Checklist for Biosafety Level 3 Laboratory Operations

Department ___________________________ Building ________________________ Room #__________

Principal Investigator ___________________________ Net ID ___________ Phone #_____________

Laboratory Contact ___________________________ Net ID ___________ Phone #_____________

IBC Member(s) Present ___________________________ Date Completed______________

The following statements are based primarily on the Biosafety Level 3 section of Biosafety in Microbiological and Biomedical Laboratories, 5th edition, 2007 (http://www.cdc.gov/od/ohs/biosfty/bmbl5/bmbl5toc.htm). Check the appropriate box for each statement. Please provide comments or an explanation for “No” or “NA” (Not Applicable) responses. This checklist may be used for in-house assessment or as part of a review completed by the Institutional Biosafety Committee. Contact the Biological Safety Officer (fac2@cornell.edu, 254-4888) if you have any questions or require assistance.

A. Standard Microbiological Practices

1. The laboratory supervisor must enforce the institutional policies that control access to the laboratory.

2. Personnel wash their hands after handling potentially hazardous materials and before leaving the laboratory.

3. Eating, drinking, handling contact lenses, and applying cosmetics and storing food for human consumption are not permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose.

4. Mouth pipetting is prohibited; mechanical pipetting devices must be used.

5. Perform all procedures to minimize the creation of splashes or aerosols.

6. Decontaminate work surfaces and laboratory equipment routinely after completion of work, and after any spill or splash of potentially infectious material with a disinfectant effective against the agents of concern.

7. Decontaminate all cultures, stocks, and other potentially infectious materials before disposal. Non-sharps wastes are discarded in red biohazard bags, decontaminated in an autoclave, and disposed as regulated medical waste (RMW). Liquid culture wastes are treated with chemical disinfectant before disposal in sanitary drain.

8. Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware must be developed and implemented. Whenever practical, laboratory supervisors should adopt improved engineering and work practice controls that reduce risk of sharps injuries.
   a. Needles must not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal. Sharps items are kept in full view at all times and are not left unattended.
   b. Used disposable needles and syringes must be carefully placed in conveniently located puncture-resistant containers used for sharps disposal.
   c. Non-disposable sharps must be placed in a hard walled container for transport to
a processing area for decontamination, preferably by autoclaving.

d. Broken glassware must not be handled directly. Instead, it must be removed using a brush and dustpan, tongs, or forceps. Plasticware should be substituted for glassware whenever possible.

9. A hazard warning sign (e.g., biohazard symbol, HASP) must be posted at the entrance to the laboratory when infectious agents are present. Posted information must include: the laboratory’s biosafety level, the supervisor’s name (or other responsible personnel), telephone number, and required procedures or personal protective equipment for entering and exiting the laboratory.

10. Materials to be decontaminated outside of the immediate laboratory must be placed in a durable, leak-proof container and closed for transport from the laboratory.

11. An effective integrated pest management program is required

12. The laboratory supervisor must ensure that laboratory personnel receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures. Personnel must receive annual updates or additional training when procedural or policy changes occur. Personal health status may impact an individual’s susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all laboratory personnel and particularly women of child-bearing age should be provided with information regarding immune competence and conditions that may predispose them to infection. Individuals having these conditions should be encouraged to self-identify to Occupational Medicine, Gannett Health Services for appropriate counseling and guidance.

Comments/Explanations for Standard Microbiological Practices

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B. Special Practices

1. All persons entering the laboratory must be advised of the potential hazards and meet specific entry/exit requirements.

2. Laboratory personnel must be provided medical surveillance and offered appropriate immunizations for agents handled or potentially present in the laboratory.

3. All procedures involving the manipulation of infectious materials must be conducted within a biosafety cabinet (BSC), or other physical containment devices. No work with open vessels is conducted on the bench. When a procedure cannot be performed within a BSC, a combination of personal protective equipment and other containment devices, such as a centrifuge safety cup or sealed rotor, must be used.

4. A laboratory-specific biosafety manual must be prepared, adopted, available, and accessible. Personnel are advised of hazards and handling procedures, and are required to read and follow instructions on practices and procedures. Procedures and policies are routinely reviewed and updated.
5. The laboratory supervisor must ensure that laboratory personnel demonstrate proficiency in standard and special microbiological practices and in practices and operations specific to the laboratory space before working with agents at BSL-3. Personnel receive regular updates or additional training as necessary. Training is documented.

6. Potentially infectious materials must be placed in a durable, leak proof container during collection, handling, processing, storage, or transport within a facility.

7. Laboratory equipment should be routinely decontaminated, as well as, after spills, splashes, or other potential contamination. Spill procedures are developed.

8. Incidents that may result in exposure to infectious materials must be immediately evaluated and treated according to procedures described in the laboratory biosafety safety manual. All such incidents must be reported to the laboratory supervisor and documented via the University reporting system (http://prp.ehs.cornell.edu/Acc-Inf/). Medical evaluation, surveillance, and treatment should be provided by Occupational Medicine, Gannett Health Services or personal physician and appropriate records maintained.

9. Animals and plants unrelated to the work being performed must not be permitted in the laboratory.

10. On campus transport (between laboratories, buildings) of cultures, tissues, or specimens must be accomplished in closed, leak proof, break resistant containers, lined with absorbent material and labeled with the biohazard sign and contact information. Off campus transport complies with domestic (US DOT) and/or international regulations (ICAO), including required training.

11. Stock cultures of infectious agents must be secured against unauthorized access.


Comments/Explanations for Special Practices

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C. Safety Equipment (Primary Barriers)

1. All procedures involving the manipulation of infectious materials must be conducted within a BSC (preferably Class II or Class III), or other physical containment devices.

2. Biological safety cabinets are certified semi-annually, when cabinets are moved, when HEPA filters are changed, or repairs made.

3. Protective laboratory clothing with a solid-front such as tie-back or wraparound gowns, scrub suits, or coveralls is worn by workers when in the laboratory. Protective
clothing is not worn outside of the laboratory. Reusable clothing is decontaminated with appropriate disinfectant before being laundered. Clothing is changed when contaminated.

4. Eye and face protection (goggles, mask, face shield or other splatter guard) is used for anticipated splashes or sprays of infectious or other hazardous materials. Eye and face protection must be disposed of with other contaminated laboratory waste or decontaminated before reuse. Persons who wear contact lenses in laboratories must also wear eye protection.

5. Gloves must be worn to protect hands from exposure to hazardous materials. Glove selection should be based on an appropriate risk assessment. Alternatives to latex gloves should be available. Change gloves when contaminated, integrity has been compromised, or when otherwise necessary. Wearing two pairs of gloves may be appropriate. Gloves must not be worn outside the laboratory. Frequent changing of gloves is recommended. Disposable gloves must not be washed or reused.

6. Respiratory protection must be worn when aerosols cannot be safely contained (i.e., outside of a biological safety cabinet), and in rooms containing infected animals.

Comments/Explanations for Safety Equipment


D. Laboratory Facilities (Secondary Barriers)

1. Each laboratory must have a sink for hand washing. The sink must be hands-free or automatically operated and should be located near the laboratory exit door.

2. The laboratory must be separated from areas that are open to unrestricted traffic flow within the building, and access to the laboratory is restricted. Passage through a series of two self-closing, locked doors is the basic requirement for entry into the laboratory from access corridors. A clothes change room or anteroom (shower optional) is included in the passageway.

3. The laboratory must be designed so that it can be easily cleaned and decontaminated. Carpets and rugs are not permitted. Seams, floors, walls, and ceiling surfaces should be sealed. Spaces around doors, ventilation openings, and other penetrations should be capable of being sealed to facilitate space decontamination.
   a. Floors must be slip resistant, impervious to liquids, and resistant to chemicals. If possible, floors should be seamless, sealed, resilient or poured floors, with integral cove bases.
   b. Walls should be constructed to produce a sealed smooth finish that can be easily cleaned and decontaminated.
   c. Ceilings should be constructed, sealed, and finished in the same general manner as walls.
   d. Decontamination of the entire laboratory should be considered when there has been gross contamination of the space, significant changes in laboratory usage,
for major renovations, or maintenance shut downs. Selection of the appropriate materials and methods used to decontaminate the laboratory must be based on the risk assessment of the biological agents in use.

4. Laboratory furniture must be sturdy and capable of supporting anticipated loads and uses. Spaces between benches, cabinets, and equipment are accessible for cleaning. Bench tops are impervious to water and resistant to moderate heat, acids, alkalis, organic solvents, and chemicals used to decontaminate the work surface.

5. BSCs must be installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations. BSCs should be located away from doors, heavily traveled laboratory areas, and other possible airflow disruptions.

6. A method for decontaminating all laboratory wastes should be available in the facility, preferably within the laboratory (e.g., pass through autoclave, chemical disinfection). Decontaminated waste is transported out of the facility.

7. A ducted air ventilation system is required. This system must provide sustained directional airflow by drawing air into the laboratory from “clean” areas toward “potentially contaminated” areas. The laboratory shall be designed such that under failure conditions the airflow will not be reversed.
   a. Laboratory personnel must verify that the direction of the airflow (into the laboratory) is proper. A visual monitoring device (e.g., photohelic gauge, lights) that indicates and confirms directional inward airflow must be provided at the laboratory entry.
   b. The exhaust air must not be re-circulated to any other area of the building. The outside exhaust air is either dispersed away from occupied areas and air intakes, or the exhaust air is HEPA-filtered.
   c. An HVAC control system is on line to maintain negative pressurization and prevent sustained positive pressurization of the laboratory. Audible and/or visual alarms are present to notify personnel of HVAC system failure.

8. HEPA filtered exhaust air from a Class II BSC can be safely re-circulated into the laboratory environment if the cabinet is tested and certified semi-annually and operated according to manufacturer’s recommendations. If exhaust air from Class II safety cabinets is discharged to the outside through the building exhaust air system, the cabinets are connected via a thimble or canopy exhaust system.

9. Equipment that may produce infectious aerosols must be contained in devices that exhaust air through HEPA filtration or other equivalent technology before being discharged into the laboratory. These HEPA filters should be tested and/or replaced semi-annually.

10. Vacuum lines must be protected with HEPA filters, or their equivalent. Filters must be replaced as needed. Liquid disinfectant traps may be required.

11. Windows, if present, must be closed and sealed.

12. An eyewash facility must be readily available within the laboratory.

13. The facility must be tested for verification that the design and operational parameters have been met prior to operation. Facilities are re-verified, at least annually, against these procedures as modified by operational experience.
14. Enhanced environmental and personal protection may be required by the agent summary statement, risk assessment, or applicable local, state, or federal regulations. These laboratory enhancements may include, for example, shower-out capabilities; gas tight dampers to facilitate laboratory isolation; final HEPA filtration of the laboratory exhaust air; laboratory effluent decontamination; and advanced access control devices.

Comments/Explanations for Laboratory Facilities

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