

Training Analysis for Biosafety Training Using BSL-2 Criteria

Patricia Delarosa, PhD, RBP, CBSP

Introduction

The Training Analysis for a BSL-2 Biomedical Laboratory was created to define all tasks and subtasks in biosafety for all persons working in an international infectious disease detection laboratory. The analysis was done using the Instructional Systems Design (ISD) methodology defined in the publication, *ISD From the Ground Up*¹. The product is a template that can be used as a reference for developing a laboratory-based biosafety training program for BSL-2 biomedical laboratories or as a base for the development of training for microbiological and containment laboratories. This template was originally used in the design of a competency-training program; however, this type of analysis can be applied to any training design and can be readily applied to the development of both didactic and practical training materials. Application of the training analysis in a competency training program is more fully described in “Quantifying Competency in Biosafety: Application of the Instructional Systems Design (ISD) to Biosafety and Laboratory Biosecurity” by Patricia Delarosa et al., *Applied Biosafety: Journal of the American Biological Safety Association*, 16(3), 2011.

¹Hodell, C. (2000). *ISD From the Ground Up*. American Society for Training and Development, Alexandria, VA.

Instructions

This is a “do it yourself” methodology for the development of biosafety training that incorporates biosafety tasks into working procedures and practices in the laboratory. The goal of the training design is to accurately define all biosafety training that an individual needs to safely complete their work and establish a method for practical integration of biosafety procedures on the job.

In brief, the template design is meant to be adapted to the facility and individual. In the template, tasks are broken down by subtask and each subtask is assigned an appropriate evaluation method and criteria (metric). When developing facility specific training, tasks can be used “a la cart” and assigned according to the needs of the individual (for competency training) or the entire task list may be used as a detailed description of training needs for the facility and translated into any desired form of training including PowerPoint slides and classroom practical materials. It is recommended that the task list and subtask list be expanded to reflect the needs of the laboratory or facility and that any training not reflective of the laboratory be eliminated.

Disclaimer

This material was designed as a training program. This list is not comprehensive. It is based on *Biosafety in the Biomedical and Microbiological Laboratory* (5th edition), but does not cover all aspects of required training for a U.S. laboratory but rather details the analysis of a particular training program. It is not intended for use as a biosafety assessment tool.

It is important to recognize that this table is not a training program and it is not a training checklist. It is only the analysis of a training program and may not reflect the needs of a different facility. These components must be reviewed and adapted to fit facility, laboratory and individual training needs. In the design of the training program for which this analysis was done the following materials were developed from this basic analysis:

- PowerPoint slides
- Classroom practical materials
- Classroom exams
- Student and Instructor guides
- Laboratory Practical materials
- Competency training checklists
- Proficiency Exams
- Train the Trainer materials for the Biosafety Instructor and Laboratory Trainer
- Biosafety Program Mentorship training
- Biosafety Program Indicators for tracking success of a biosafety program

Help

For help with this training methodology, please contact Patricia Delarosa.

Appendix 1: Training Analysis

A Matrix Template for Developing a Laboratory-based Biosafety Training Program that Measures Competency for BSL-2 Biomedical Laboratories

| Job | Task | Subtask | Evaluation Method | Metric | Reference |
|--|---|--|---|---|--|
| <i>Suggested job titles are listed. Add a job title that is appropriate for your institution</i> | <i>Add tasks as suggested by the job description.</i> | <i>Add or remove subtasks as appropriate. Use active verbs to describe each subtask.</i> | <i>Insert appropriate evaluation method. Suggested methods are inserted into the cells.</i> | <i>Insert appropriate degree for successful completion.</i> | <i>List biosafety document describing the associated theory or procedure</i> |
| Clinical Laboratory Technician | Demonstrates Knowledge of Institute Biosafety Regulations | Lists main topics covered by the Laboratory Biosafety Manual | Exam | ≥80% | |
| | | Lists procedures to follow in the Emergency Response Plan | Exam | ≥80% | |
| | | Lists or complies with entry and exit procedures for the institute | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Lists procedures in spill response | Exam or Demonstration | ≥80% | |

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| | Demonstrates Knowledge of Preventative Care Measures | Lists pathogens that are contained in the institute and the medical signs and symptoms of diseases associated with those pathogens | Exam | ≥80% | |
| | | Obtains appropriate vaccines (based on risk assessment) | Inspection | Yearly review | |
| | | Completes respiratory protection medical exam, fit test, and training when applicable | Inspection | Yearly review | |
| | | Describes time period for flushing eye or body site after biological or chemical exposure | Exam | ≥80% | |
| | | Defines Select Agent | Exam | ≥80% | |
| | | Demonstrates Knowledge of Biosafety | Defines biosafety | Exam | ≥80% |
| | Defines agent risk groups | | Exam | ≥80% | |
| | Differentiates between risk groups and biosafety levels | | Exam | ≥80% | |
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| | | Lists national and international literature fundamental to biosafety | Exam | ≥80% | |
| | | Lists common sources and causes of laboratory-acquired infections | Exam | ≥80% | |
| | | Lists factors important to a risk assessment | Exam | ≥80% | |
| | | Identifies situations that require a risk assessment | Exam or Demonstration | ≥80% | |
| | | Uses PPE appropriate to defined tasks | Exam and Inspection | demonstrates procedure over a 12 month period | |
| | | Lists facility design elements that increase biosafety and biosecurity | Exam | ≥80% | |
| | | Lists common procedures that produce aerosols | Exam | ≥80% | |
| | Demonstrates Knowledge of Waste Handling and Decontamination | List procedures to decontaminate liquids and culture media | Exam | ≥80% | |

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|--|--|---|------------------------------------|---|--|
| | | Identifies hazardous vs. non-hazardous waste | Demonstration, Exam and Inspection | demonstrates procedure over a 12 month period | |
| | | Describes procedure for decontamination of laboratory equipment | Exam | ≥80% | |
| | | Lists conditions for decontamination of laboratory equipment | Exam | ≥80% | |
| | | Lists chemical and biological spill control procedures and responsibilities | Demonstration | demonstrates procedure over a 12 month period | |
| | | Double bags solid waste for autoclaving | Demonstration | demonstrates procedure over a 12 month period | |
| | | Separates biohazardous waste into labeled autoclave bags | Demonstration | demonstrates procedure over a 12 month period | |
| | | Disposes of sharps in sharps container | Demonstration | demonstrates procedure over a 12 month period | |
| | | Prepares a 1:10 bleach solution | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Refreshes 1:10 bleach solution as required by a risk assessment | Demonstration | demonstrates procedure over a 12 month period | |
| | | Adds water to biohazard waste as described in SOP | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses secondary containers for transport of biohazardous waste to autoclave | Demonstration | demonstrates procedure over a 12 month period | |
| | | Locates spill control materials | Demonstration or Inspection | demonstrates procedure over a 12 month period | |
| | | Runs biological spore strip test (according to a predetermined schedule) to assure proper autoclave function and records results | Demonstration or Inspection | demonstrates procedure over a 12 month period | |
| | | Uses autoclave gloves to open autoclave | Demonstration | demonstrates procedure over a 12 month period | |
| | | Loosens lids on liquid containers before autoclaving | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Tightens lids after liquid has cooled | Demonstration | demonstrates procedure over a 12 month period | |
| | | Label biohazardous waste using designated labels | Demonstration | demonstrates procedure over a 12 month period | |
| | | Maintains bleach solutions for decontamination as described in the laboratory manual | Inspection | Yearly review | |
| | Demonstrates Good Microbial Technique | Washes hands after working with organisms or when leaving the laboratory | Demonstration | demonstrates procedure over a 12 month period | |
| | | Does not eat or drink in laboratory | Inspection | Yearly review | |
| | | Wears PPE required for activity | Demonstration | demonstrates procedure over a 12 month period | |
| | | Does not wear PPE in neutral spaces | Demonstration | demonstrates procedure over a 12 month period | |
| | | Does not recap needles | Demonstration or Inspection | demonstrates procedure over a 12 month period | |
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| | | Assists in regular housekeeping of laboratory | Demonstration | demonstrates procedure over a 12 month period | |
| | | Keeps hallways of laboratory clutter free | Demonstration | demonstrates procedure over a 12 month period | |
| | | Wears closed toed shoes | Demonstration or Inspection | demonstrates procedure over a 12 month period | |
| | | Does not store food in the laboratory refrigerator | Inspection | Yearly review | |
| | Effectively Uses Personal Protective Equipment | Selects and uses the proper personal protective equipment | Demonstration and Inspection | demonstrates procedure over a 12 month period | |
| | | Demonstrate donning and doffing of PPE | Demonstration and Inspection | demonstrates procedure over a 12 month period | |
| | Demonstrates Knowledge of Biosecurity | Identifies institute signage | Exam | ≥80% | |
| | | Knowledge of required training for entry into contained areas | Exam | ≥80% | |
| | | Lists facility design elements and | Exam | ≥80% | |

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| | | regulations that increase biosecurity | | | |
| | | Identifies and reports a security incident | Exam | ≥80% | |
| | | Keeps a laboratory notebook | Inspection | demonstrates procedure over a 12 month period | |
| | Demonstrates Knowledge of Bloodborne Pathogens | Lists main topics covered in the Exposure Control Plan | Exam | ≥80% | |
| | | Identifies common BBP | Exam | ≥80% | |
| | | Lists common ways that people are exposed to infectious organisms in the laboratory | Exam | ≥80% | |
| | | Lists common exposure control methods | Exam | ≥80% | |
| | | Identifies potentially infectious material | Exam | ≥80% | |
| | | Lists common symptoms of BBP disease | Exam | ≥80% | |
| | | Locates and reads emergency | Demonstration | Yearly review | |

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| | | response protocol | | | |
| | | Works with all samples as if infectious | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses pipette aid and does not mouth pipette | Demonstration | demonstrates procedure over a 12 month period | |
| | | Disinfects bench tops and BSC surfaces | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses sharps container | Demonstration | demonstrates procedure over a 12 month period | |
| | | Lists other potentially infectious material worked with in the facility | Exam | ≥80% | |
| | Demonstrates Knowledge of Chemical Hygiene | Lists main topics covered in the Chemical Hygiene Plan | Exam | ≥80% | |
| | | Properly stores chemicals | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Stores only working dilutions on bench | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Separates acids and bases in storage cabinet | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses MSDS recommendations for disposal of assay chemicals | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Properly disposes of acids and bases after neutralization | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses fume hood to dilute acids, bases and other hazardous chemicals | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses fume hood to measure acrylamide and SDS powder | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses secondary containers to transport chemical hazards | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses secondary containers to separate groups of liquid chemicals | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Dates chemicals upon opening stock containers | Demonstration | demonstrates procedure over a 12 month period | |
| | | Properly labels dilutions | Demonstration | demonstrates procedure over a 12 month period | |
| | | Stores liquids below eye level | Demonstration | demonstrates procedure over a 12 month period | |
| | | Locates MSDS sheets | Demonstration | demonstrates procedure over a 12 month period | |
| | | Lists data contained in MSDS sheets | Exam | ≥80% | |
| | | Checks eyewash station weekly by activation | Demonstration | demonstrates procedure over a 12 month period | |
| | | Understands when and how to use safety shower if available | Exam | ≥80% | |
| | | Describes time period for flushing eye or body site after chemical exposure | Exam | ≥80% | |

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| | | Maintains a chemical inventory | Demonstration | demonstrates procedure over a 12 month period | |
| | | Properly disposes of expired chemicals | Demonstration | demonstrates procedure over a 12 month period | |
| | Demonstrates Knowledge of Equipment Safety | Stores equipment according to directions | Demonstration | demonstrates procedure over a 12 month period | |
| | | Regularly inspects equipment for safety problems prior to use | Demonstration | demonstrates procedure over a 12 month period | |
| | Demonstrates Knowledge of Exposure Control | Locates emergency spill response document in laboratory | Demonstration | Yearly review | |
| | | Locates exposure control plan in laboratory | Demonstration | Yearly review | |
| | | Locates and details necessary information on safety labels | Demonstration | Yearly review | |
| | | Locates fire extinguishers | Demonstration | Yearly review | |
| | | Locates eye wash station | Demonstration | Yearly review | |
| | | Locates SOPs in laboratory | Demonstration | Yearly review | |

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|--|--|---|--|--|---|
| | | Locates algorithm for organism detection in laboratory | Demonstration | Yearly review | |
| | | Demonstrates working knowledge of SOPs and algorithms | Demonstration | Yearly review | |
| <i>Suggested job titles are listed. Add a job title that is appropriate for your institution.</i> | <i>Add tasks as suggested by the job description.</i> | <i>Add or remove subtasks as appropriate. Use active verbs to describe each subtask.</i> | <i>Insert appropriate evaluation method. Suggested methods are inserted into the cells.</i> | <i>Insert appropriate degree for successful completion.</i> | <i>List biosafety document describing the associated theory or procedure</i> |
| Scientist | Demonstrates Knowledge of Biosafety Regulations | Assists in protocol-specific risk assessment | Exam or Demonstration | Yearly review | |
| | | Trained in Respiratory Protection (as required) | Exam or Demonstration | Yearly review | |
| | | Lists procedures for a Biological Spill Response | Exam or Demonstration | Yearly review | |
| | | Lists main topics and details procedures in the Chemical Hygiene Manual | Exam or Demonstration | Yearly review | |

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| | | Lists topics and details procedures in the Laboratory Biosafety Manual | Exam or Demonstration | Yearly review | |
| | | Lists topics in the Exposure Control Plan | Exam or Demonstration | Yearly review | |
| | | Details procedures covered in the General requirements for handling pathogenic agents and toxins | Exam or Demonstration | Yearly review | |
| | | Lists risk group associated with sample handling | Exam | Yearly review | |
| | | Wears PPE suggested by protocol risk assessment | Demonstration | demonstrates procedure over a 12 month period | |
| | Demonstrates Knowledge of Aseptic Technique | Assures sterility of culture vessels before use | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Avoids cross contamination of material during manipulation | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Arranges workspace to flow from clean to dirty | Exam or Demonstration | demonstrates procedure over a 12 month period | |

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| | | Aseptically changes pipette tips | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Keeps tops of vessels closed except when in use | Demonstration | demonstrates procedure over a 12 month period | |
| | | Decontaminates objects in contact with cultures | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses flame on workbench | Demonstration | demonstrates procedure over a 12 month period | |
| | | Does not use flame in BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses BSC when indicated by a risk assessment | Demonstration | demonstrates procedure over a 12 month period | |
| | | Opens centrifuge rotor cups in BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | Lists concept behind and follows Universal Precautions | Exam or Demonstration | demonstrates procedure over a 12 month period | |

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| | | Demonstrates ability to perform a risk assessment of assay protocol | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Selects and uses proper PPE for application | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses a splash pad to prevent aerosols | Demonstration | demonstrates procedure over a 12 month period | |
| | | Demonstrates pipetting techniques that prevent aerosols | Demonstration | demonstrates procedure over a 12 month period | |
| | | Demonstrates ability to decontaminate liquids by adding 10% bleach to waste | Demonstration | demonstrates procedure over a 12 month period | |
| | | Separates biohazardous waste into labeled autoclave bags | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Separates sharps and disposes in sharps container | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Demonstrates proper biohazard labeling of samples | Exam or Demonstration | demonstrates procedure over a 12 | |

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| | | and equipment | | month period | |
| | | Assures bleach solution is fresh before use | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Arranges workspace to flow from clean to dirty | Demonstration | demonstrates procedure over a 12 month period | |
| | | Disinfects work area before and after work with organisms | Demonstration | demonstrates procedure over a 12 month period | |
| | | Keeps doors of laboratory closed when working with organisms | Demonstration | demonstrates procedure over a 12 month period | |
| | | Reports all spills and accidents | Demonstration | demonstrates procedure over a 12 month period | |
| | | Demonstrates sequence for donning and doffing of PPE | Demonstration | demonstrates procedure over a 12 month period | |
| | | Labels assay plates with hazard, experiment and researcher's name | Demonstration or Inspection | demonstrates procedure over a 12 month period | |

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| Demonstrates Knowledge of Biosafety Cabinet (BSC) Use and Safety Procedures | Uses the BSC for operations that produce aerosols | Demonstration | demonstrates procedure over a 12 month period | |
| | Lists functions of the biosafety cabinet | Exam | ≥80% | |
| | Lists limitations of the biosafety cabinet | Exam | ≥80% | |
| | Performs pre-procedure cleaning and setup of the BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | Maintains BSC free of clutter | Demonstration | demonstrates procedure over a 12 month period | |
| | Keeps necessary safety items (sharps containers, biohazardous waste containers, disinfectants, etc.) inside the BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | Allows BSC to stabilize (at least 4 minutes) once all supplies and samples are inside before beginning | Demonstration | demonstrates procedure over a 12 month period | |

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| | | procedures | | | |
| | | Maintains sash of biosafety cabinet at optimal level | Demonstration | demonstrates procedure over a 12 month period | |
| | | Works with minimal hand movement in BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | Maintains arms, equipment, and supplies off of front grille | Demonstration | demonstrates procedure over a 12 month period | |
| | | Keeps samples 10 cm inside the front of the grille | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses heat block instead of flame inside BSC (where applicable) | Demonstration | demonstrates procedure over a 12 month period | |
| | | Uses vacuum line with hydrophobic filter inserted | Demonstration | demonstrates procedure over a 12 month period | |
| | | Lists emergency procedure for exit out of and shut down of BSC | Exam | demonstrates procedure over a 12 month period | |

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| | | Decontaminates outside container and removes everything from inside BSC and performs post-procedure cleanup | Demonstration | demonstrates procedure over a 12 month period | |
| | | Performs daily, and weekly/monthly scheduled cleaning of the BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | Decontaminates objects placed in the biosafety cabinet | Demonstration | demonstrates procedure over a 12 month period | |
| | | Maintains weekly maintenance schedule | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | | Relates functional operations of the BSC to safe working procedures | Demonstration | demonstrates procedure over a 12 month period | |
| | | Demonstrates BSC setup for work | Demonstration | demonstrates procedure over a 12 month period | |
| | | Reads and records Magnehelic gauge | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Works from clean to dirty in the biosafety cabinet keeping approximately a 30 cm distance between clean media and cultures | Demonstration | demonstrates procedure over a 12 month period | |
| | | Defines HEPA Filter function | Exam | ≥80% | |
| | | Locates HEPA filter and BSC certification records | Exam | ≥80% | |
| | | Decontaminates workstation after completion of work | Demonstration | demonstrates procedure over a 12 month period | |
| | | Removes PPE and stores in laboratory after work | Demonstration | demonstrates procedure over a 12 month period | |
| Demonstrates Knowledge of Institute Gloves Use Procedures | | Wears one, or two, new fitting pair(s) of gloves when established by protocol and/or risk assessment | Exam / Demonstration | demonstrates procedure over a 12 month period | |
| | | Understands the effects of caustic cleaners and chemicals (i.e., alcohol, bleach, etc.) on glove fibers | Exam | ≥80% | |

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| | | Replaces gloves if they become torn, contaminated, soiled, or otherwise unusable | Demonstration | demonstrates procedure over a 12 month period | |
| | | Replaces gloves between sample sets, and when inoculating different microbiological organisms | Demonstration | demonstrates procedure over a 12 month period | |
| | | Does not wear gloves to manipulate or open common equipment (i.e. keyboard, telephone, door knob), or in common hallways and passages | Demonstration | demonstrates procedure over a 12 month period | |
| | | While double gloved and inside the BSC, removes the outer pair of gloves and decontaminates the inner pair with disinfectant before removing hands from the BSC | Demonstration | demonstrates procedure over a 12 month period | |

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| | | Only disposes of used gloves in biohazard container | Demonstration | demonstrates procedure over a 12 month period | |
| | | While double gloved and inside the BSC, only disposes of used gloves in biohazard container inside the BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | While working inside the BSC, only disposes of used gloves in biohazard container inside the BSC | Demonstration | demonstrates procedure over a 12 month period | |
| | | Performs a risk assessment prior to work that requires using a needle or sharp object | Exam or Demonstration | demonstrates procedure over a 12 month period | |
| | Management | Correlates spore strip results with chemical strip monthly to assure proper autoclave function | Inspection | Yearly review | |
| | Keeps track of training requirements and attends yearly retraining | Inspection | Yearly review | | |

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|--|--|---|--|--|--|
| | | Maintains equipment | Demonstration | demonstrates procedure over a 12 month period | |
| <i>Suggested job titles are listed. Add a job title that is appropriate for your institution.</i> | <i>Add tasks as suggested by the job description.</i> | <i>Add or remove subtasks as appropriate. Use active verbs to describe each subtask.</i> | <i>Insert appropriate evaluation method. Suggested methods are inserted into the cells.</i> | <i>Insert appropriate degree for successful completion.</i> | <i>List biosafety document describing the associated theory or procedure.</i> |
| Clinical Laboratory Manager | Medical Surveillance and Epidemiology Knowledge Responsibilities | Lists case definitions for suspect and confirmed cases | Exam | ≥80% | |
| | | Lists Epidemiology of Disease corresponding to the organism(s) detected in the laboratory | Exam | ≥80% | |
| | | Lists local vaccines available for laboratory organisms in laboratory | Exam | ≥80% | |
| | | Works with biosafety officer to keep laboratory personnel current on required | Demonstration | Yearly review | |

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| | | vaccines | | | |
| | | Lists average number of infectious organisms required for infection by organisms | Exam | ≥80% | |
| | | Lists natural route(s) and known LAI routes of infection of organisms | Exam | ≥80% | |
| | | Details accounts of LAI cases associated with organisms | Exam | ≥80% | |
| | | Lists risk group classifications for all organisms worked with in the facility | Exam | ≥80% | |
| | | Lists locations of endemic diseases | Exam | ≥80% | |
| | | Lists national epidemiological definitions for disease outbreak for all diseases | Exam | ≥80% | |
| | | Lists diseases that have potential as bioweapons | Exam | ≥80% | |

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| | | List common symptoms of disease caused by exposure to EDPs and Bloodborne pathogens | Exam | ≥80% | |
| | | Collaborates with Biosafety Officer to maintain medical records of employees | Demonstration | Yearly review | |
| | | Coordinates Incident Response Training | Demonstration and Inspection | Yearly review | |
| | | Coordinates with local emergency response teams | Demonstration and Inspection | Yearly review | |
| | | Coordinates supplies for incident response | Demonstration and Inspection | Yearly review | |
| | | Lists differences between endemic and epidemic disease | Exam | Yearly review | |
| | | Lists local endemic diseases and their geographic locations in country | Exam | ≥80% | |
| | | Lists common epidemic diseases in country | Exam | ≥80% | |
| | | Lists emerging infectious diseases | Exam | ≥80% | |

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| | | in country | | | |
| | | Lists case definitions for suspect and confirmed cases | Exam | ≥80% | |
| | Chemical Safety Responsibilities | Responsible for maintenance of chemical inventory list for chemicals in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Responsible for maintenance of MSDS sheets in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Responsible for insuring that laboratory personnel follow MSDS recommendations | Demonstration / Inspection | Yearly review | |
| | | Responsible for collaborating with the safety officer to write emergency response protocols for chemical spills in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Lists signs and symptoms of exposure to hazardous chemicals in the | Exam | ≥80% | |

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| | | laboratory | | | |
| | | Disposes of chemicals from the laboratory as biohazardous waste | Exam | ≥80% | |
| | | Lists permissible limits of toxic chemicals used in the laboratory | Exam | ≥80% | |
| | Biological Safety Responsibilities | Responsible for collaborating with the biosafety officer to write emergency response protocols for biological spills in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Responsible for hazard communication and signage in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Interfaces with biosafety committee on scientific procedures conducted in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Lists algorithm for assays conducted in laboratory | Demonstration / Inspection | Yearly review | |

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| | | Defines sample and culture storage conditions | Inspection | Yearly review | |
| | | Lists QC tests and testing schedules for assay controls used in the laboratory | Demonstration / Inspection | Yearly review | |
| | Training Responsibilities | Instructs laboratory personnel in spill response protocols | Demonstration / Inspection | Yearly review | |
| | | Trains laboratory personnel in the labeling of samples, assay plates and centrifuge tubes | | Yearly review | |
| | | Trains laboratory personnel in the labeling of chemical solutions | Demonstration / Inspection | Yearly review | |
| | | Retrains personnel in biosecurity within the laboratory | Demonstration / Inspection | Yearly review | |
| | | Serves as in-lab mentor of good microbial techniques and biosafety practices | Demonstration / Inspection | Yearly review | |
| | | Trains personnel in safety aspects of all equipment used in the laboratory | Demonstration / Inspection | Yearly review | |

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| | | Instructs laboratory personnel in safe packaging and package receiving protocol | Demonstration / Inspection | Yearly review | |
| | | Uses Biosafety Task Lists to advance biosafety in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Trains personnel in decontamination of infectious agents used in the laboratory | Demonstration / Inspection | Yearly review | |
| | | Collaborates with Biosafety Officer to maintain biosafety training required by personnel in the laboratory | Demonstration / Inspection | Monthly inspection | |
| | Security Responsibilities | Identifies actions by laboratory personnel that could compromise security | Demonstration / Inspection | Monthly inspection | |
| | | Identifies personnel entering the laboratory who could compromise laboratory security | Exam / Inspection | ≥80% | |
| | | Coordinates with biosafety on restricted laboratory | Exam / Inspection | ≥80% | |

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| | | entry | | | |
| Risk Assessment Responsibilities | List differences between organism risk group and biosafety level | Demonstration | Monthly inspection | | |
| | Conducts protocol risk assessment when there is a change in procedure or personnel | Demonstration | Yearly review | | |
| | Coordinates with safety officer on PPE required for assay | Exam | ≥80% | | |
| Biosafety Management Responsibilities | Informs biosafety when there is a change in protocol or procedure | Demonstration / Inspection / Exam | Yearly review | | |
| | Implements biosafety policies as directed by the biosafety committee or biosafety officer | Demonstration / Inspection / Exam | Yearly review | | |
| | Inspects equipment for problems that may compromise safety | Demonstration / Inspection | Yearly review | | |
| | Supports Biosafety Officer in safety inspections | Demonstration / Inspection | Monthly inspection | | |

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| | | Follows up on biosafety officer recommendations after a laboratory inspection | Demonstration / Inspection | Monthly inspection | |
| | | Identifies biohazards and applies biohazard signs on equipment that may contain biohazards | Demonstration / Inspection | Monthly inspection | |
| | | Responds to laboratory incident reports | Demonstration / Inspection | Monthly inspection | |
| | | Communicates incidents to Senior management, Laboratory Director and Biosafety Officer | Demonstration / Inspection | Monthly inspection | |
| | | Maintains emergency spill response current for laboratory | Demonstration / Inspection | Monthly inspection | |
| | | Implements exposure control plan | Demonstration / Inspection | Monthly inspection | |
| | | Ensures bleach solution is correctly diluted and fresh | Demonstration / Inspection | Monthly inspection | |
| | | Maintains autoclave | Demonstration / Inspection | Monthly inspection | |

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| | Records actions taken to address spore test failure | Demonstration / Inspection | Monthly inspection | |
| | Keeps printout sheet of autoclave cycles | Demonstration / Inspection | Monthly inspection | |
| | Lists laboratory test report logic for all diseases | Exam | ≥80% | |
| | Troubleshoots problems with organism assays | Demonstration | Demonstration over time | |
| | Verifies quality controls for assays | Demonstration | Yearly review | |
| | Promotes a safety culture by supporting and promoting safety at a leadership level | Demonstration | Yearly review | |
| | Follows and corrects problems identified in an inspection | Demonstration | Yearly review | |
| | Maintains and revises safety documents | Demonstration / Inspection | Yearly review | |
| | Collaborates with BSO in interpretation and of national and international regulations | Demonstration | Biosafety Committee participation | |

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| | | Supports BSO in defining institute-wide biosafety procedures and practices | Demonstration / Inspection | Biosafety Committee participation | |
| | | Member of the Institutional Biosafety Committee | Demonstration | Biosafety Committee participation | |
| | | Approves requests for storage of organisms collected in the program | Demonstration / Inspection | demonstration over time | |
| | | Maintains records of diagnostic research | Demonstration / Inspection | demonstration over time | |
| | | Maintains a copy of the facility risk assessment | Demonstration / Inspection | demonstration over time | |
| | | Supports security procedures outlined in the institutional biosecurity manual | Demonstration | demonstration over time | |
| | | Reviews requests for visiting researchers to enter the laboratories | Demonstration | demonstration over time | |
| | | Reviews biological research proposals | Demonstration | Biosafety Committee participation | |

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| | | Assures that research proposals are reviewed by the Institutional Biosafety Committee | Demonstration | Biosafety Committee participation | |
| | | Acts to complete recommendations of the Institutional Biosafety Committee | Demonstration | demonstration over time | |
| | Shipping Responsibilities | Lists Category A and B infectious substances | Demonstration / Inspection | Yearly review | |
| | | Lists shipping requirements for diagnostic samples | Exam | ≥80% | |
| <i>Suggested job titles are listed. Add a job title that is appropriate for your institution.</i> | <i>Add tasks as suggested by the job description.</i> | <i>Add or remove subtasks as appropriate. Use active verbs to describe each subtask.</i> | <i>Insert appropriate evaluation method. Suggested methods are inserted into the cells.</i> | <i>Insert appropriate degree for successful completion.</i> | <i>List biosafety document describing the associated theory or procedure</i> |
| Biosafety Officer | Demonstrates Knowledge of Biosafety Procedures | Familiar with Institute General biosafety training | Exam | ≥80% | |
| | | Familiar with BMBL guidelines | Exam | ≥80% | |

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| | Familiar with WHO laboratory biosafety manual | Exam | ≥80% | |
| | Familiar with national biosafety regulations | Exam | ≥80% | |
| | Familiar with chemical hygiene plan | Exam | ≥80% | |
| | Familiar with biosafety and biosecurity SOPs | Exam | ≥80% | |
| | Lists practices included in standard microbial practices and technique | Exam or Demonstration | ≥80% | |
| | Lists applications of assessment and risk mitigation techniques | Exam or Demonstration | ≥80% | |
| | Defines biosafety training requirements and continuing education schedules for laboratory and administrative personnel | Exam or Inspection | Semi annual review | |
| | Lists entry and exit procedures for the institute | Exam or Demonstration | Yearly review | |

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| | | Lists procedures in spill response | Exam or Demonstration | Semi annual review | |
| | | Lists pathogens that are contained in the institute and the medical signs and symptoms of disease associated with those pathogens | Exam or Inspection | Yearly review | |
| | | List natural routes of exposure for Institute laboratory pathogens | Exam | ≥80% | |
| | | Lists most common exposure routes for laboratory acquired infections (LAI) | Exam | ≥80% | |
| | | Lists procedures in emergency response to a possible exposure | Exam or Demonstration | | |
| | | Lists procedure in a response to a confirmed (LAI) | Exam | ≥80% | |
| | | Lists main topics in the Institutional Biosafety Plan | Exam | ≥80% | |
| | | Lists main topics covered in the Institute Exposure Control Plan | Exam | ≥80% | |

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| | | Lists main topics and regulatory aspects of the Respiratory Protection Plan | Exam | ≥80% | |
| | | Lists procedures to follow in case of an incident | Exam | ≥80% | |
| | | Lists main topics and procedures to follow in the Institute Medical Surveillance Plan | Exam | ≥80% | |
| | | List procedures to follow in case of a lost sample or culture | Exam | ≥80% | |
| | | Applies biosafety procedures to working practices in the laboratory | Demonstration | Monthly review | |
| | | Demonstrates Knowledge of Disinfection Techniques used in Institute | Lists types of disinfectants and the concentrations necessary for cleaning of laboratory surfaces | Exam or Demonstration | ≥80% |
| Lists the steps necessary to decontaminate liquid waste with bleach | Exam or Demonstration | | ≥80% | | |

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| | | Lists the steps in formaldehyde decontamination of the BSC or a room | Exam or Demonstration | ≥80% | |
| | | Demonstrates how to program and run the autoclave | Exam or Demonstration | ≥80% | |
| | | Lists common run conditions for the autoclave | Exam or Demonstration | ≥80% | |
| | | Lists the steps to follow to incinerate biohazardous waste | Exam or Demonstration | Monthly review | |
| | | Oversees decontamination of equipment scheduled for repair or decommissioning | Exam or Demonstration | Monthly review | |
| | Biosafety Quality Management Requirements | Discusses biosafety protocols and procedures with biosafety manager or administration when appropriate | Demonstration | Monthly review | |
| | | Trains laboratory staff in biosafety regulations and requirements | Demonstration or Inspection | Monthly review | |
| | | Discusses violations of biosafety protocols or procedures with | Demonstration or Inspection | Monthly review | |

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| | staff | | | |
| | Discusses repetitive violations of protocols or procedures with biosafety manager or administration when appropriate | Demonstration or Inspection | Yearly review | |
| | Involves administration in biosafety decisions | Demonstration | Yearly review | |
| | Supports biosafety compliance within the laboratory | Demonstration | Monthly review | |
| | Inspects sample labeling and storage for compliance with biosafety regulations | Demonstration or Inspection | Monthly review | |
| | Keeps medical and training records for all employees | Demonstration or Inspection | Yearly review | |
| | Monitors employees health | Demonstration or Inspection | Monthly review | |
| | Keeps vaccine records current | Demonstration or Inspection | Yearly review | |
| | Discusses biosafety protocols and procedures with Administration | Demonstration | Yearly review | |

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| | | Trains entry level BSOs in biosafety regulations and requirements | Demonstration | Monthly review | |
| | | Discusses violations of biosafety protocols or procedures with staff | Demonstration / Inspection | Monthly review | |
| | | Involves administration in biosafety decisions | Demonstration / Inspection | Monthly review | |
| | | Applies Plan/Do/Check/Act continual improvement procedures to all biosafety management documents | | Monthly review | |
| | Biosecurity Requirements | Keeps signage on entry doors current | Demonstration or Inspection | Monthly review | |
| | | Oversees entry of maintenance personnel into the laboratory areas | Demonstration or Inspection | demonstration over time | |
| | | Oversees entry of visitors, including visiting scientists, into the laboratory areas | Demonstration or Inspection | demonstration over time | |
| Inspection Responsibilities | Schedules regular laboratory | Demonstration or Inspection | Monthly review | | |

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| | | inspections | | | |
| | | Informs administration on necessary engineering changes to improve biosafety | Demonstration or Inspection | demonstration over time | |
| | | Informs administration on necessary facility changes to improve biosafety | Demonstration or Inspection | demonstration over time | |
| | | Informs laboratory managers on necessary procedure changes to improve biosafety | Demonstration or Inspection | demonstration over time | |
| | | Inspects for problems with chemical storage, labeling and usage | Demonstration or Inspection | Monthly review | |
| | | Conducts regular safety drills | Demonstration or Inspection | Semi annual review | |
| | | Assures transport of materials and movement of personnel in the laboratory area meets safety requirements | Demonstration or Inspection | demonstration over time | |

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| | Training Responsibilities | Trains scientists within the institute in biosafety concepts using didactic materials | Demonstration or Inspection | Monthly review | |
| | | Trains scientists within the institute in biosafety concepts using approved proficiency level exams and task lists | Demonstration or Inspection | Semi annual review | |
| | | Performs Risk assessment of protocols with appropriate laboratory managers | Demonstration or Inspection | demonstration over time | |
| | | Performs Risk assessment of laboratory equipment with appropriate laboratory managers | Demonstration or Inspection | demonstration over time | |
| | | Maintains facility risk assessment forms | Demonstration or Inspection | Semi annual review | |
| | | Trains staff on risk management procedures identified by the institute biosafety | Demonstration or Inspection | demonstration over time | |

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| | | manual in the risk assessment | | | |
| | | Works with laboratory staff on good microbial techniques and practices | Demonstration or Inspection | demonstration over time | |
| | | Works with laboratory staff on aseptic techniques | Demonstration or Inspection | demonstration over time | |
| | | Works with laboratory staff on donning and doffing of PPE | Demonstration or Inspection | demonstration over time | |
| | | Works with laboratory staff on donning and doffing of required respirators | Demonstration or Inspection | demonstration over time | |
| | | Trains visiting scientists on entry and exit protocols | Demonstration or Inspection | demonstration over time | |
| | | Trains visiting scientists on necessary biosafety procedures | Demonstration or Inspection | demonstration over time | |
| | | Informs visiting scientists of PPE requirements | Demonstration or Inspection | demonstration over time | |

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| | | Uses Biosafety Task Lists for hands-on laboratory training | Demonstration or Inspection | demonstration over time | |
| | | Instructs laboratory managers in the use of Task Lists | Demonstration or Inspection | demonstration over time | |
| | | Interfaces between the biosafety committee and administration | Demonstration / Inspection | Monthly review | |
| | | Interfaces between the biosafety committee and laboratory managers | Demonstration / Inspection | Monthly review | |
| | | Defines responsibilities of laboratory managers based on biosafety committee decisions | Demonstration / Inspection | Monthly review | |
| | | Defines responsibilities of members of the safety committee | Inspection | Monthly review | |
| | | Designs biosafety research to be conducted in the institution | Demonstration / Inspection | Yearly review | |
| | | Assists QA manager in internal | Demonstration / Inspection | Monthly review | |

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| | | proficiency testing | | | |
| | | Conducts biosafety audits | Demonstration / Inspection | demonstration over time | |
| | | Assists government officials in biosafety audits of institutions | Demonstration / Inspection | demonstration over time | |
| | | Reports inspection findings to institute | Demonstration / Inspection | demonstration over time | |
| | | Adapts respiratory protection manual to institute needs | Demonstration / Inspection | Yearly review | |
| | | Reviews and revises Biosafety Task Lists for personnel | Demonstration | Yearly review | |
| | | Instructs BSOs and laboratory managers on Biosafety Task List training, biosafety performance reviews and using Task Lists for safety inspections | Demonstration | Yearly review | |
| | Designs and manages the biosafety program for the institute | Writes/Reviews the institute biosafety manual | Demonstration | Yearly review | |
| | | Assists in biosafety | Demonstration | Monthly | |

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| | | committee | | review | |
| | | Assists in IACUC committee | Demonstration | Monthly review | |
| | | Interfaces with institute quality manager | Demonstration | As needed | |
| | | Interfaces with institute laboratory managers | Demonstration | As needed | |
| | | Interfaces with institute institute director | Demonstration | As needed | |
| | Develops biosafety policy for the Institute | Develop and support a biosafety program in institute | Demonstration | Yearly review | |
| | | Defines the purpose and scope of the institute biosafety manual | Demonstration / Inspection | Yearly review | |
| | | Define the regulatory agencies involved in biohazard regulation in institution | Demonstration / Inspection | Yearly review | |
| | | Define local regulators of biological research | Demonstration / Inspection | Yearly review | |
| | | Defines biosafety and biosecurity responsibilities within the institute | Demonstration / Inspection | Yearly review | |
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| | | Defines training requirements and continuing education schedules | Demonstration / Inspection | Yearly review | |
| | | Defines organisms stored or used within the facility | Demonstration / Inspection | Yearly review | |
| | | Collaborates with Biosafety committee to define the biosafety levels for the laboratories based on the facility and equipment in the institute | Demonstration / Inspection | Yearly review | |
| | | Defines institute procedures for receiving samples | Inspection | Yearly review | |
| | | Defines institute procedures for shipping samples | Inspection | Yearly review | |
| | | Outlines responsibilities for biosafety management and procedures in the institute | Inspection | Yearly review | |
| | | Defines sterilization, disinfection and disposal procedures | Inspection | Yearly review | |
| | | Outlines roles and responsibilities in | Inspection | Yearly review | |

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| | the respiratory protection program | | | |
| | Outlines institute emergency procedures and policies | Demonstration / Inspection | Yearly review | |
| | Coordinates international and national biosafety laws into defined rules and regulations for the institute | Inspection | Yearly review | |
| | Defines the requirements for biosafety committee membership | Inspection | Yearly review | |
| | Defines the purpose and scope of the committee | Inspection | Yearly review | |
| | Defines the requirements for submissions to the committee | Inspection | Yearly review | |
| | Trains biosafety committee members | Demonstration / Inspection | Yearly review | |
| | Chairs biosafety committee meetings | Inspection | Yearly review | |
| | Keeps meeting minutes | Inspection | Monthly review | |

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| | Research Responsibilities | Adapts training for cleaning, disinfecting, storing, inspecting, repairing and discarding respirator or filters to institute | Demonstration / Inspection | Monthly review | |
| | | Recommends institutional standards for assessing air quality and flow for recommendation of respirator based on national or international guidelines | Demonstration / Inspection | Yearly review | |
| | Audit Responsibilities | Lists medical signs and symptoms that would limit respirator use | Exam | ≥80% | |
| | | Lists personal habits that can interfere with respirator function | Exam | ≥80% | |
| | | Advises on conditions within the institute that require respiratory protection | Demonstration or Inspection | As needed | |

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| | Respiratory Protection Program Responsibilities | Assists or conducts training for laboratory personnel | Demonstration or Inspection | Yearly review | |
| | | Understands adult education principles | Exam | ≥80% | |
| | | Designs and coordinates training sessions for entering biosafety officers | Demonstration | As needed | |
| | | Collaborates with international trainers in biosafety | Demonstration | As needed | |
| | | Collaborates with international researchers in biosafety | Demonstration | As needed | |
| | | Conducts management level training classes for biosafety officers and laboratory managers | Demonstration | Yearly review | |