



Laboratory Biosecurity and Laboratory Biosafety

Susan B. Rivera

**US-Taiwan Nonproliferation and Confidence Building Measures
Workshop**

International Security Programs

March 15, 2005

SAND No. 2005-1561C

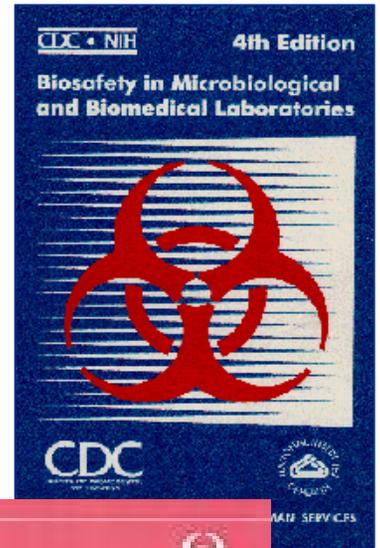
Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000.





Goals and Objectives

- **Laboratory biosafety and biosecurity share a similar goal**
 - **Keeping dangerous pathogens safely and securely inside the areas where they are stored and used**
- **Laboratory biosafety and biosecurity have different objectives**
 - **Laboratory biosafety: Reduce or eliminate accidental exposure to or release of potentially hazardous agents**
 - **Laboratory biosecurity: Protect biological agents against theft and sabotage**





Similar Implementation Strategies and Components

- **Strategies**

- Define unacceptable and acceptable risks by evaluating probabilities and consequences
- Apply a graded protection approach
- Integrate technologies and procedures across all affected systems
- Impact operations only to the level required

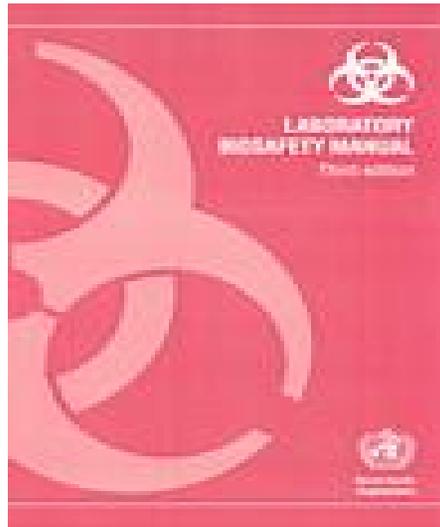
- **Components**

- Risk assessment and risk management
- Personnel management
- Material transport protocols
- Physical security elements
- Training
- Emergency planning
- Program management



World Health Organization: Laboratory Biosafety and Biosecurity

- **Third edition of World Health Organization's (WHO) Laboratory Biosafety Manual (LBM) demonstrates that biosafety contributes to biosecurity**



- **“Security precautions should become a routine part of laboratory work, just as have aseptic techniques and other safe microbiological practices.”**



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	✓	



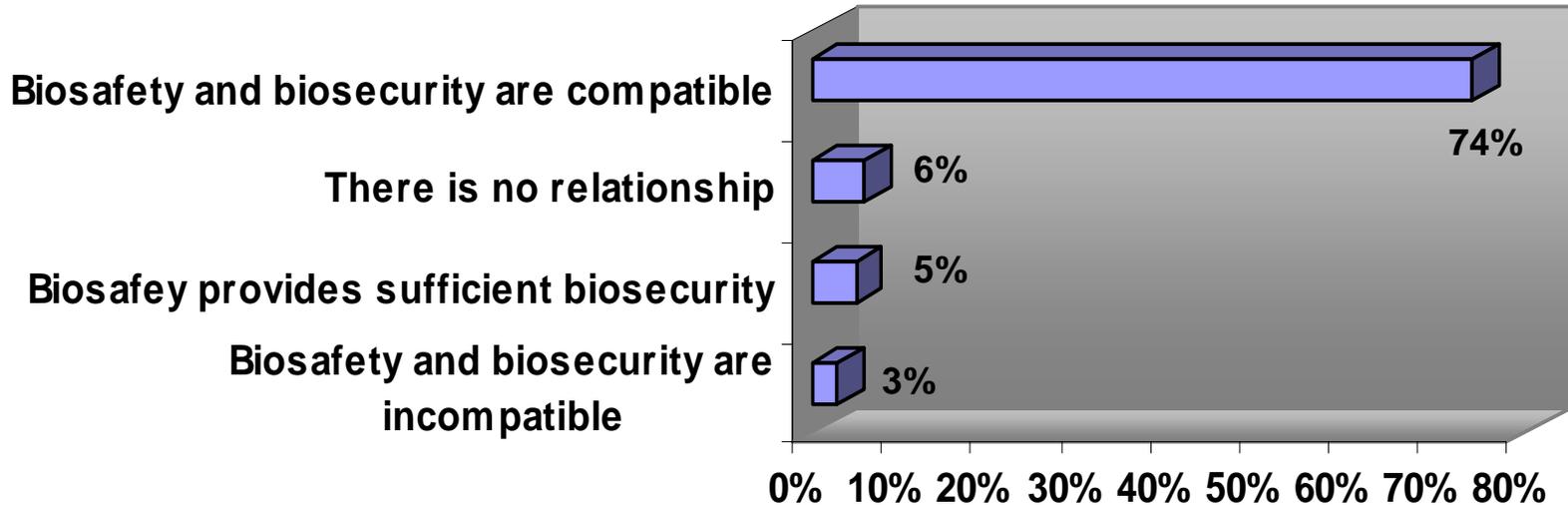
Potential Conflicts between Biosafety and Biosecurity

- **Access controls and emergency response**
 - Emergency ingress and egress are important for life-safety, but the biological agents should remain secure
- **Identification badges**
 - Important for identifying personnel, but may cause a hazard in a high containment facility
- **Signage**
 - Staff and visitors should be alerted to biohazards, but identifying the biological agents in use violates an important principle of biosecurity
- **Thus, laboratory biosecurity measures must be carefully implemented**





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.”



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 provides basic 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**