LEGISLATION:

The Employer (Senior Investigator, Department Head, Dean, Director, President) must:

- Provide proper facilities and Environments
- Provide training on handling infectious materials
- Provide Material Safety Data Sheets (MSDS)
- Educate workers about risks
- Prepare a Standard Operational Protocol (SOP)

The Worker (Faculty, Support Staff & Students) must:

- Undergo all relevant training
- Understand the risks of the project
- Use safety equipment and practices
- Follow the prepared Standard Operational Protocols (SOP)
- Inform the Employer of any deficiencies in facilities or Standard Operational Protocols (SOP)

THIS MANUAL is intended to direct the Senior Investigator to WHMIS Regulations and Health Canada's '*Laboratory Biosafety Guidelines*' and help the laboratory worker adopt safe work practices. This manual is intended to be used in conjunction with Health Canada's '*Laboratory Biosafety Guidelines*' which are referred to in this manual as the "**Guidelines**". Other regulations that must be adhered to include the Transportation of Dangerous Goods Act and the City of Winnipeg bylaw on Sharps and Biomedical Waste.

NOTE: This Manual is not intended to cover work with Plant Pathogens and Transgenic Plants or Biosafety Levels for work with naturally and experimentally Infected Animals.

For Work with Animal and Zoonotic Pathogens

The Biohazard Containment and Safety Unit (BCS) of the Canadian Food Inspection Agency's 'Laboratories Directorate' has established biocontainment levels, procedures and protocols that are needed to work safely with animal and zoonotic pathogens, chemical hazards, and plant pests of quarantine significance, and to protect laboratory staff, the Canadian public, and the environment.

The biocontainment levels for working with animal and Zoonotic pathogens are described in the BCS publication *Containment Standards for Veterinary Facilities*. This Standard is now only available off the web at:

<http://www.inspection.gc.ca/english/sci/lab/convet/convete.shtml>

The Health of Animals Act and its regulations gives the CFIA the legislative authority to control the use of imported animal pathogens and pathogens associated with reportable animal diseases. Permits are required for the importation of all animal pathogens into Canada. For an agent brought into Canada under an import permit which restricts its distribution, further approval must be obtained before transferring the agent to another location. The BCS Unit also establishes the conditions under which animal pathogens will be maintained and work will be carried out. The containment level required for working with specific pathogens is kept in a listing maintained by the Unit. An Application for Permit to Import (<http://www.inspection.gc.ca/english/for/pdf/c5083perimpe.pdf>) into Canada must be made to the CFIA. After evaluation and approval by the BCS Unit, an import permit will be issued which must accompany the pathogen into Canada. A single- or multiple-entry permit will be issued according to the particular situation. The import permit will specify the conditions under which the pathogen is to be maintained and work is to be carried out. Applicants are also required to submit the application form Facility Certification for the Importation of Animal Pathogens (<http://www.inspection.gc.ca/english/for/pdf/c5083apaze.pdf>). Completed applications for the importation of animal pathogens should be sent to:

Biohazard Containment and Safety Unit
Canadian Food Inspection Agency
59 Camelot Drive
Nepean, ON
K1A 0Y9
Tel.: (613) 225-2342 (4256)

Check the web site for the most current fax # and contact person.

<http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/index.html>

For Plant Pathogens and Transgenic Plants, consult:

Canadian Food Inspection Agency(CFIA) - Plant Biosafety Office

<http://www.inspection.gc.ca/english/plaveg/pbo/pbobbve.shtml>

See also the CFIA Site Map for an overview of CFIA programs and resources

<http://www.inspection.gc.ca/english/index/sitee.shtml>

CONTACTS

U OF M Environmental Health and Safety Office – Ph: 474-6633

- Biosafety Permit Applications
- Laboratory Safety Surveys
- Biological Safety Cabinet Certification Information
- WHMIS Guidelines
- Radiation Safety

Bannatyne Campus Office,

Environmental Health & Safety Office
University of Manitoba
T157 Old Basic Sciences Building:
Winnipeg, Manitoba R3E 0W3

Biological Safety Technologist: (789)-3477
Evelyn Froese evelyn_froese@umanitoba.ca

Fort Garry Campus & General Office

Environmental Health & Safety Office
University of Manitoba
191 Frank Kennedy Centre
Winnipeg, Manitoba
R3T 2N2191

(474)-6633
(Office Hrs.: Weekdays 8:30-4:30)

Ph: (474)-6633

Biological Safety Co-ordinator (474)-8791
Prabhat Goswami pgoswam@ms.umanitoba.ca

Chair - Biological Safety Advisory Committee

- Biosafety Project Approval Certificates for External Grants and Contracts
Currently: Dr. Patrick Choy
A108 Chown Building
Ph:(789)-3375

Health Canada – Office of Laboratory Security - Ph: (613) 957-1779, Fx: (613) 941-0596
<http://www.phac-aspc.gc.ca/ols-bsl/index.html>

- Material Safety Data Sheets – Risk Group 2-4 see also page 12 of this guide
- ‘Laboratory Biosafety Guidelines’ – Manual
- Application and Permits to import Human Pathogens
<http://www.phac-aspc.gc.ca/ols-bsl/pathogen/index.html>

Canadian Food Inspection Agency (CFIA) Biohazard Containment and Safety Unit,

- Ph: (613) 225-2342 (4256) <http://www.inspection.gc.ca/english/sci/bio/bioe.shtml>

- ‘Containment Standards for Veterinary Facilities’ - Manual
 - ‘Application for Permit to Import Animal Pathogens’
 - ‘Facility Certification for the Importation of Animal Pathogens’
- The above manual and forms are only available on-line..

PERMITS AND PROTOCOLS

A **Biosafety Permit** is required for the possession and use of biological agents (Risk Group 1-3) in all research, teaching and clinical/diagnostic laboratories in University of Manitoba controlled buildings. The permit application details the requisite safety equipment, personnel involved in the laboratory procedures and the Standard Operational Protocols under which all operations with biohazardous agents in the laboratory will be conducted.

The EHSO is responsible for administering the Biosafety Program as approved by the Biological Safety Advisory Committee, and in accordance with all legislated regulations and University Policies.

Biosafety Permits are required:

1. as registration of the laboratory's biological containment level
2. as WHMIS inventory of biological agents.
3. for all **Biosafety Project Approval Certificates** (previously called-University of Manitoba Biohazard Certificate) for external research grants and contracts.

The Environmental Health and Safety Office (EHSO) must be informed of any changes to the information on the Biosafety Permit Application

A **Biosafety Project Approval Certificate** is required for all external research grant and contracts. The Biological Safety Advisory Committee reviews and approves with the applicant that the proposed research project will be carried out at the appropriate containment level.

To obtain a Biosafety Permit

Complete the Biosafety Permit Application found at the end of the Biosafety Guide or available from:

- Dr. Prabhat Goswami –8791 or Evelyn Froese –3477 –or-
- available on line at http://www.umanitoba.ca/campus/health_and_safety

Submit it to: Environmental Health and Safety Office

@Bannatyne Campus-
T157 Old Basic Sciences Building

@Fort Garry Campus-
191 Frank Kennedy Building

To obtain a Biosafety Project Approval Certificate:

1. "Biosafety Project Approval Certificate" forms can be obtained from and submitted to:
Dr. Patrick Choy Chair, Biological Safety Advisory Committee
A108 Chown Building Phone:789-3375
2. Complete the relevant information on the Biosafety Project Approval Certificate, up to and including Investigator's Declaration Signature.
3. Include any information changes, including personnel, safety equipment, biological agents used in the proposed project that are not listed on the original permit.
4. Attach a copy of your Research Summary.

Biohazardous Waste Disposal

Biohazardous waste includes material that contains biological material or substances present in or arising from the work environment that are infectious or potentially contain material that may present a hazard to the health of the worker or community. Biohazardous waste includes:

- Cultured animal cells and the potentially infectious agents which these cells may contain
- Primate body fluids and other potentially infectious clinical specimens
- Tissue or microbial cultures, and materials contaminated by such cultures, stocks or specimens of micro-organisms
- Containers or materials saturated with blood products
- Parasites
- Allergens
- Tissue from experimental animals including animal dander
- Plant viruses, bacteria, fungi
- Toxins (bacterial or plant)
- Vaccines
- Human anatomical waste (body parts or organs)
- Animal anatomical waste (carcasses, body parts, organs)

Waste disposal is an integral part of every experiment and each lab has site specific variations, therefore:

- ❖ **Each PI or supervisor must establish appropriate protocol for their agents and methods.**
- ❖ **All waste should be segregated at source.**
- ❖ **All biohazardous waste, must be appropriately decontaminated (treated) before disposal regardless of risk level of agent.** You must consult with the safety office to receive an exemption. Acceptable methods of treatment include steam autoclaving, chemical decontamination, incineration. Not all methods are appropriate for all types of waste. See (page24) for recommendations on disinfectants and see #8 as follows for requirements for autoclaving waste. EHSO may be contacted for consultation.

General Guidelines

1. Consult Section 7.4 in Chapter 7 of the Health Canada "Laboratory Biosafety Guidelines" (2nd Ed., 1996).
2. Biohazardous waste containers must hold the waste without leaking, puncturing or tearing.
3. **Transport of untreated biohazardous material between floors must be in secondary containers with a secure lid.** At a minimum, containers should be surface disinfected before leaving the lab and again after removal of biomedical waste. Transport should be done using service elevators (if available) and not on passenger elevators.
4. All biohazardous waste must be left secured at all times (i.e. do not leave it in hallways)
5. Biohazardous wastes should be disposed of frequently to reduce accumulation in the laboratories.

6. Biohazardous Wastes involving radioisotopes are considered mixed waste. Follow directions given in the U of M "Waste Disposal Chart for Radioisotope Users" or contact Radiation Safety Co-ordinator-789-3613
RADIOACTIVE WASTE MAY NOT BE AUTOCLAVED

7. Biohazardous Waste involved with chemicals are considered mixed wastes.
For further information and/or guidance contact Environmental Health & Safety Office 474-6633.
BLEACH OR "TOXIC" CHEMICALS (EG PHENOL) MAY NOT BE AUTOCLAVED

8. If you are using **autoclaving** as a treatment method for biohazardous waste, the following are requirements at the U of M.

1. A minimum of 1 hr autoclave time @ 121°C (40 minutes @132°C) unless you can prove valid decontamination in less. Valid decontamination would be double the minimum time required for a negative biological indicator test located in the centre of a bag in the centre of the load of waste. This also assumes that number, size and distribution of the bags in subsequent loads remains relatively similar to the test load.
2. Documented waste autoclave log books containing date, origin of waste, number of bags, autoclaving time and temperature.
3. Autoclave chart recording (if available) is kept for waste autoclaving loads.
4. Maintain an autoclave maintenance and repair log.
5. Minimum annual servicing with temperature verifications.
6. A minimum of monthly biological indicator testing in "as used" scenario.

9. Biohazardous waste should be segregated at source into the following categories

9.1 Solid waste

Examples- petri dishes, tissue culture flasks, plastic test tubes (**but not** sharps, glass, rigid tips)

1. Collect in **plain clear autoclave bags**, autoclave and then **package in dark garbage bags for disposal**. In this manner they can be disposed of as regular trash with the caretakers.

NOTE- They must still be clearly labelled "BIOHAZARDOUS" in the lab and during transport before autoclaving as warning to other laboratory and custodial staff.

Containers with a biohazard sign may only be used for biologically contaminated material and not for other types of waste.(e.g. ethidium bromide or other chemical or radioactive waste must have their own appropriate container and hazard logo).

Consult with EHSO for disposal of mixed waste.

Biohazard labeling must be removed after autoclaving.

It is recommended that autoclave tape is used as well and left on as indication of decontamination status.

The City of Winnipeg requires that autoclaved or treated biohazardous waste that is to be land filled through regular means, should not display biohazards signs or other labelling that could give the impression that the waste is still biohazardous. Waste is moved through a compacting system at both Fort Garry and Bannatyne campuses. This process could potentially rip the outer dark garbage bags and expose the coloured or labelled bags giving the impression that the waste poses a risk that is higher or different than what it actually is. The use of orange or other autoclave bags with pre-printed biohazard warning logos or words is still acceptable for the disposal of biohazardous material that is to be incinerated.

Fisher Catalogue(2001)is one source:

Plain clear autoclave bags are available in a variety of sizes

e.g. Cat # 01-826, 01-814-(1-3)but not (A-D), 01-832

Biohazard Warning Tape -250 labels/role, Cat# 11-884-7

Autoclave Indicator Tape

-page 42-43

-page 939

-page 41

9.2 Biomedical Sharps-

Biomedical Sharps represent both a physical and potentially infectious hazard.

The disposal of Biomedical Sharps is subject to the City of Winnipeg By-Law No.6001/92

Biomedical Sharp	Source of contamination	Method of disposal
Needles, syringes, razor and scalpel blades	Biological only (any type of biohazard)	Follow steps #1-6 below
	Chemical only	Follow steps # 1-4 below
	Radioactive only	Follow steps #1-4 below
	Mixed Waste	Consult the EHSO
Any glass, plastic or metal object which can be reasonably expected to cut or puncture an individual's body(examples: broken glass test tube, glass pasteur pipettes, rigid pipetteman tips, microscope slides)	human or animal blood, tissues, body fluids but no mixed waste	Follow steps #1-6 below
	contaminated with biohazardous waste other than human or animal blood and tissues or body fluids but no mixed waste e.g. cell lines or microbial cultures	Dispose of as in of 9.3 Glass below.

1. After using, sharps must be deposited only into an approved, appropriately labelled sharps containers(consult EHSO if you have questions)
2. Recapping of needles is prohibited. Needles and other sharps shall not be bent, sheared or purposely broken. The entire syringe and needle assembly must be disposed of into the sharps container of appropriate size.
3. Sharps containers must not be filled to more than $\frac{3}{4}$ of their total volume and contents must be secured with a tightly fitting lid when $\frac{3}{4}$ full.
4. All sharps containers are to be disposed of through the hazardous waste program. These containers are not to be reused.
5. If contaminated with Biohazardous material the container and contents should be autoclaved or otherwise appropriately decontaminated.
6. There should be autoclave tape on the sharps container as indication that the biohazardous material has been autoclaved.

9.3 Glass-

Examples- any glass, plastic or metal object which can be reasonably expected to cut or puncture an individual's body (examples: broken glass test tube, glass pasteur pipettes, rigid pipette tips, microscope slides) **and has only** been in contact with biohazardous material **other than** human or animal blood, tissues, body fluids.

1. Collect in the lab in a non-breakable, rigid, autoclavable or chemically resistant container, labeled with the biohazard warning logo. These containers can be of the reusable type.
2. Decontaminate and remove labeling. Package into a plastic bag lined, sturdy cardboard container, securely taped shut and labeled "Broken Glass" prior to disposal as regular trash with the caretakers.

9.4 Liquids-

Biohazardous agents in a non-hazardous, water soluble liquid, once sterilized by a method that is proven effective may be poured down the laboratory drain with copious amounts of water. See 'Disinfection' page 24 of University of Manitoba "Biosafety Guide"

9.5 Human and Animal Anatomical Waste-(excluding preserved specimens)

1. Must be refrigerated at 4° C or lower. Carcasses are to be placed in carcass bags (double bagged) and stored in a designated freezer until disposal.
2. Consult Radiation Safety manual for disposal of radioactively contaminated pathological waste.
3. Consult Central Animal Care Services manual for the appropriate disposal of animal waste and carcasses. Refer to S.O.P. # F3, F11, F13.
4. Bannatyne Campus: - Contact Bob Madziak (Central Animal Care Services) 789-3362 for in-house incineration at the Chown Building. Check with your department or Unit for any special steps such as keyed access etc., that are required.
Fort Garry Campus: - Contact Nelson Hoffman (Zoology Department) 474-6873 for in-house incineration.
Check with your department or Unit for any special directives.

Specific Laboratory Waste Disposal –Contact the Hazardous Waste Co-ordinator 474-6316

BASIC BIOSAFETY REQUIREMENTS

- Summary

CONTAINMENT LEVEL 1

- U of M “Biosafety Permit” for Containment Level 1-3 Laboratories –
Contact: Environmental Health and Safety Office 474-8791
- A well designed regular Microbiological Laboratory with washable walls, countertops and hand wash sink.
- Established Safe Laboratory Practices.
- Regulations: General WHMIS Safety Training and specific training for Infectious Agents (Class D, Div.3) - *Contact: Environmental Health and Safety Office 474-8791*
- Emergency First Aid Plan

CONTAINMENT LEVEL 2

- All of the above apply (Level 1)
- “Biosafety Project Approval Certificate” for External Grant and contracts
Contact: Chair, Biological Safety Advisory Committee, Currently-Dr. P. Choy 789-3375
- Biosafety Training
- Biological Safety Cabinet
- Biohazard Signage
- A written Standard Operational Protocol (SOP)
- MSDS for the Infectious Agent

CONTAINMENT LEVEL 3

- All of the above apply (Level 1 and Level 2)
- A specifically designed Containment Laboratory with air lock entry. The facility must be *certified by Health Canada Ph. (613) 957-1779 or a biosafety professional.*
- A Medical Surveillance Program in place
- Restricted entry through self closing doors

CONTAINMENT LEVEL 4

- Restricted – There are no Level 4 facilities at the University of Manitoba

RISK ASSESSMENT

“AT WHAT LEVEL SHOULD MY LABORATORY OPERATE?”

- A. Biological agents are listed in one of four Levels of Risk according to the ‘Laboratory Biosafety Guidelines’ by Health Canada. Level 1 being the lowest risk level and Level 4 the highest.

Some factors in risk assessment include:

- Virulence of infectious agents
- Toxin production
- Mode of transmission i.e. – aerosol
- Infectious dose and concentration
- Source of material

Consult the following:

1. The Material Safety Data Sheet (MSDS) – Health Canada, Office of Laboratory Security has MSDS for about 180 different infectious agents. These MSDSs provide information on Risk Levels, Safety Requirements and Emergency handling. See listing of available sheets.

Ph. (613) 957-1779.

Fx. (613) 941-0596.

Web Address:

<http://www.hc-sc.gc.ca/pphb-dgspsp/msds-ftss/index.html>

3. The Guidelines – The investigator should consult the ‘**Guidelines**’

(Web Address: <http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/index.html>)

for the correct risk group of their infectious agent and follow the specific details for that risk group. These include

- The Physical Laboratory requirements
- Safety Equipment required
- Operational protocol
- Other Safety Practices

Before an infectious agent which is not listed at Levels 2, 3, or 4 in the ‘**Guidelines**’ can be assumed to be in Risk Group 1, its pathogenicity should be verified in consultation with Health Canada’s Office of Biosafety. Likewise if an organism is listed at Level 2 and you as an expert investigator are aware of or discover previously unknown higher risk factors you should inform Health Canada, Office of Biosafety of these risk factors and proceed with your work at a higher level

- B. World Health Organization (WHO) and 1999 Poliovirus Regulations

(From CDC- NIH Guidelines; See Reference # 2)

see also : <http://www.hc-sc.gc.ca/pphb-dgspsp/ols-bsl/who-oms/index.html>

The World Health Organization (WHO) has issued guidance documents related to work with wild poliovirus in the near and long-term future. Starting in 1999, BSL-2/polio laboratories should be established for all workers wishing to manipulate wild poliovirus. BSL-2/polio follows traditional BSL-2 requirements for facilities, practices, and procedures, with the following additions:

- 1) all poliovirus stocks and potentially infectious materials are disposed of when there are no programmatic or research needs for retention;
- 2) all persons entering the laboratory are fully immunized against polio;

- 3) access to the laboratory is restricted;
- 4) all wild poliovirus retained in the laboratory is inventoried and stored in a separate secure area with limited access;
- 5) only viruses that are readily identifiable by molecular methods are used if wild virus reference strains or working stocks are required; and
- 6) Appropriate sterilization and/or incineration is used for disposing of wild polioviruses, infectious materials, and potentially infectious materials.

All laboratories wishing to retain wild poliovirus infectious or potentially infectious materials must begin implementing *BSL3/polio* containment procedures one year after detection of the last wild poliovirus and provide documentation of implementation by the second year. Laboratories wishing to qualify as a BSL3/polio facility and retain wild poliovirus infectious materials must then be listed on Agency/Institutional and National Inventories. Laboratories not wishing to convert to BSL-3/polio containment must destroy all wild poliovirus and potentially infectious materials by autoclaving or incineration. Alternatively, laboratories may contact a WHO-designated BSL-3/polio repository to arrange for transfer and storage of selected materials.

When OPV immunization stops, all work with wild poliovirus will be restricted to maximum containment (BSL-4) laboratories. These may be suit or cabinet laboratories (Section III).

C. Prions (From CDC- NIH Guidelines; See Reference # 2)

See also latest CFIA publication “ Draft: Containment Standards for the Laboratories, Animal Facilities and Post Mortem Rooms Handling Prion Disease Agents” (2005).

<http://www.inspection.gc.ca/english/sci/bio/consult/prionconsulte.shtml>

Physical properties of prions. The smallest infectious prion particle is probably a dimer of PrP^{Sc}; this estimate is consistent with an ionizing radiation target size of 55±9 kDa. Therefore, prions may not be retained by most of the filters that efficiently eliminate bacteria and viruses. Additionally, prions aggregate into particles of non-uniform size and cannot be solubilized by detergents, except under denaturing conditions where infectivity is lost. Prions resist inactivation by nucleases, UV-irradiation at 254 nm, and treatment with psoralens, divalent cations, metal ion chelators, acids (between pH 3 and 7), hydroxylamine, formalin, boiling, or proteases.

Inactivation of prions. Prions are characterized by extreme resistance to conventional inactivation procedures including irradiation, boiling, dry heat, and chemicals (formalin, betapropiolactone, alcohols). While prion infectivity in purified samples is diminished by prolonged digestion with proteases, results from boiling in sodium dodecyl sulfate and urea are variable. Sterilization of rodent brain extracts with high titers of prions requires autoclaving at 132°C for 4.5 hours (h). Denaturing organic solvents such as phenol or chaotropic reagents such as guanidine isothiocyanate or alkali such as NaOH can also be used for sterilization. Prions are inactivated by 1N NaOH, 4.0 M guanidinium hydrochloride or isocyanate, sodium hypochlorite (≥2% free chlorine concentration), and steam autoclaving at 132°C for 4.5 h. It is recommended that dry waste be autoclaved at 132°C for 4.5 h or incinerated. Large volumes of infectious liquid waste containing high titers of prions can be completely sterilized by treatment with 1N NaOH (final concentration) or autoclaving at 132°C for 4.5 h. Disposable plasticware, which can be discarded as a dry waste, is highly recommended. Because the paraformaldehyde vaporization procedure does not diminish prion titers, the biosafety cabinets must be decontaminated with 1N NaOH, followed by 1N HCl, and rinsed with water. HEPA filters should be autoclaved and incinerated.

Although there is no evidence to suggest that aerosol transmission occurs in the natural disease, it is prudent to avoid the generation of aerosols or droplets during the manipulation of tissues or fluids and during the necropsy of experimental animals. It is further strongly recommended that gloves be worn for activities that provide the opportunity for skin contact with infectious tissues and fluids. Formaldehyde-fixed and paraffinembedded tissues, especially of the brain, remain infectious. Some investigators

recommend that formalin-fixed tissues from suspected cases of prion disease be immersed for 30 min in 96% formic acid or phenol before histopathologic processing, but such treatment may severely distort the microscopic neuropathology.

RISK GROUPS AND CONTAINMENT LEVELS

LEVEL 1:

These organisms present Low Risk to the investigator and Low Risk to the Community.

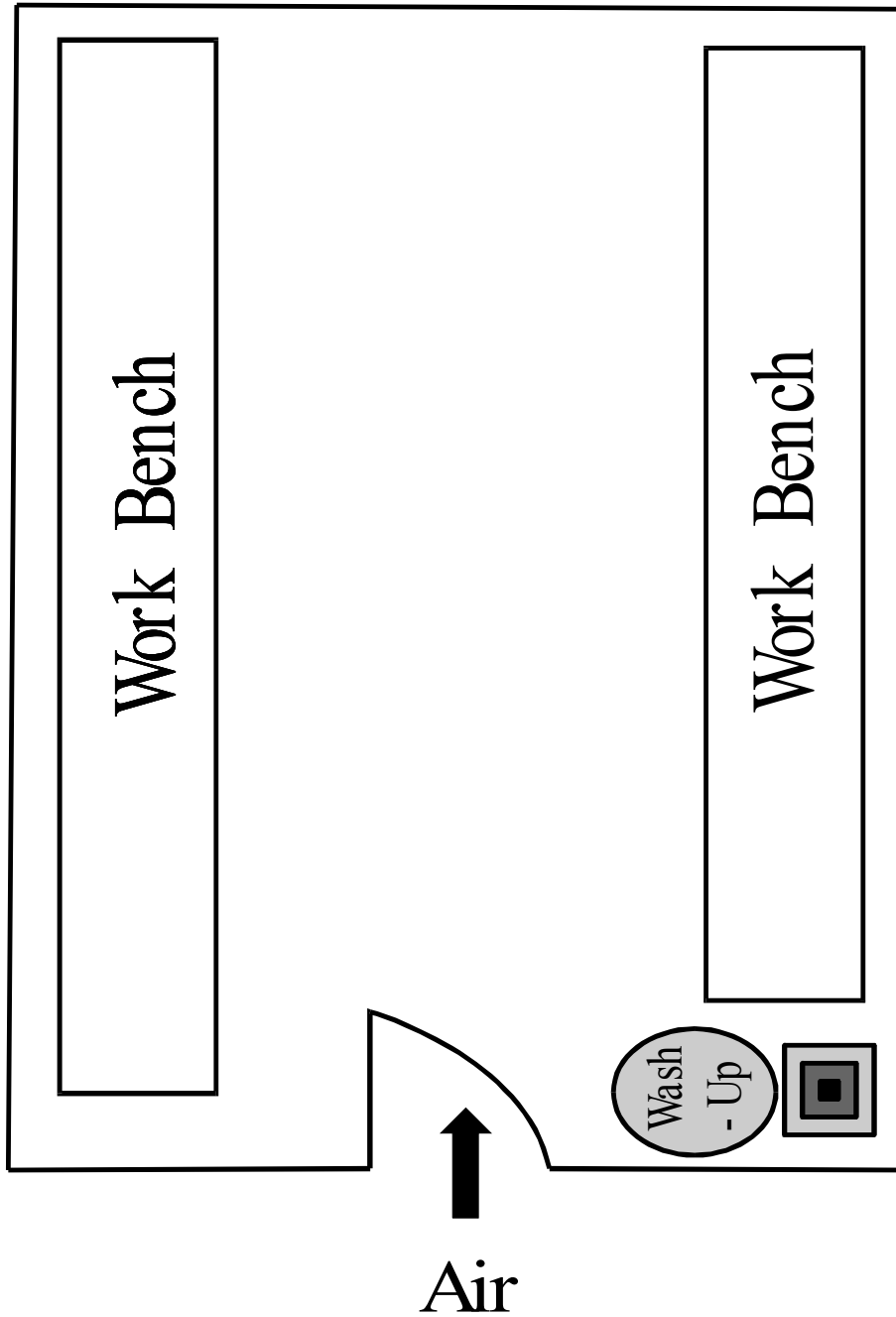
There is no listing of level 1 agents in the '**Guidelines**' and MSDS for Level 1 agents. These may typically involve saprophytic soil organisms or normal flora of laboratory animals. Confirm that the '**Guidelines**' do not classify your work at a higher risk level.

PHYSICAL REQUIREMENT:

No special design features are required. A well designed Biological laboratory with washable walls and countertops is acceptable. However it is still Level 1 risk and a hand wash station is required, usually near the exit.

Autoclave: Not required but availability desired.

Operational Protocol: No formal written protocol is required for work with Level 1 agents. But it is still a risk level and 'Good Laboratory Practices' as handwashing and disinfections of countertops should be practiced. As in any laboratory WHMIS Guidelines apply.



Basic Level 1

- Shaded components indicate minimum physical safety requirements
Additional safety equipment may be required according to risk

LEVEL 2:

Consult the ‘**Guidelines**’ for detailed requirements. Obtain a MSDS from Health Canada, Office of Biosafety for your specific agent. These agents present Moderate Risk to the researcher of coming down with a serious illness in case of contact with the infectious agent, and presents low risk to the community in case of escape from the Laboratory. Examples of Level 2 agents are: Neisseria gonorrhoeae, Helicobacter pylori, and Mammalian Cell Cultures (See notes on mammalian cells, page 19)

Biosafety Permit:	YES (U of M Environmental Health & Safety Office)
Standard Operational Protocol (SOP):	YES
Biosafety Training:	YES
Import Permit when Importing:	YES , from Health Canada and/or Canadian Food Inspection Agency
Medical Surveillance Program	YES

Physical Requirements:

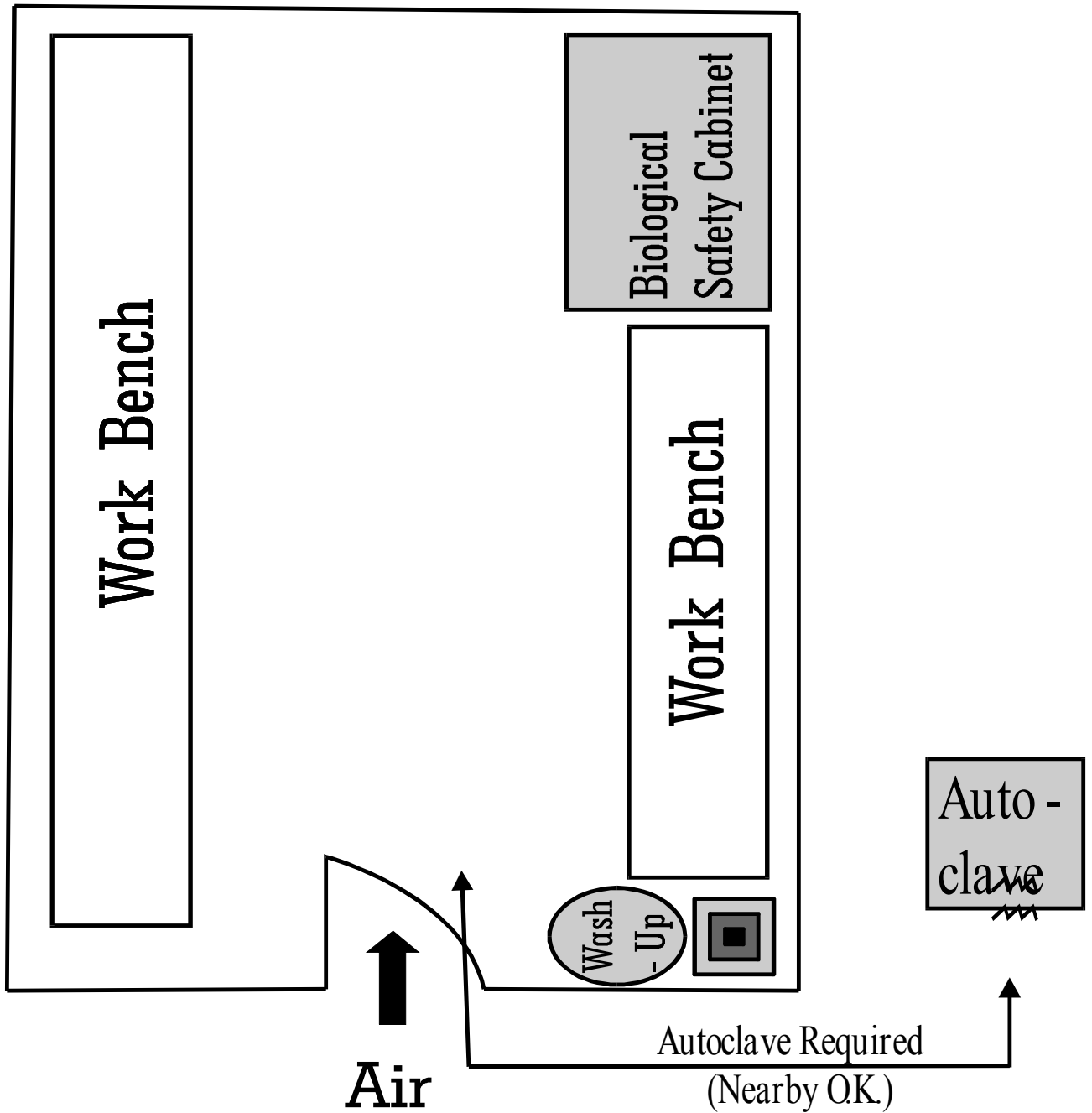
Most modern well designed Microbiological Laboratory as in level 1, washable walls and countertops will meet the requirements. A Class I or II Biological Safety Cabinet must be installed and must be used for all aerosol producing procedures.

Autoclave: Must be available. An autoclave on the same floor is acceptable with precautions when transporting infectious material to autoclave. (See section on biohazardous waste)

Standard Operational Protocol

A written standard operational protocol (SOP) is required. This protocol must include:

- Telephone numbers and names of responsible investigator and of alternate contact person
- Emergency Plans
- First Aid Treatment
- Methods of Disposal i.e. Autoclaving
- Disinfectant use; Routine and in case of spills
- Lab coat/Gown use
- Biohazard warning logo on doors with name of infectious agent.
- MSDS for biological agents used



Basic Level 2

- Shaded components indicate minimum physical safety requirements
- Additional safety equipment may be required according to risk

LEVEL 3

Consult the 'Guidelines' for detailed requirements. Obtain a MSDS from Health Canada Office of Biosafety for your specific infectious agent.

These agents present a High Risk to the researcher of coming down with a serious illness in case of contact with the infectious agent, and present a moderate risk to the community in case of escape from the laboratory. Example of Level 3 agent is Mycobacterium tuberculosis.

Biosafety Permit:	YES (U of M Environmental Health & Safety Office)
Standard Operational Protocol (SOP):	YES
Biosafety Training:	YES
Import Permit when Importing:	YES , from Health Canada and/or Canadian Food Inspection Agency
Medical Surveillance Program	YES
<u>Physical Requirements:</u>	

There are substantial engineering features designed into a Level 3 Laboratory such as air-tight perimeter of laboratory, air filtration, entry through an air lock, on-site autoclave and many other detailed requirements.

THE DESIGN OF A LEVEL 3 LABORATORY SHOULD BE DONE WITH THE HELP OF A BIOSAFETY PROFESSIONAL. ON COMPLETION AND BEFORE USE THE FACILITY SHOULD BE CERTIFIED BY HEALTH CANADA OR A QUALIFIED BIOSAFETY PROFESSIONAL.

Standard Operational Protocol

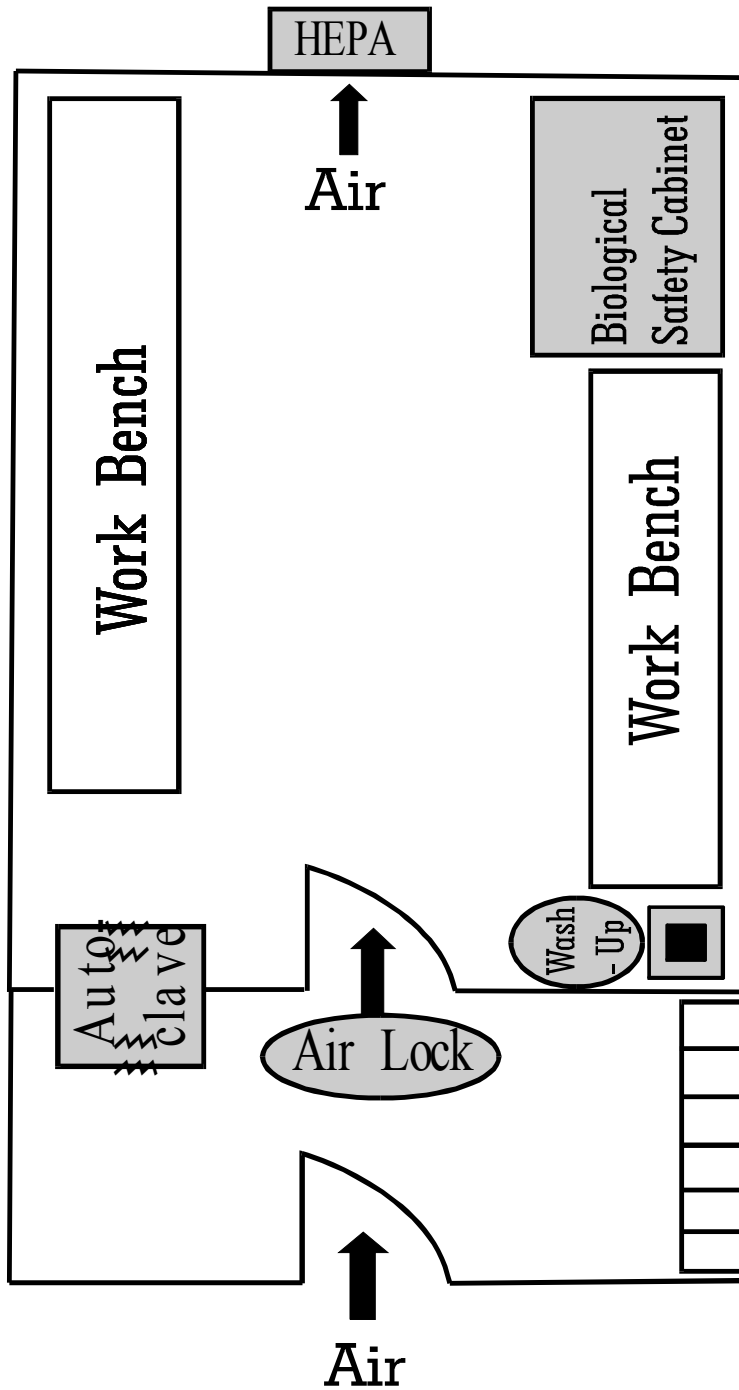
A written Standard Operational Protocol as for Level 2 is required.

In addition all items such as laundry and waste which leave the facility must be autoclaved or disinfected.

Entry through self-closing doors is restricted to authorized staff.

The doors must bear Biohazard signs.

MSDS must be available for the biological agents used.



Basic Level 3

- Shaded components indicate minimum physical safety requirements
- Additional safety equipment may be required according to risk

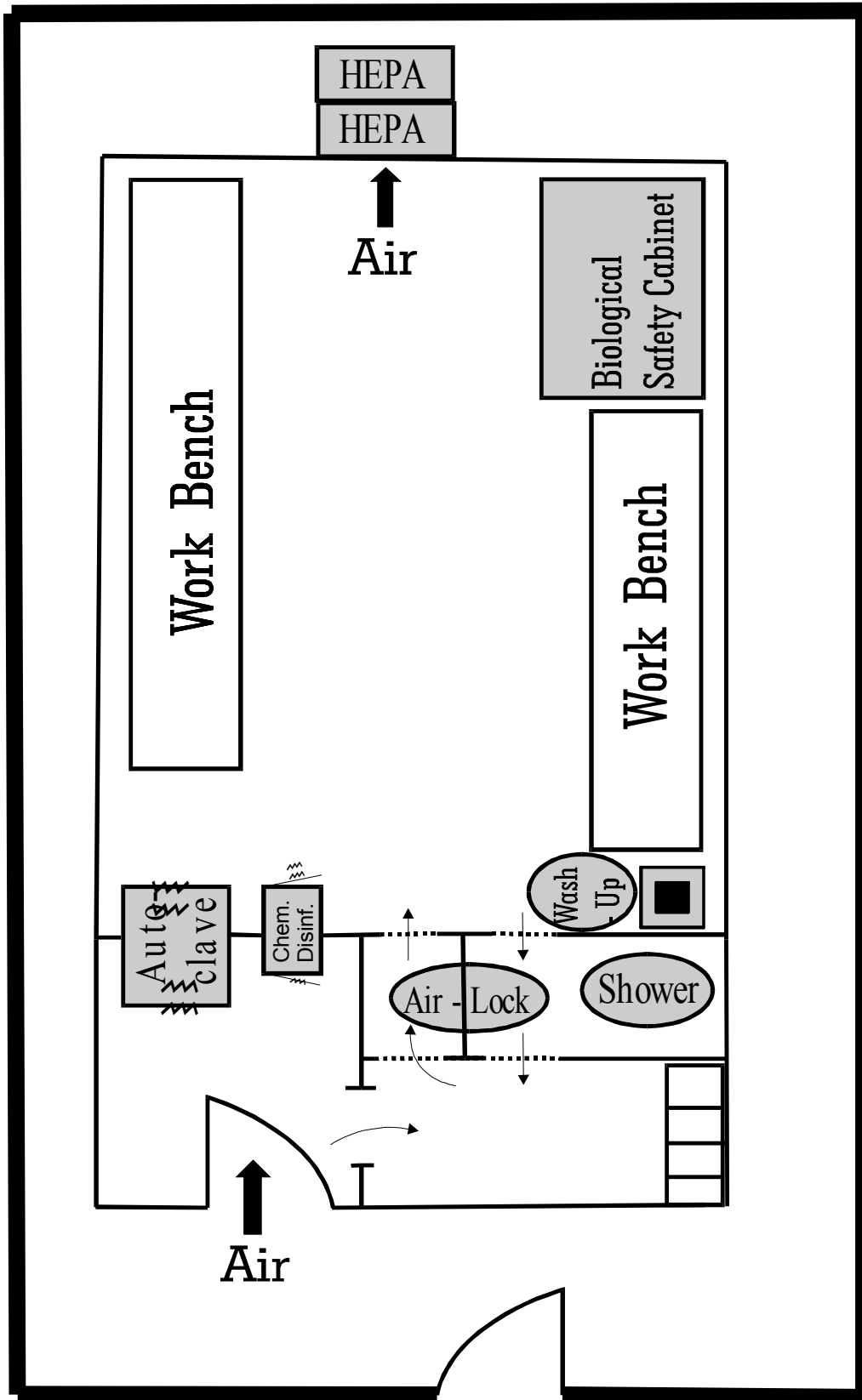
LEVEL 4

Risk Group 4 is assigned to infectious agents which present a high risk to the researcher and a high risk to the community in case of an escape from the laboratory.

Examples: Ebola virus and Lassa Fever virus.

THERE ARE NO BACTERIAL AND FUNGAL AGENTS AT LEVEL 4.

Design features include a self contained secure laboratory with many safety features within a secure building or wing of a building.



Basic Level 4

Facility within a secure building or part of a secure wing

- Shaded components indicate minimum physical safety requirements
- Additional safety equipment may be required according to risk

MAMMALIAN CELLS IN TISSUE CULTURE

Primary and immortalized mammalian cell cultures may contain infectious agents. These cells should be handled at Containment Level 2 in a Biological Safety cabinet for aerosol creating procedures until proven to be free of infectious agents.

Cells which contain a known infectious agent should be in the risk group of that infectious agent.

Primate cell lines derived from lymphoid or tumour tissue, all cell lines exposed to or transformed by a primate oncogenic virus, all primate tissue, all virus-containing primate cell lines and all mycoplasma-containing cell lines should always be handled at containment Level 2.

All work with human blood, tissues and fluids regardless of source, needs to be handled with Universal Precautions which equates to containment Level 2.

RECOMBINANT DNA & MOLECULAR BIOLOGY

Because of the numerous host-vector transfers of genetic materials possible the 'Guidelines' do not offer specific risk classification. *

Work with recombinant DNA should be placed at the higher risk level of either the Host or Vector.

If neither the Host or Vector possesses known virulence or risk factors, no biohazard restrictions are needed.

* For further information consult NIH Website:-

- NIH Guidelines for Recombinant DNA Molecules
<http://www4.od.nih.gov/oba/rac/guidelines/guidelines.html>
- NIH Office of Recombinant DNA Activities
<http://www4.od.nih.gov/oba/Rdna.htm>

BIOLOGICAL SAFETY CABINETS

Procedures with Levels 2 and 3 agents which create infectious aerosols must be done in a Class I or II Biological Safety Cabinet. Biological Safety Cabinets offer protection from aerosols only and are no substitute for a good aseptic techniques. Also the protection from aerosols in Class I and Class II in Biological Safety Cabinets is not absolute. Therefore, Class I and II Biosafety Cabinets are recommended only for work with Low to Moderate Risk infection agents (Risk Level 1-3).

Work with High Risk (Level 4) agents require a Class III (absolute barrier) cabinet or a Class II cabinet where the researcher wears a protective suit with a self-contained breathing apparatus.

CLASSIFICATION OF BIOLOGICAL SAFETY CABINETS

Biological Safety Cabinets are classified in roman numerals as Class I, II, III.

CLASS I CABINETS -- are similar to a chemical fume hood by drawing room air at 100 ft/min. through the work opening over the work area. They are recommended for work with the Levels 1 –3 infectious agents

The exhaust air is sterilized by passing through a HEPA filter.

This cabinet offers worker and environmental protection but no sterile environment to the work area.

CLASS II CABINETS -- offer worker, environmental, and work zone protection and must meet performance standards and manufacturers specification as outlined by the National Sanitation Foundation Standard NSF-49.

Class II cabinets come as Type A, Type B1, Type B2, and Type A/B3. Each of these types of cabinet offer the same degree of protection against infectious aerosols but vary in their ability to handle volatile toxic substances or radioisotopes.

Class II Type A

Must maintain a minimum airflow of 75 ft/min. through the working opening for personnel protection.

The outer walls of the contaminated plenum may be under positive pressure and must not be used with any volatile toxic substances.

This is a self-contained unit that may recirculate HEPA filtered air back into the laboratory. Optionally, these cabinets may be exhausted to the outside. The ratio of exhausted to recirculated air is 30% to 70%.

Class II Type B1

Exhaust 70% of the air through a hard ducted dedicated exhaust, and re-circulate 30% of the air.

THE EXHAUST MUST BE DESIGNED BY A MECHANICAL ENGINEER AND A CONSULTING BIOSAFETY PROFESSIONAL FOR EACH CABINET AND IT'S PROPOSED LOCATION. THE EXHAUST FAN BECOMES AN ESSENTIAL FUNCTIONAL PART OF THE CABINET WHOSE COST COULD EASILY EXCEED THE COST OF THE CABINET ITSELF.

The intake airflow through the front opening must be maintained at 100 ft/min and the outer walls of the contaminated plenum must be under negative pressure. These cabinets may be used occasionally with minute amounts of volatile toxic substances.

Class II Type B2

These are known also known as 'Total Exhaust' cabinets that are similar to Type B1 cabinets in their installation and performance except that 100% of the air is exhausted. Because there is no re-circulation of air these cabinets are used where the re-circulation of volatile toxic substances is not desirable as in the case of the antineoplastic preparation in pharmacies.

Class II TypeA/B3

These cabinets are also known as 'Convertible' Type A to B3.

They must maintain an airflow of 100 ft/min into the working opening, have the outer walls under negative pressure, recirculate 70% and exhaust 30% of the air handled.

As Type A cabinets they are self-contained and may exhaust HEPA filtered air back into the laboratory.

To covert to a Type B-3 mode the unit needs to be connected to an exhaust system. A canopy exhaust is recommended.

In the Type B-3 mode the unit may be used with occasional minute amount of volatile toxic substances.

All types of Class II cabinets are suitable for work with infectious agents at Levels 1, 2, and 3.

The Class II Type A/B3 has become the cabinet of choice because it can be converted for use with minute amounts of volatile chemical and radioisotopes simply by connecting it to an exhaust.

CLASS II BIOLOGICAL SAFETY CABINETS - Utilization

When properly installed and certified, these cabinets protect your work area, the environment and the worker from infectious aerosols.

To maximize this protection, the worker must understand the workings of the cabinet and follow a strict working protocol.

Annual certification is required to recalibrate the cabinet to CSA-Z316.3.95 or NSF-49 performance standards.

USE OF BIOLOGICAL SAFETY CABINETS

1. ALWAYS wipe the working surface and interior with an appropriate disinfectant before and after work. Pay close attention to the front intake grille.
2. NEVER rely on UV light for disinfecting the cabinet.
3. ALWAYS turn the cabinet on at least 5 minutes before working and turn off 5 minutes after finishing.
4. ALWAYS make periodic checks of gauges or warning signals.
5. NEVER change the air speed in a cabinet without the use of an air velocity meter.
6. ALWAYS use aseptic techniques.
7. NEVER use a burner other than a touch-o-matic or electric burner. (A Bunsen Burner is rarely needed inside a cabinet as the need to flame necks of bottles is removed in a sterile environment).
8. NEVER block air intake grilles.
9. NEVER use Class I or II cabinets for work with Level 4 agents.
10. ALWAYS certify the cabinet to CSA or NSF-49 standards on an annual basis.

Resources and References

The U.S. Department of Health and Human Services (Centers for Disease Control and Prevention and National Institutes of Health) has a comprehensive guideline on the Selection, Installation and Use of Biological Safety Cabinets. The guide includes pictures and diagrams of all the different classes of cabinets.

As well, various information can be found on the web site of the manufactures list on the next page.

PURCHASE OF BIOLOGICAL SAFETY CABINETS

WHAT ARE YOUR NEEDS?

- Personal Protection only?
- A Sterile Work Area?
- Both – a sterile work area and personal protection?
- Are you handling minute amounts of volatile chemicals with infectious substances?
- Will you be using Radioactive Material?
- Do you need a 4 foot or 6 foot cabinet? (Mark a 4 foot and 6 foot section of a laboratory bench and test position all materials you need to place in a cabinet on this section to establish your needs.) See ‘Biological Safety Cabinet‘ section.

Look for a unit that has been certified by National Sanitation Foundation Standard NSF-49 for performance and design standards and CSA label for electrical compliance when purchasing a cabinet. Class II cabinets only. Class I and III cabinets are not certified by NSF-49 Standards.

Next examine ergonomic factors of different models (30” vs 36” height, footrest etc.) and finally look at the cost of cabinets.

The following manufacturers have cabinets that are certified by NSF-49:

The Baker Co.
P.O. Drawes E. Sanford, Maine 04073
1-800-992-2538

Forma Scientific Inc.
P.O. Box 649 Marietta, OH 45750-0649
1-800-843-3080

Microzone Corp.
Box 11336, Station H. 25 Northside Rd, Nepean, ON
613-829-1433

NuAire Inc.
2100 Fernbrook Land,
Plymouth, Minnesota 55447
1-800-328-3352

Labconco
8811 Prospect Avenue
Kansas City, MO 64132
1-800-821-5525 or 816-333-8811
Fax 816-363-0130

The Safety Office will advise on the purchase of Biological Safety Cabinets.

CENTRIFUGATION

Centrifugation of Level 2 and Level 3 agents should be done in aerosol proof safety tubes or rotors.

These tubes or rotors must only be opened in a Biological Safety Cabinet.

DISINFECTION

An operational protocol must be in place in your SOP and include 'how to use' instructions for an appropriate disinfectant.

Effective disinfectants are recommended on each MSDS.

“DISINFECTING WITH BLEACH”

Household Bleach (5.25% concentration of Sodium Hypochlorite, NaOCl) is widely recommended as a disinfectant to inactivate viruses and bacteria.

The Centres for Disease Control (CDC) recommends the following dilutions of bleach or concentrations of Sod. Hypochlorite for the:

- Inactivation of HIV & Hepatitis B

Bleach diluted 1:10 \cong 0.50% NaOCl (5,000 ppm)

and

- Routine wipe down of surfaces:

Bleach diluted 1:100 \cong 0.05% Sod. Hypochlorite (NaOCl) (500 ppm)

Health Canada recommends for Biohazard Spills:

Bleach diluted 1:5 \cong 1.0% Sod. Hypochlorite NaOCl (10,000 ppm)

Biohazard Spill - Gently cover the spill with absorbent paper towel and apply 1% sodium hypochlorite, starting at the perimeter and working towards the centre.

Full strength household bleach (Javex) loses most of its activity in six months at room temperature. The rate of break down accelerates rapidly at low dilutions. Therefore, working dilutions should be prepared daily.

NOTE: SODIUM HYPOCHLORITE IS CORROSIVE TO METALS AND PROLONGED CONTACT WITH METALS, PARTICULARLY AT HIGH CONCENTRATIONS, SHOULD BE AVOIDED.

Alcohol:

70% Ethyl or 70% isopropyl alcohol are effective against many bacteria and viruses. Alcohols are non-corrosive, flammable and have a high evaporation rate.

Phenolics: (Lysol, Fullphene)

Iodophores: (Wescodyne)

Gluteraldehydes: Cidex

Quaternary Ammonium Compounds: Not recommended for Biohazards

For any disinfectant:

1. Ask for independent laboratory test results which may show antimicrobial activities against any one of these:

Staphylococcus aureus

Mycobacterium bovis

Salmonella typhimurium

Pseudomonas aeruginosa

Polio virus

Rota virus

2. Use as per manufacturer's directions.
3. Obtain Material Safety Data Sheet (MSDS)
4. Perform your 'In Use' test if possible, using your 'Target' organism with the disinfectant which is prepared under local conditions, i.e. – dilute with local water and use under actual protein load.

IMPORTING

IMPORTING INFECTIOUS AGENTS AND ANIMAL PRODUCTS

AGENTS

REQUIREMENTS

Risk Group LEVEL 1

No Permit is required.

Risk Group LEVEL 2

Submit a pre-numbered application which is available from:

Health Canada Office of Biosafety

Laboratory Centre for Disease Control

Ottawa, ON K1A 0L2

Postal Location 0700A1

Ph. (613) 957-1779 Fax (613) 941-0596

<http://www.phac-aspc.gc.ca/ols-bsl/pathogen/index.html>

The permit must be sent to the shipper of the infectious substance and attached to outside of the shipping container.

Multiple shipments of the same infectious species from the same source are possible for 1 year on the same multiple entry permit.

Risk Group LEVEL 3

Apply for a permit as for Level 2. Permits may be issued for one single entry only, and only for shipments to Health Canada certified Level 3 Laboratory facilities.

Risk Group LEVEL 4

Prohibited entry into Canada.

ANIMAL PATHOGENS:

The importation of infectious agents that are known to cause diseases i.e. animals and for animal products require an import permit from:

Animal Biohazard Containment and Safety Unit

Canadian Food Inspection Agency

59 Camelot Dr.

Nepean, ON K1A 0Y9

Tel. (613) 225-2342

Check the web site for the most current Fax # and Contact person

<http://www.inspection.gc.ca/english/sci/bio/bioe.shtml>

An infectious agent that is known to cause disease in human and in animals requires permits from both Health Canada and the Animal Health Division.

REFERENCES

1. 'Laboratory Biosafety Guidelines' 2nd Edition -1996
'Laboratory Biosafety Guidelines' 3rd Edition -2005
Health Canada
2. 'Biosafety In Microbiology and Biomedical Laboratories'
CDC-NIH, 4th Edition - 1999
U.S. Dept. of Health and Human Sciences
3. Canadian Standard Association
Z316.3 'Biological Containment Cabinets (Class I and II)
4. NSF International (NSF)
Standard 49
Class II (Laminar Flow) Biohazard Cabinetry
5. 'Containment Standards for Veterinary Facilities' 1st Edition – 1996
Agriculture and Agri-Food Canada
6. 'Biohazards Reference Manual' Reprinted 1986
American Industrial Hygiene Association

Material Safety Data Sheets

Available from Health Canada , Office of Laboratory Security Website:

<http://www.hc-sc.gc.ca/pphb-dgsp/MSDS-ftss/index.html>

Material Safety Data Sheets (MSDS), regulated under Workplace Hazardous Materials Information System (WHMIS) legislation, for chemical products have been available to workers for many years. However because many laboratory workers, whether in research, public health, teaching, etc., are exposed to not only chemicals but infectious substances as well, there was a large gap in the readily available safety literature for employees. These MSDS are produced for personnel working in the life sciences as quick safety reference material relating to infectious micro-organisms.

The MSDS are organized to contain health hazard information such as infectious dose, viability (including decontamination), medical information, laboratory hazard, recommended precautions, handling information and spill procedures. The intent of these documents is to provide a safety resource for laboratory personnel working with these infectious substances. Because these workers are usually working in a scientific setting and are potentially exposed to much higher concentrations of these human pathogens than the general public, the terminology in these MSDS is technical and detailed, containing information that is relevant specifically to the laboratory setting. It is hoped along with good laboratory practises, these MSDS will help provide a safer, healthier environment for everyone working with infectious substances.

Please note that although the information, opinions and recommendations contained in these Material Safety Data Sheets are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

Other Web site Resources and References

Health Canada-Search and Quick Pick Web-site

http://www.hc-sc.gc.ca/pphb-dgspsp/search_e.html

Quick search and link to Health Canada Web-sites including Group 2 Risk Agents MSDS, Current issues, "Laboratory Biosafety Guidelines" etc.

Canadian Food Inspection Agency(CFIA) Web-site.

<http://www.inspection.gc.ca/english/sci/bio/bioe.shtml>

Veterinary Laboratory Containment Standards and forms for importing animal pathogens.. Researchers (including at the U of M) are using some zoonotic organisms that require both Health Canada and CFIA importation permits. CFIA has recently started to regulate the importing of animal pathogens more closely. This web site has links to the Laboratory Standard for working with Animal Pathogens in the Laboratory(only available online) and copies of forms that CFIA is requiring when importing.

AIHA(American Industrial Hygiene Association) Laboratory Safety Web-site:

<http://www2.umdj.edu/eohssweb/aiha/>

Good general laboratory safety reference and starting point. Check out their Laboratory Safety Incidents for a list of real life lab accidents and links to other incident lists.

ATCC- American Type Culture Collection

<http://www.atcc.org/>

Catalogue/Repository of a large collection of microorganisms, cell cultures, Molecular Biology products etc. Information on Cell Line origins and Biosafety levels. **Note:** American guidelines vary from Canadian standards so consider them a guide post not an authority. The Microorganism free status of the cell lines refers only to those ordered directly from them and not indication of the cell line in general.

CDC on-line Biosafety training course.

<http://www.cdc.gov/od/ohs/pdffiles/Module%2020-%20Biosafety.pdf>

Basic generic biosafety training with pictures. Worth the time to view it. American Reference

Others:

Latex Glove information

http://www.sustainablehospitals.org/HTMLSrc/IP_Latex_GloveFacts.html

European Federation of Biotechnology:

http://www.boku.ac.at/iam/efb/efb_wp.htm

EPA website on antimicrobial pesticides:

<http://www.epa.gov/oppad001/>

University of Manitoba
Biohazardous Waste Disposal Guidelines

This Waste chart is intended for reference for the disposal of Items contaminated ONLY with Biohazardous materials
(see U of M "Biosafety Guide" for definition and details or consult EHSO 474-6633)

All Biohazardous Waste must be appropriately Decontaminated/Treated before disposal.
****MATERIAL WITH RADIOACTIVE OR CHEMICAL RESIDUES SHOULD NOT BE AUTOCLAVED****
Contact the Environmental Health and Safety Office (474-6633) before generating mixed waste items
i.e. contaminated with biological and radioactive or chemical residues.

Items To Be Disposed		Collection Method	Decontamination	Final Destination
Solids e.g. Petri Dishes, Plastic Culture flasks, bench paper, gloves	For Items with Biological Contamination <u>Only</u> .	Place in Plain Clear Autoclave Bags with Biohazard Logo Tape for Identification	Autoclave Minimum 1 Hr @ 121°C Add Autoclave Tape to bag as indication of decontamination status	-Remove Biohazard Logo Tape after autoclaving. -Place in Dark Garbage Bags. -Dispose of with Caretakers.
	Radioactive contamination <u>Only</u>	Dispose of into a rigid, puncture resistant, container with a secure lid. Label the hazard appropriately.	none	-Give to EHSO Hazardous Waste Coordinator for disposal
Chemical Contamination <u>Only</u>	none			
Biomedical Sharps e.g. All Needles, Syringes, Scalpel or Razor Blades,	Biological Contamination <u>Only</u> - Any Type	Dispose of into an Approved, Autoclavable Appropriately Labeled Sharps Container	-Add Autoclave Tape to container as indication of decontamination status – -Autoclave Minimum 1 Hr @ 121°C	-Label with Biosafety Permit# & Initial Give to EHSO Hazardous Waste Coordinator for disposal
	Contaminated with <u>Human or Animal Blood, Body Fluids or Tissue</u>	Do NOT fill to more than ¾ of the total volume		
	<u>Other Biological Contamination Only</u> e.g. Microbiological and cell cultures	-Collect in a reusable rigid puncture resistant autoclavable container, -Label with Biohazard LogoTape / Autoclave tape	-Autoclave 1Hr @-121°C -Remove Biohazard Logo Tape -or- -Decontaminate with a proven chemical method	-Package in plastic bag lined sturdy cardboard box -Seal well -Label as "Broken Glass" -Dispose of with caretakers
Glass and other sharps with the potential of puncturing skin e.g. microscope slides, glass pasteur pipettes, rigid plastic pipette tips,				
Liquids	Biological Contamination <u>Only</u> -No chemical or radioactive hazards		Autoclave as appropriate for volume or decontaminate with a proven chemical method	Dispose to Sewer with copious amounts of water
Pathological Waste e.g. Animal Carcasses	Consult with Radiation Safety Manual, Central Animal Care Services/Manual and your department for any special directives			Double bag and store in designated freezer for pick-up and incineration.

For Exceptions or Clarifications please call
Dr. Prabhat Goswami-474-6633 or Evelyn Froese-789-3477