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Developing and Implementing a Biosecurity Plan in a University Setting

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Biosafety vs Biosecurity

- ❑ **Biosecurity** refers to ensuring the security of biological materials to prevent theft, illicit use, or release
 - counters deliberate release of materials
- ❑ **Biosafety** focuses on reducing exposure to and release of biological materials
 - counters accidental release
- ❑ Integrating biosecurity and biosafety programs is important


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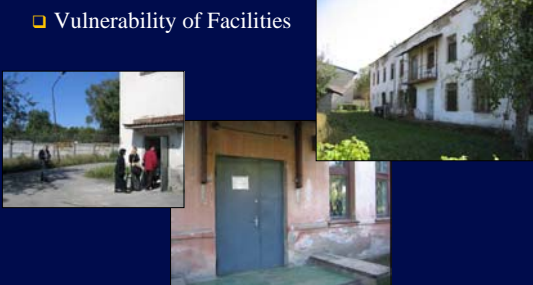
Why Biosecurity?

- ❑ Increase in facilities handling dangerous pathogens
 - ❑ Increase in laboratory networks for laboratory-based surveillance and diagnostics
 - ❑ Increase in biodefense and infectious disease research
 - ❑ Field applications
- ❑ Increase in number of individuals with access to these agents

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Vulnerability of Facilities



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Consolidation of culture collections

- Reduce resources needed for biosecurity upgrades
- Secure storage and access



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Challenges....

Change ?




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Biosecurity Challenges

- ❑ Biological materials
 - ❑ Pathogens can replicate
 - ❑ Materials-balance & input/output discrepancy approach not feasible
 - ❑ Theft of minute quantities significant
 - ❑ Benign pathogens can be rendered pathogenic through genetic engineering
- ❑ No devices to detect pathogens being removed from a facility
- ❑ Easy to hide small vials, filter paper


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Biosecurity Challenges



- ❑ Present in many locations within the lab
 - ❑ Freezers, incubators, working stocks, wastes
 - ❑ Volumes and concentrations constantly increasing and decreasing
 - ❑ Accounting of pathogens difficult

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Unique Approach

- ❑ Traditional “guards, gates, guns, and two-man rule” not optimal

- ❑ Approach
 - ❑ Unique aspects of biological work
 - ❑ Identify targets, threats and vulnerabilities associated with biological programs
 - ❑ Develop biosecurity measures that address and solve problem


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Unique Approach


- ❑ Bring various disciplines together
 - ❑ Security
 - ❑ Biosafety
 - ❑ Scientists
 - ❑ Management
 - ❑ Human resources
 - ❑ IT (information technology) staff
 - ❑ Law enforcement

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Responsibilities

- ❑ **Laboratory Director**
 - ❑ Ensure effective biosecurity policies are in place
 - ❑ Adhere to regulatory requirements
- ❑ **Biosafety/Biosecurity Officer**
 - ❑ Work with laboratory managers to implement biosecurity measures
- ❑ **Scientists, laboratory workers**
 - ❑ Ensure follow biosecurity protocols (e.g. inventory control of pathogens)
- ❑ All personnel are responsible for biosecurity....

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Biosecurity Program

- ❑ Key Elements
 - ❑ Physical protection
 - ❑ Personnel suitability/reliability
 - ❑ Pathogen accountability
 - ❑ Information and cybersecurity systems
 - ❑ Incident response

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Physical Facility

- ❑ Restricted access
 - ❑ Signage
 - ❑ Physical barriers
 - ❑ Access controls
 - ❑ Intrusion detection systems



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Access Control

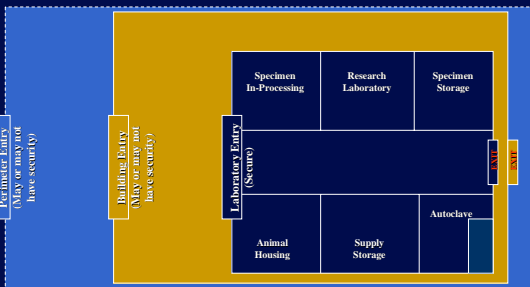
- Separate from public areas
- Should be locked at all times
- All entries recorded
- Only workers required be allowed access
- Access for students etc. limited to when reg. Employees present
- Freezers, refrigerators etc. to be locked when unattended

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Physical Layout



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Lab Entry-Sophisticated

The diagram shows a laboratory layout with a yellow dashed box around the lab area. A yellow arrow points from a collection of various access control devices (keypads, card readers, mobile phones) to the lab entrance. Another yellow arrow points from a 3D cutaway of a door with a keypad to the lab entrance.

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Lab Entry-Simple

The diagram shows a laboratory layout with a yellow dashed box around the lab area. A yellow arrow points from a key to the lab entrance. Another yellow arrow points from a keypad to the lab entrance. Below the diagram are two boxes: 'Key Control' with a key icon and 'Code Control' with a keypad icon.

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Specimen Controls

The diagram shows a laboratory layout with a yellow dashed box around the lab area. A yellow arrow points from a biohazard sign to a 'Specimen Storage' area. Below the diagram are three images: a white specimen storage cabinet, a biohazard sign, and a blue specimen storage container.

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Access Control (current situation)

- UBC has over 30,000 access points on campus alone
- Using key access
- Cost to change to keycard ~ \$25 – \$50,000/bldg. – (\$2 – 4 million total cost)
- Offsite Level 3 facilities use keycard access
- Centre for Excellence in HIV offsite has keycard with PIN
- Locked freezers etc. - ??



Personnel in Facility

- ❑ Personnel suitability
 - ❑ Working in containment facilities with access to pathogens
- ❑ Background checks and security clearances
 - ❑ Confidential, secret, top secret





Who is in the lab?

- All workers should be known to facility administrators, lab. Directors. Background checks/security clearances may be appropriate
- All workers (including students, visitors etc.) should wear visible ID Badges
- Guests should be issued ID Badges and escorted.



Who is in the lab? (current situation)

- With ~ 3500 research staff, 1000 Faculty, & 2400 Grad students – difficult to know all and have background checks
- ID badges great idea but may be a logistical nightmare
- Currently there is not enough staff to issue visitor badges and escort individuals




Pathogen Inventories

- Accountability of pathogen collections
 - Detailed inventory
 - Summary of all agents at Centre
 - Detailed inventory of repositories
 - Accountability for experimental and working stocks
 - Sample labeling
 - Inactivation and disposal of pathogens
 - Internal transfer within the laboratory



Pathogen Inventories

- Record keeping
 - Database of stocks
 - Disposition of materials
- Security of stored material
 - Control access to rooms, freezers, fridges
 - Maintain log of all entries to area
- Signage
 - Conflict between safety “need to know” and security “do not advertise”

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Know what is being removed from the lab? (current situation)

- ????

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Things we are doing...

- Biosafety Project Approval Form
 - Procedures involved
 - Location of where materials are to be used and stored
 - Registration of individuals working with biohazardous materials
 - Disposal procedures

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So where do we need improvement?

- ❑ Need to have a better appreciation of what is being worked with and the hazard if it were to be removed from the research environment.
- ❑ Better Access Control
- ❑ Change in the attitude of everyone in regard to Biosecurity.

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Thank you

- Questions ?????

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