
Integrating Laboratory Biosafety and Biosecurity

Laboratory Biosafety and Biosecurity Workshop

**Cairo, Egypt
3-5 April 2007**

www.biosecurity.sandia.gov

SAND No. 2005-7122C and 2006-0953C
Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000.

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

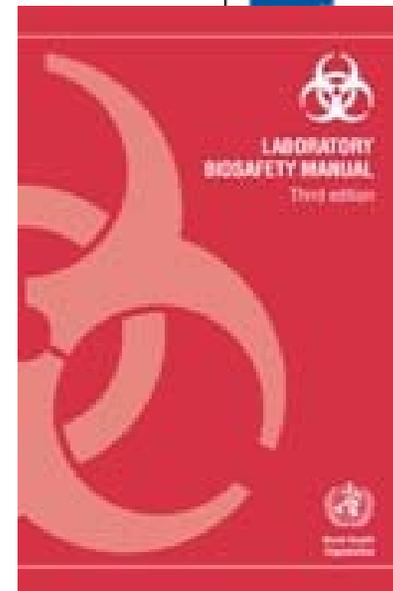
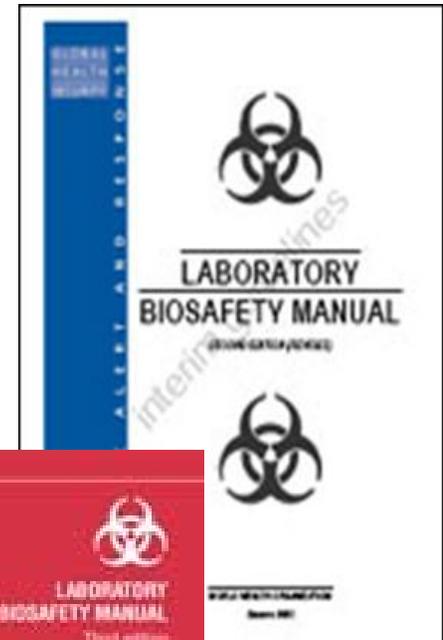
Biosecurity

- 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

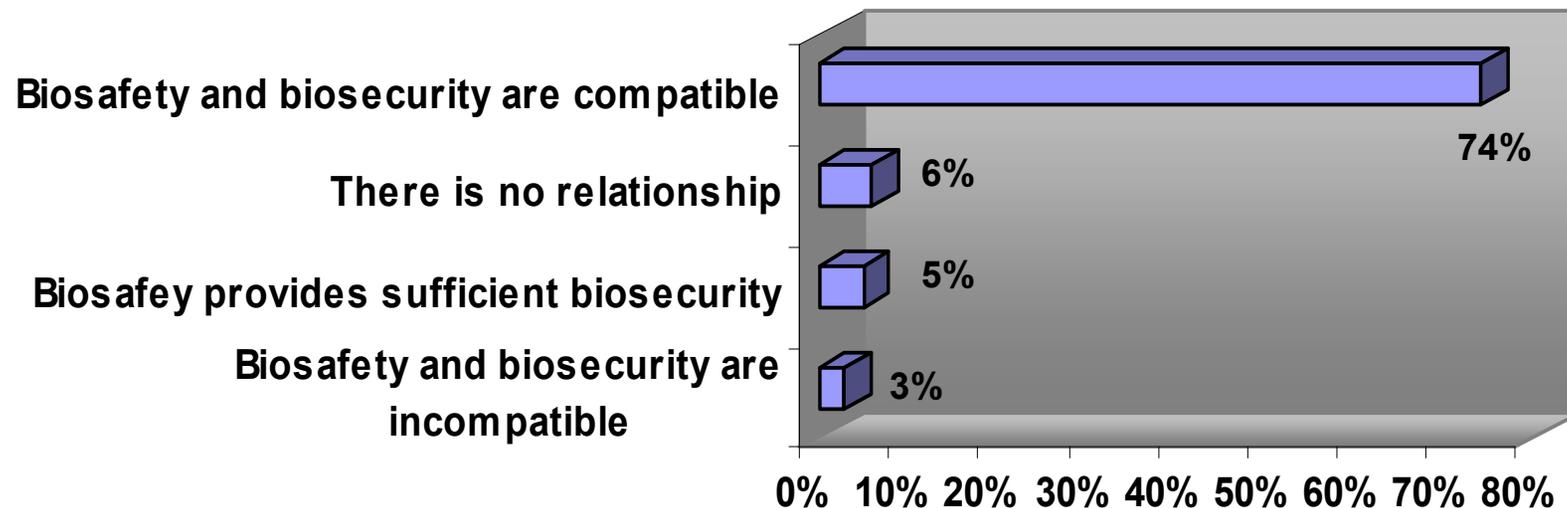
Biosafety Measure	Provides Security	Potential to Compromise Security
Two-person rule	✓	
Controlled Access	✓	
Primary Containment	✓	
Decontamination & Waste Handling	✓	
Emergency Power	✓	

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

- **New edition of CDC/NIH *Biosafety in Microbiological and Biomedical Laboratories* includes extensive recommendations on biosecurity, 2007**
- **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 Guidance, 2006**
- **Organisation for Economic Co-operation and Development (OECD) is establishing biosecurity guidelines**
- **Laboratory Biosecurity Handbook – CRC Press, forthcoming**
- **www.biosecurity.sandia.gov**