How Evolving Biocontainment Agendas and an Increase in Support Apparatus Impact Laboratory Design Requirements

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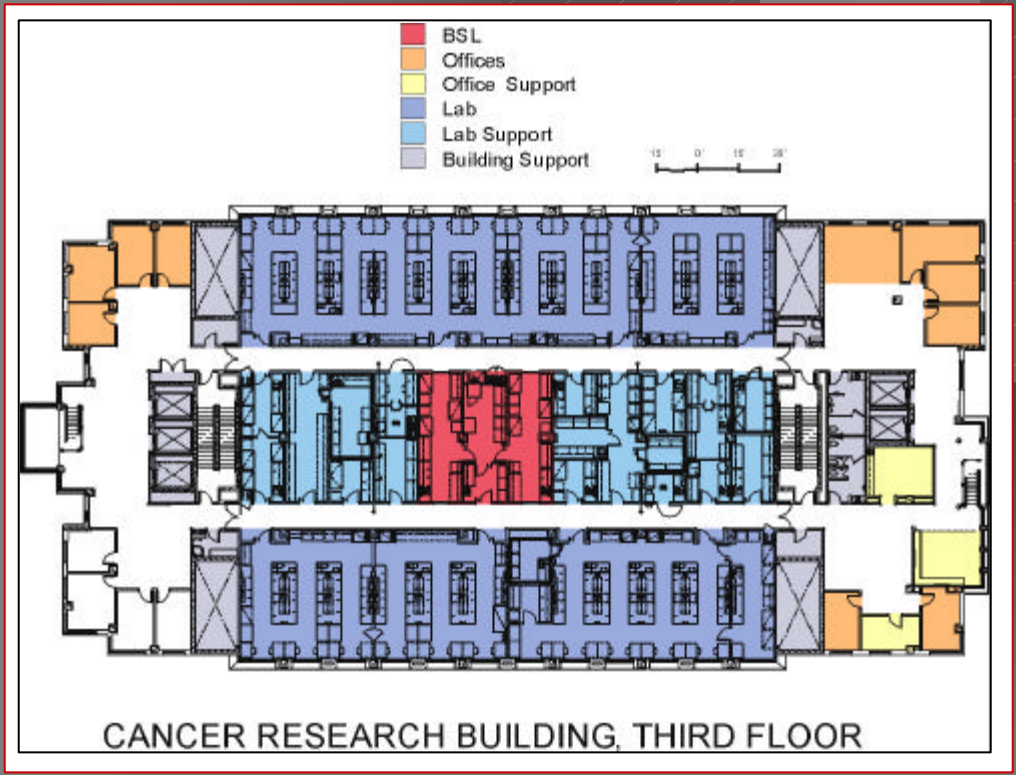
Past – 2-Room Schoolhouse



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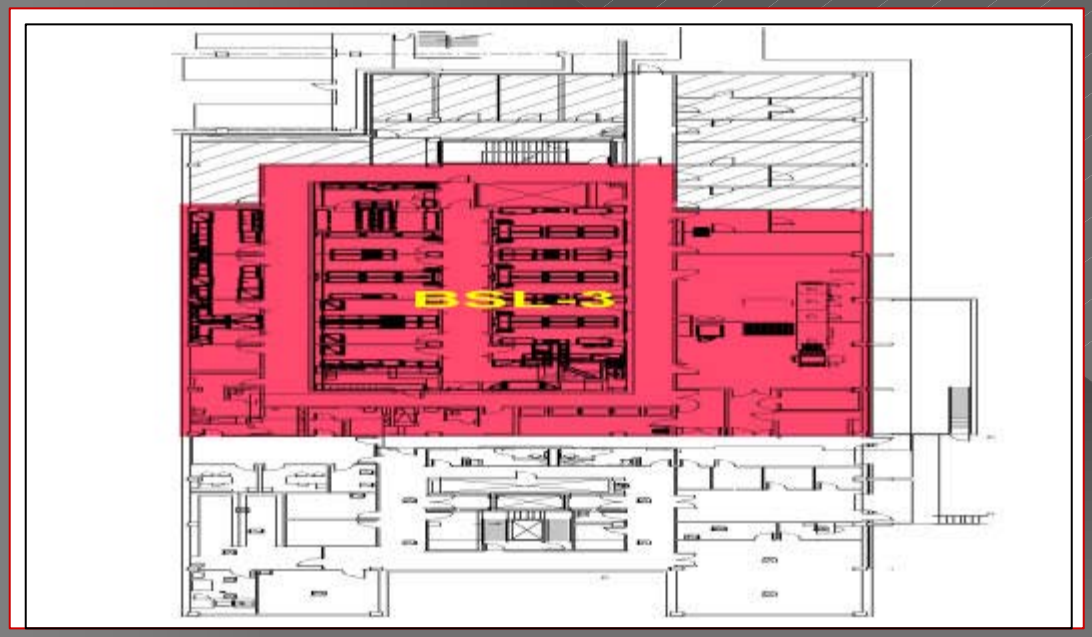
Present - Academy



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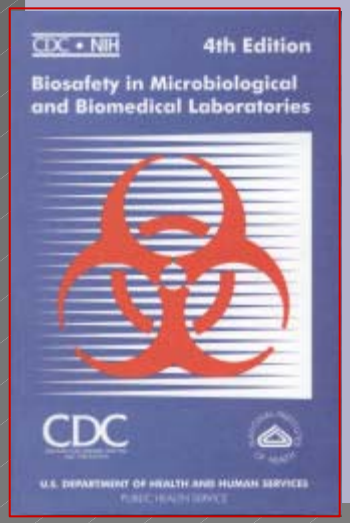
Sources for BSL Guidelines

- NIH-CDC Biosafety in Microbiological and Biomedical Laboratories
- World Health Organization Biosafety Guidelines
- Canadian Laboratory Biosafety Guidelines



WHO OMS
WORLD HEALTH ORGANIZATION - ORGANISATION MONDIALE DE LA SANTE

Health Canada Santé Canada

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Small Benchtop Equipment

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Large Apparatus

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NSF Standard Number 49-2002

- Type A BSCs can recirculate their filtered exhaust air back into the laboratory, or out of the lab via a canopy connection. A flow alarm is optional.
- Type Bs must exhaust some or all of their air directly out of the lab after HEPA filtration through a sealed, dedicated exhaust system. A flow alarm is required.
- Type A/B3 or B3 BSCs will cease to exist. They are now known as Type A2. A2s can recirculate back into the lab, or be exhausted by a canopy.

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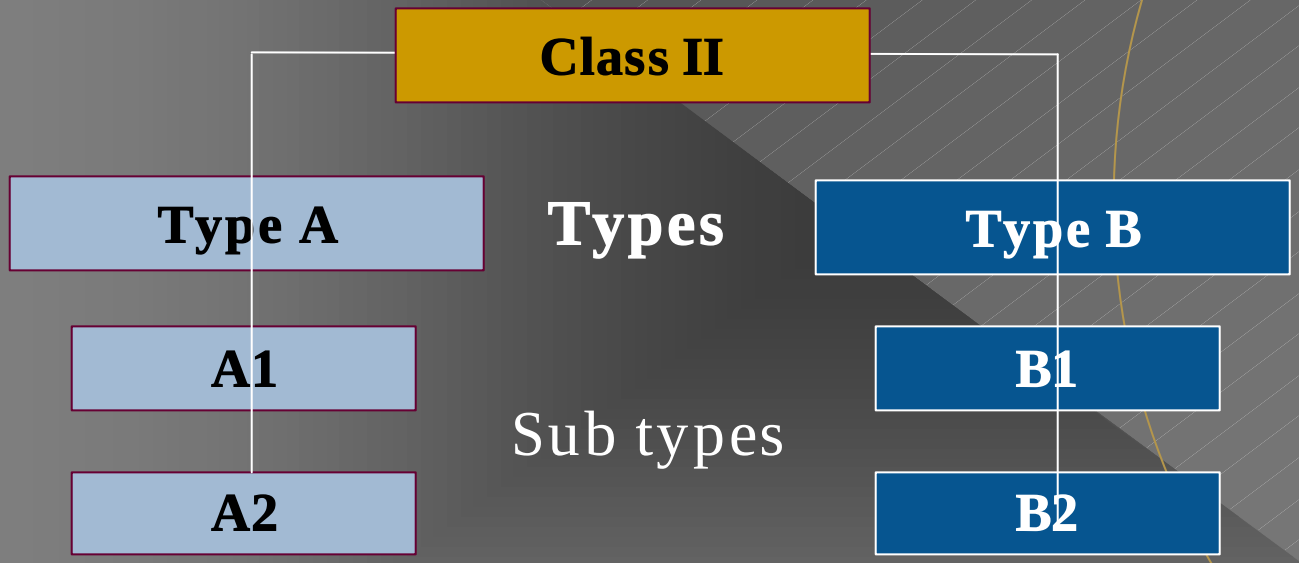
Types of Class II BSC's



Differences Between Type A and Type B BSCs

Class II

Type A

- May have “exposed” contaminated positive pressure plenums (A1 only)
- Minimum Average face velocity of 75FPM (A1) or 100FPM (A2)
- Exhaust into lab or to outside via canopy

Type B

- No “exposed” contaminated positive pressure plenums allowed
- Minimum Average face velocity of 100FPM
- Must exhaust outside the lab via dedicated exhaust system with alarm

Type A or Type B - Which to Choose?

Type A

- For routine microbiological work. Type A2 may be used with volatile toxic gasses and fumes if canopy connected.

Type B

- Offers containment and direct removal of volatile toxic gasses and fumes used in conjunction with biological research.

The critical factor in choosing Type A or B is not biological containment, but whether or not and how much the user works with volatile toxic chemicals.

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Lab Waste

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Mechanical

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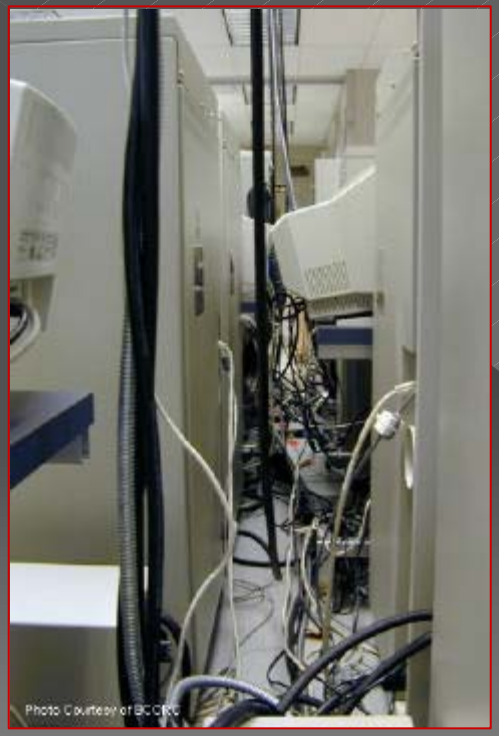
Electrical



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Biological Safety Cabinets

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Construction Details

- Finishes
  - Flooring
  - Ceilings
  - Casework
- Doors
- Sinks
- Autoclaves
- Decontamination

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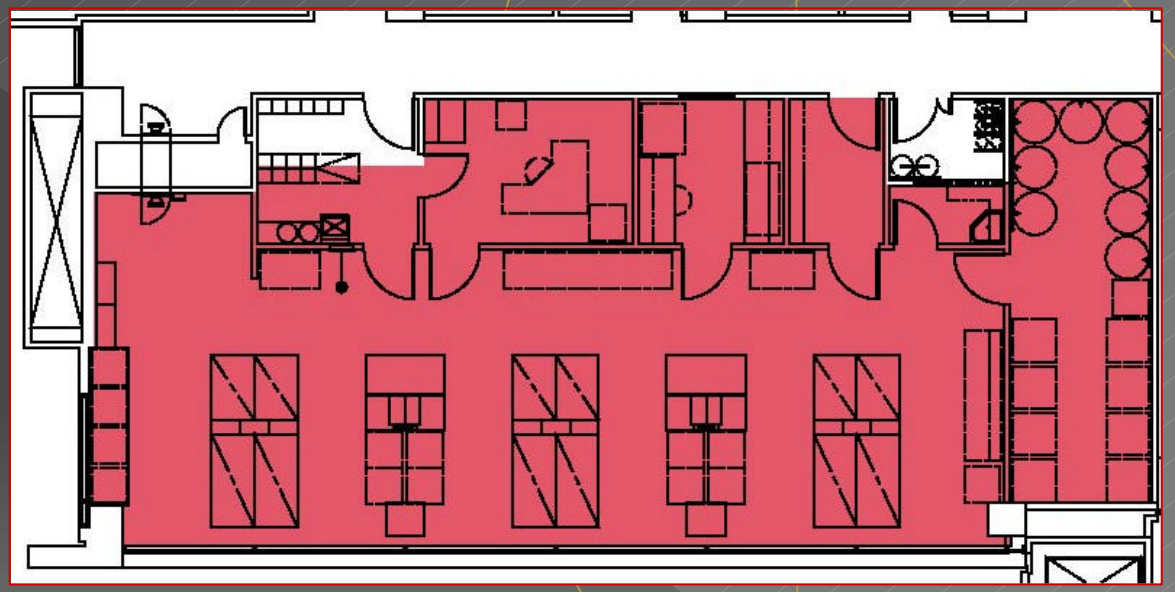
Maximize Use

- Multiple Work Stations
- Shared Facilities
- Single Entrance and Autoclave
- Equipment Locations



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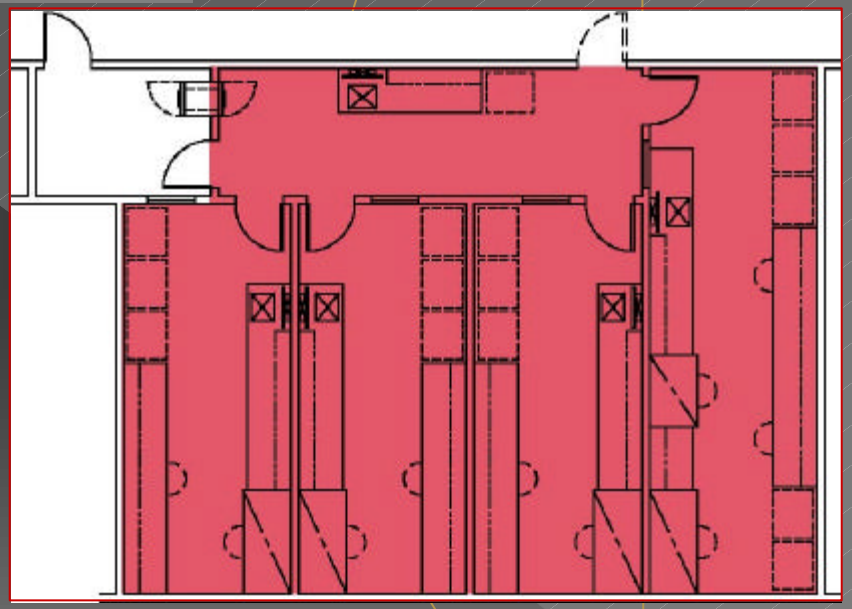
Multiple Agent Suites

- Shared
  - Entrance
  - Autoclave
  - Support
- Each Cell
  - Sink
  - BSC
  - Incubators
  - Microscopes



Space Issues - Infrastructure

- Redundant Systems
- Emergency Power System
- Waste Systems
- Maintenance Staff Outside Barrier
- Flexibility
- Reliability
- Decontamination Agents

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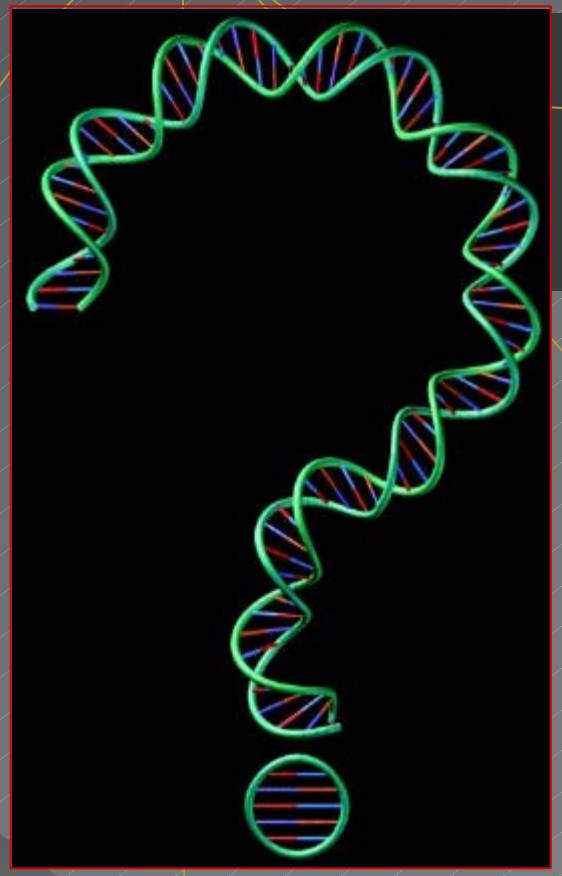
Containment – BSL3

- Primary Barrier
  - Clothing
  - BSCs
- Secondary Barrier
  - Architecture
  - Construction
  - Engineering
  - Pressurization

Lessons Learned



- Once Constructed – Protect from Change
- Biosecurity – Manage Users
- Manage Tour Routes
- Design for Decontamination
- Design for Upgrade to BSL3 if not needed now

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