
Integrating Laboratory Biosafety and Biosecurity

Training Seminar on Laboratory Biosecurity and Biosafety

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And

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www.biosecurity.sandia.gov

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Strengthening Biological Risk Management



Vision for Integrated BioRisk Management:

- ✓ Increased focus on "awareness" to change current culture
- ✓ Clarify terminology
- ✓ Development of targeted "training strategies"
- ✓ Securing "commitment" from key stakeholders, including government officials, who must be on board
- ✓ Continue increasing "capacity" based on Regional/Country needs and establish accountability through development of Country "report cards"

Similar Physical Aspects of Biosafety and Biosecurity

Biosafety

- **Physical protection**
 - **Increasing levels of physical containment to prevent the accidental release of dangerous biological agents**
 - BSL-1
 - BSL-2
 - BSL-3
 - BSL-4
 - **Examples: negative air pressure, cabinets and hoods**

Biosecurity

- **Physical protection**
 - **Graded protection designed to secure dangerous biological agents from adversaries**
 - **Property Protection Area**
 - **Limited Area**
 - **Exclusion Area**
 - **Examples: access controls, delay, intrusion detection**

Similar Procedural Aspects of Biosafety and Biosecurity

Biosafety

- **Material control and accountability**
 - Handling procedures to prevent accidental infection
 - Use of personal protective equipment

- **Personnel reliability**
 - Background/reference checks to ensure proper credentials to handle dangerous organisms
 - Policies to prevent untrained individuals from working with materials that pose a biosafety risk

Biosecurity

- **Material control and accountability**
 - Allows the institute to rapidly know where their materials are located, its use, who has access, and enables them to investigate any losses/suspect theft
 - Designation of laboratory workers responsible for specific material

- **Personnel reliability**
 - Background/reference checks to ensure personnel are reliable and trustworthy
 - Procedures to remove unauthorized personnel from secure areas

Similar Procedural Aspects of Biosafety and Biosecurity

Biosafety

- **Transport**
 - Requirements to ensure the safe transport of materials within a lab
 - Federal and international regulations governing the transport of infectious substances outside the lab

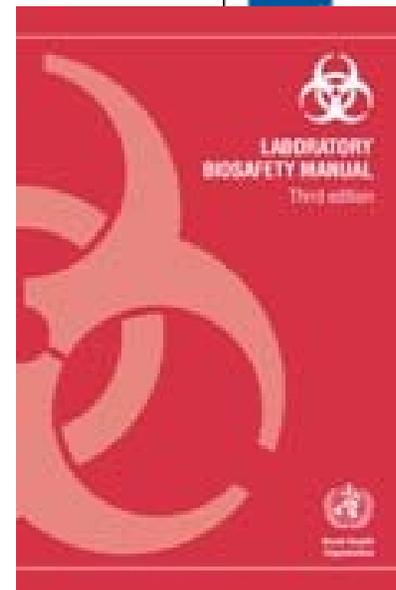
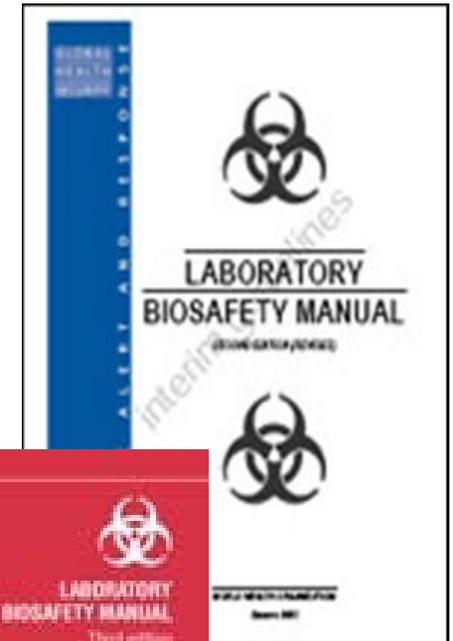
Biosecurity

- **Transport**
 - Best practices to ensure the secure transport of materials both inter-facility and intra-facility
 - Chain of custody where appropriate

Biosafety and Biosecurity share a variety of components

Laboratory Biosecurity Supports Laboratory Biosafety

- **Laboratory biosecurity supports the laboratory biosafety agenda of preventing disease in people, animals, and plants and minimizing the risk of worker injury**
- **Safe and secure laboratories help**
 - **Ensure the containment of hazardous infectious substances in laboratories**
 - **Maintain citizens' confidence in the activities of the bioscience research community**
 - **Increase transparency to investors in the biomedical and biotechnology industries**
 - **Protect valuable research and commercial assets**
 - **Reduce the risks of crime and bioterrorism**



WHO LBM Biosafety Levels 1 and 2

| Biosafety Measure | Provides Security | Potential to Compromise Security |
|----------------------------------|-------------------|----------------------------------|
| Signage | | ✓ |
| Authorization of Entry | ✓ | |
| Windows and Doors | | ✓ |
| Decontamination & Waste Handling | ✓ | |
| Emergency Power | ✓ | |
| Physical and Fire Security | ✓ | |

WHO LBM Biosafety Level 3

| Biosafety Measure | Provides Security | Potential to Compromise Security |
|---|-------------------|----------------------------------|
| Signage | | ✓ |
| Self-closing, and Interlocking Access Doors | ✓ | |
| Sealed and Break Resistant Windows | ✓ | |
| Decontamination & Waste Handling | ✓ | |

WHO LBM Biosafety Level 4

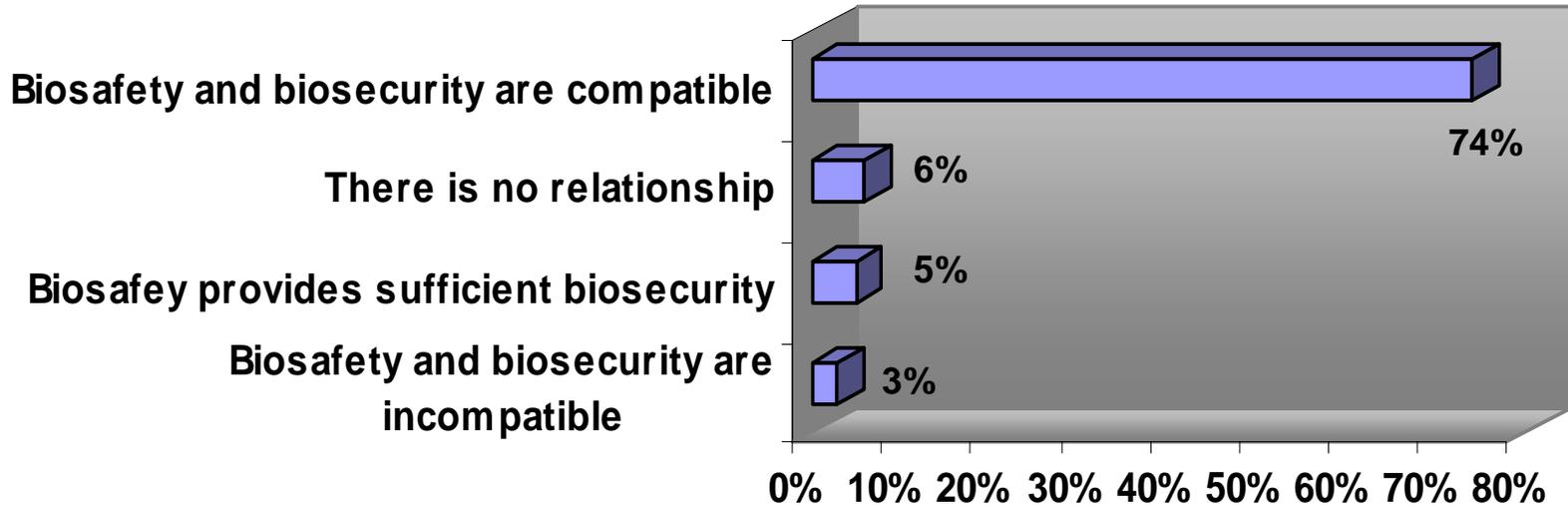
| Biosafety Measure | Provides Security | Potential to Compromise Security |
|----------------------------------|-------------------|----------------------------------|
| Two-person rule | ✓ | |
| Controlled Access | ✓ | |
| Primary Containment | ✓ | |
| Decontamination & Waste Handling | ✓ | |
| Emergency Power | ✓ | |

Potential Conflicts between Biosafety and Biosecurity

- **Emergency alarm – electronic locks**
 - Safety – doors fail open
 - Security – doors fail secure
- **Emergency egress**
 - Safety – move people into the safest location as quickly as possible
 - Security – prevent people from moving into or through restricted areas
- **Emergency response**
 - Safety – provide emergency responders with locations of hazards and responsible individuals
 - Security – control distribution of sensitive information only to those with a need to know
- **Signage**
 - Safety – identify hazardous substances and responsible parties
 - Security – avoid identification of target materials or individuals with access
- **Keys required inside laboratory areas**
 - Safety – contamination concern
 - Security – multiple layers of access



Biosafety and Biosecurity are Compatible



“A program should be designed to incorporate both activities [biosafety and biosecurity] into a daily regime that allows for productive work as well as safety and security.”

Data and quote from a Sandia survey of the US Bioscience community

Summary

- **Biosafety and biosecurity mitigate different risks, but they share a common goal**
 - Keeping dangerous pathogens safely and securely inside the areas where they are stored and used
- **Biosafety and biosecurity must work as coordinated, complementary systems**
- **A sound biosafety system can provide some biosecurity**
- **But biosafety alone cannot provide sufficient biosecurity**
 - Biosecurity policies and procedures should be developed
 - Several potential conflicts between biosafety and biosecurity should be resolved
- **Good laboratory biosecurity practices reinforce and strengthen laboratory biosafety systems**
- **“Security precautions should become a routine part of laboratory work, just as have aseptic techniques and other safe microbiological practices.” (WHO LBM 3rd edition)**

Additional Information

- **Next edition of CDC/NIH *Biosafety in Microbiological and Biomedical Laboratories* will include extensive recommendations on biosecurity**
- **Canada's Laboratory Biosafety Guidelines includes biosecurity**
- **WHO Laboratory Biosafety Manual (Ch 9 is Laboratory Biosecurity)**
- **WHO/FAO/OIE developing joint international biosecurity guidelines – Biorisk Management: Laboratory Biosecurity**
- **Organisation for Economic Co-operation and Development (OECD) is establishing biosecurity guidelines**
- **Laboratory Biosecurity Handbook – CRC Press, forthcoming**
- **www.biosecurity.sandia.gov**
- **www.BEPstate.gov**