Biosafety Checklist for Biomedical and Microbiological Laboratories

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Biosafety Level 1:

Biosafety Level 1 (BSL-1) is suitable for work involving well-characterized agents not known to consistently cause disease in immunocompetent adult humans and that present minimal potential hazard to laboratory personnel and the environment. BSL-1 laboratories are not necessarily separated from the general traffic patterns in the building. Work is typically conducted on open benchtops using standard microbiological practices. Special containment equipment or facility design is not generally required but may be used as determined by appropriate risk assessment. Laboratory personnel receive specific training in the procedures conducted in the laboratory and are supervised by a scientist with training in microbiology or a related science.

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| **Requirements:** | **Checklist:** | **Comments:** |
| **Personnel Training** | | |
| Have laboratory personnel received appropriate **training** regarding their duties, potential hazards, manipulations of infectious agents, necessary precautions to minimize exposures, and hazard/exposure evaluation procedures (e.g., physical hazards, splashes, aerosolization)? |  |  |
| Do personnel receive **annual updates and additional training** when equipment, procedures, or policies change? |  |  |
| **Personnel Predisposed to Infection** | | |
| Have all personnel, particularly those with **conditions which may predispose them to increased risk of infection**, been informed about the risks about working with the agents in the laboratory? |  |  |
| **Safety Manual** | | |
| **Safety Manual**: Does the laboratory have a **safety manual** specific to the facility and prepared by the appropriate safety professionals? |  |  |
| **Accessibility**: Is the laboratory safety manual **accessible** to all personnel and staff? |  |  |
| **Information**: Does the safety manual contain **sufficient information** describing the biosafety and containment procedures for the organisms and biological materials in use, appropriate agent-specific decontamination methods, and the work performed? |  |  |
| **Emergency**: Does the safety manual contain or reference **protocols for emergency situations**, including exposures, medical emergencies, facility malfunctions, and other potential emergencies? |  |  |
| Personal Protective Equipment (PPE) | | |
| **PPE**: Are personnel provided with PPE, I.e., laboratory coats, gowns, uniforms, gloves, etc? |  |  |
| **PPE and Research with Animals**: In cases where research animals are present in the laboratory, is the PPE appropriate for eye, face, and respiratory protection? |  |  |
| Facility | | |
| **Biohazardous signs**: Does the facility have visible biohazard warning signs indicating its biosafety level with the contact details of the biosafety officer and laboratory manager? |  |  |
| **Access control**: Does the facility have lockable doors for access control? |  |  |
| **Sink**: Does the facility have a sink for handwashing? |  |  |
| **Eyewash station**: Does the facility have an eyewash station readily available? |  |  |
| **Designed for cleaning**: Is the facility designed to assist easy cleaning? |  |  |
| **Benches, cabinets, and equipment**: Are spaces between benches, cabinets, and equipment accessible for cleaning? |  |  |
| **Autoclave**: Does the facility have an autoclave? (recommended) |  |  |
| **Floors**: Are the floors non-porous? |  |  |
| **Benchtops**: Are the benchtops impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals? |  |  |
| **Chairs**: Are the chairs used in the facility covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant? |  |  |
| **Windows**: Are the facility’s windows that can open to the exterior fitted with screens? |  |  |
| **Lighting**: Does the facility have adequate illumination for all activities which avoids reflection and glare? |  |  |
| **Separate space**: Does the facility have a space available for personal belongings separate to the work area? |  |  |

# Biosafety Level 2:

Biosafety Level 2 (BSL-2) builds upon BSL-1. BSL-2 is suitable for work with agents associated with human disease and pose moderate hazards to personnel and the environment. BSL-2 differs from BSL-1 primarily because: 1) laboratory personnel receive specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures; 2) access to the laboratory is restricted when work is being conducted; and 3) all procedures in which infectious aerosols or splashes may be created are conducted in BSCs or other physical containment equipment.

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| **Requirements:** | **Checklist:** | **Comments:** |
| **Personnel Training** | | |
| Have laboratory personnel received appropriate **training** regarding their duties, potential hazards, manipulations of infectious agents, necessary precautions to minimize exposures, and hazard/exposure evaluation procedures (e.g., physical hazards, splashes, aerosolization)? |  |  |
| Do personnel receive **annual updates and additional training** when equipment, procedures, or policies change? |  |  |
| **Personnel Predisposed to Infection** | | |
| Have all personnel, particularly those with **conditions which may predispose them to increased risk of infection**, been informed about the risks about working with the agents in the laboratory? |  |  |
| **Safety Manual** | | |
| **Safety Manual**: Does the laboratory have a **safety manual** specific to the facility and prepared by the appropriate safety professionals? |  |  |
| **Accessibility**: Is the laboratory safety manual **accessible** to all personnel and staff? |  |  |
| **Information**: Does the safety manual contain **sufficient information** describing the biosafety and containment procedures for the organisms and biological materials in use, appropriate agent-specific decontamination methods, and the work performed? |  |  |
| **Emergency**: Does the safety manual contain or reference **protocols for emergency situations**, including exposures, medical emergencies, facility malfunctions, and other potential emergencies? |  |  |
| **Personal Protective Equipment (PPE)** | | |
| **PPE**: Are personnel provided with PPE, I.e., laboratory coats, gowns, uniforms, gloves, etc? |  |  |
| **PPE and Research with Animals**: In cases where research animals are present in the laboratory, is the PPE appropriate for eye, face, and respiratory protection? |  |  |
| **Facility** | | |
| **Biohazardous signs**: Does the facility have visible biohazard warning signs indicating its biosafety level with the contact details of the biosafety officer and laboratory manager? |  |  |
| **Biohazardous signs:** Does the facility have visible biohazard warning signage where cultures are stored and used? |  |  |
| **Biohazardous signs:** Does the facility have visible biohazard warning signage on containers used to transport cultures? |  |  |
| **Access control**: Does the facility have lockable doors for access control? |  |  |
| **Sink**: Does the facility have a sink for handwashing? |  |  |
| **Eyewash station**: Does the facility have an eyewash station readily available? |  |  |
| **Biological Safety Cabinet**: Does the facility have maintained Biological Safety Cabinet (BSC), or other physical containment device to minimize splashing and aerosol production? (BSCs can be connected to the laboratory exhaust system by either a canopy connection (Class IIA only) or directly exhausted to the outside through a hard connection (Class IIB, IIC, or III). Class IIA or IIC BSC exhaust can be safely recirculated back into the laboratory environment if no volatile toxic chemicals are used in the cabinet) |  |  |
| **Designed for cleaning**: Is the facility designed to assist easy cleaning? |  |  |
| **Benches, cabinets, and equipment**: Are spaces between benches, cabinets, and equipment accessible for cleaning? |  |  |
| **Autoclave**: Does the facility have a working and validated autoclave? |  |  |
| **Routine decontamination**: Does the facility have a protocol in place for the routine decontamination of equipment? |  |  |
| **Decontamination of laboratory waste**: Does the facility have a waste management program in place for the decontamination of waste prior to disposal? |  |  |
| **Decontamination of wastewater**: Does the facility have a waste management program in place for the decontamination of wastewater prior to disposal into municipal pipes? |  |  |
| **Incidence protocols**: Does the facility have an incidence manual stipulating the follow-up procedures and protocols following exposures and spills? |  |  |
| **Floors**: Are the floors non-porous? |  |  |
| **Benchtops**: Are the benchtops impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals? |  |  |
| **Chairs**: Are the chairs used in the facility covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant? |  |  |
| **Windows**: Does the facility have windows that are sealed from the exterior? If not, are the facility’s windows that can open to the exterior fitted with screens? |  |  |
| **Lighting**: Does the facility have adequate illumination for all activities which avoids reflection and glare? |  |  |
| **Separate space**: Does the facility have a space available for personal belongings separate to the work area? |  |  |
| **Facility maintained under negative pressure**: Is the facility maintained under negative pressure relative to corridors and adjacent public areas? (Ensure exhaust air is not recirculated) |  |  |

# Biosafety Level 3:

Biosafety Level 3 (BSL-3) is suitable for work with indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure. Laboratory personnel receive specific training in handling pathogenic and potentially lethal agents, and they are supervised by scientists competent in handling infectious agents and associated procedures.

A BSL-3 laboratory has special engineering and design features.

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| **Requirements:** | **Checklist:** | **Comments:** |
| **Personnel Training** | | |
| Have laboratory personnel received appropriate **training** regarding their duties, potential hazards, manipulations of infectious agents, necessary precautions to minimize exposures, and hazard/exposure evaluation procedures (e.g., physical hazards, splashes, aerosolization)? |  |  |
| Do personnel receive **annual updates and additional training** when equipment, procedures, or policies change? |  |  |
| **Personnel Predisposed to Infection** | | |
| Have all personnel, particularly those **with conditions which may predispose them to increased risk of infection**, been informed about the risks about working with the agents in the laboratory? |  |  |
| **Safety Manual** | | |
| **Safety Manual**: Does the laboratory have a **safety manual** specific to the facility and prepared by the appropriate safety professionals? |  |  |
| **Accessibility**: Is the laboratory safety manual **accessible** to all personnel and staff? |  |  |
| **Information**: Does the safety manual contain **sufficient information** describing the biosafety and containment procedures for the organisms and biological materials in use, appropriate agent-specific decontamination methods, and the work performed? |  |  |
| **Emergency**: Does the safety manual contain or reference **protocols for emergency situations**, including exposures, medical emergencies, facility malfunctions, and other potential emergencies? |  |  |
| **Personal Protective Equipment (PPE)** | | |
| **PPE**: Are personnel provided with PPE, I.e., laboratory coats, gowns, uniforms, gloves, respiratory protection, safety goggles, solid-front scrub suits, wrap-around gowns, coveralls, gumboots, face shield? |  |  |
| **PPE:** Is a double glove system employed? |  |  |
| **PPE Decontamination**: Does the facility have an effective decontamination/laundry protocol for PPE? |  |  |
| **PPE and Research with Animals**: In cases where research animals are present in the laboratory, is the PPE be appropriate for eye, face, and respiratory protection? |  |  |
| **Facility** | | |
| **Facility Design**: Is the facility separated from areas open to unrestricted foot traffic within the building? |  |  |
| **Facility Design**: Does the facility have two consecutive self-closing doors? |  |  |
| **Facility maintained under negative pressure:** Is the facility maintained under negative pressure relative to corridors and adjacent public areas? (Ensure exhaust air is not recirculated) |  |  |
| **Facility Design**: Does the facility have a **ducted mechanical air ventilation system**? (This system provides sustained directional airflow by drawing air into the laboratory from “clean” areas toward “potentially contaminated” areas. The laboratory is designed such that under failure conditions the airflow will not be reversed at the containment barrier). |  |  |
| **Facility Design:** Is the laboratory exhaust air dispersed away from occupied areas and away from building air intake locations? Or is the exhaust air **HEPA filtered**. (The laboratory exhaust air must not re-circulate to any other area of the building). |  |  |
| **Facility Design**: Does the facility have appropriate communication systems (e.g., telephone lines, computers, etc) with the outside? |  |  |
| **Biohazardous signs**: Does the facility have visible biohazard warning signs indicating its biosafety level at the entrance with the contact details of the biosafety officer and laboratory manager? |  |  |
| **Biohazardous signs**: Does the facility have visible biohazard warning signage where cultures are stored and used? |  |  |
| **Biohazardous signs**: Does the facility have visible biohazard warning signage on containers used to transport cultures? |  |  |
| **Access control:** Does the facility have lockable doors for limited access control? |  |  |
| **Sink**: Does the facility have a hands-free sink for handwashing? |  |  |
| **Anteroom**: Does the facility have a clothing changing room and/or an anteroom? |  |  |
| **Eyewash Station**: Does the facility have an eyewash station readily available? |  |  |
| **Biological Safety Cabinet**: Does the facility have maintained and certified Biological Safety Cabinet (BSC), or other physical containment device to minimize splashing and aerosol production? (BSCs can be connected to the laboratory exhaust system by either a canopy connection (Class IIA only) or directly exhausted to the outside through a hard connection (Class IIB, IIC, or III). Class IIA or IIC BSC exhaust can be safely recirculated back into the laboratory environment if no volatile toxic chemicals are used in the cabinet).  BSCs should be located away from doors, heavily travelled laboratory areas, air supply/exhaust diffusers and other possible airflow disruptions. |  |  |
| **Biological Safety Cabinet**: If BSC are present, is the exhaust air HEPA filtered for the Class II (tested and certified) BSC and safely discharged into the laboratory room environment or to the outside? Is the HEPA filtered exhausted air from the Class III BSC discharged directly to the outside or via the exhaust system? (If the HEPA filtered exhaust air from any of these BSCs is discharged through the exhaust system, it is connected to this system in a manner which avoids interference with the air balance of the cabinets or the exhaust system). |  |  |
| **Designed for cleaning:** Is the facility designed to assist easy cleaning? |  |  |
| **Designed for cleaning:** Are the seams in the facility’s flooring, walls and ceilings sealed for easy decontamination? |  |  |
| **Benches, cabinets, and equipment** Are spaces between benches, cabinets, and equipment accessible for cleaning? |  |  |
| **Autoclave** Does the facility have a working and validated autoclave? |  |  |
| **Routine decontamination** Does the facility have a protocol in place for the routine decontamination of equipment? |  |  |
| **Decontamination of laboratory waste:** Does the facility have a waste management program in place for the decontamination of waste prior to disposal? |  |  |
| **Decontamination of wastewater**: Does the facility have a waste management program in place for the decontamination of wastewater prior to disposal into municipal pipes? |  |  |
| **Incidence protocols**: Does the facility have an incidence manual stipulating the follow-up procedures and protocols following exposures and spills? |  |  |
| **Floors**: Are the floors non-porous and slip-resistant? |  |  |
| **Benchtops**: Are the benchtops impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals? |  |  |
| **Chairs**: Are the chairs used in the facility covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant? |  |  |
| **Windows**: Does the facility have windows that are sealed from the exterior? |  |  |
| **Lighting**: Does the facility have adequate illumination for all activities which avoids reflection and glare? |  |  |
| **Separate Space**: Does the facility have a space available for personal belongings separate to the work area? |  |  |

Final Comments:

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_