Adapting Laboratory Level Biosecurity Measures to Support Systems-Level Awareness, Prevention, and Recovery Efforts of Infectious Disease

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Objectives

1. To describe alignment between the five pillars of biosecurity and elements of a public health pathway;
2. To present a historical analysis of past epidemics revealing positive impacts of biosecurity measures that can be augmented and potentially standardized to better fortify the overall systems approach to awareness, prevention, response, and recovery efforts of infectious diseases;
3. To demonstrate that adapting principles of laboratory biosecurity to a systems-level public health pathway may result in increased containment of the spread of infectious disease, and a reduction in the number of infected patients and animals.

Topics

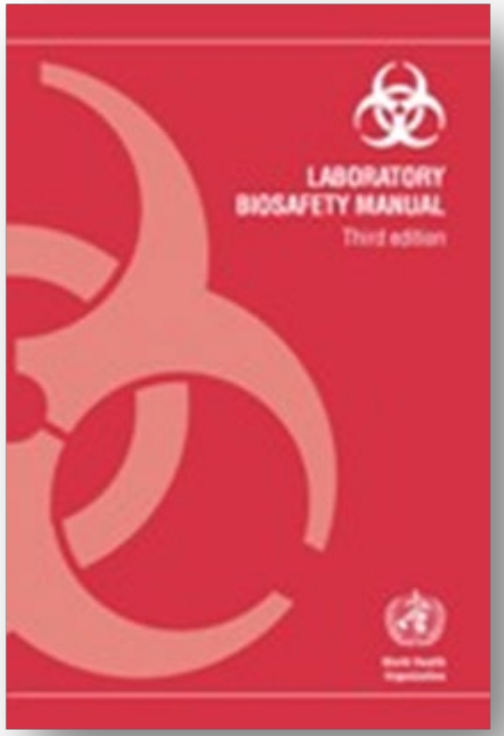
- Laboratory Biosecurity
- Public Health
- Alignment of Laboratory Biosecurity and Systems of Public Health Pathway
- Case Studies
- Summary

Laboratory Biosecurity

What is Laboratory Biosecurity?

"… laboratory biosecurity…[as the] institutional and personal security measures designed to prevent the loss, theft, misuse, diversion, or intentional release of pathogens and toxins."

World Health Organization. Laboratory Biosafety Manual, 3rd Ed.



Outcomes of Effective Laboratory Biosecurity

- Protects and contains valuable biological materials (VBM)
- Limits access to facilities, research materials, and information
- Ensures laboratory environments are secure
- Safeguards the movement of materials within an institution (e.g. during shipping and receiving activities) and outside of the facility (e.g. between institutions and locations)

Laboratory Biosecurity - The 5 Pillars

1. Physical Security
2. Information Management
3. Material Control and Accountability
4. Personnel Reliability
5. Transportation Safeguards

Public Health

What is Public Health?

"… the science and art of preventing disease, prolonging life, and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals."

Winslow CEA. The untilled field of public health. Mod Med 1920;2: 183–91.

Outcomes of Effective Public Health

- Prevents or mitigates the impact of naturally occurring outbreaks and accidental or intentional releases of dangerous pathogens
- Rapidly detects and transparently reports outbreaks when they occur
- Responds effectively to limit the spread of infectious disease outbreaks in humans and animals, mitigates human suffering and the loss of human life, and reduces economic impact

Public Health Pathway – 5 Elements

1. Public Health Awareness
2. Biosurveillance
3. Recognition
4. Response
5. Recovery

Case Studies

Foot and Mouth Disease (FMD)

- Frameworks for Communication
- Environmental Impacts
- Traceability
- Roles of Difference Species
- Timeliness of Reporting
- Joint Training
- Waste Management
- Movement Controls
- Zoning
- Trade Impact

Ebolavirus Disease (EVD)

- Supply Chain
- Communication Structures
- Sample Transport Networks
- Targeted Surveillance
- Infection Control Measures
- Movement Controls
- Universal Precaution Practices
- Waste Management
- Safe Burials

Alignment of Laboratory Biosecurity to a Systems of Public Health Pathway

Laboratory Biosecurity and Public Health Pathway

Public Health Awareness	• Optimum time to build biosecurity frameworks and legislative policies and conduct routine and regular training activities
Biosurveillance	• Routine surveillance activities should incorporate biosecure sample transport activities and emphasize biosecurity training
Recognition	• Biosecurity activities, such as isolation of infected patients/animals, should begin immediately to reduce unwanted spread
Response	• Implement biosecurity measures, such as fortifying sample transport networks, additional use of PPE, increased isolation, and healthcare worker competency augmentation
Recovery	• Often a wake of infectious materials and stockpiles of samples are left behind which should be properly isolated and decontaminated to reduce unnecessary spread of infection

Summary

- Laboratories are an integral component of public health systems
- Public and global health experiences have shown the need to take and apply biosecurity measures outside the walls of laboratories
- Applying biosecurity measures in conjunction with public health activities can mitigate emerging and re-emerging infectious health threats

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Thank You

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