Trends in Public Health Laboratories

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November 2008

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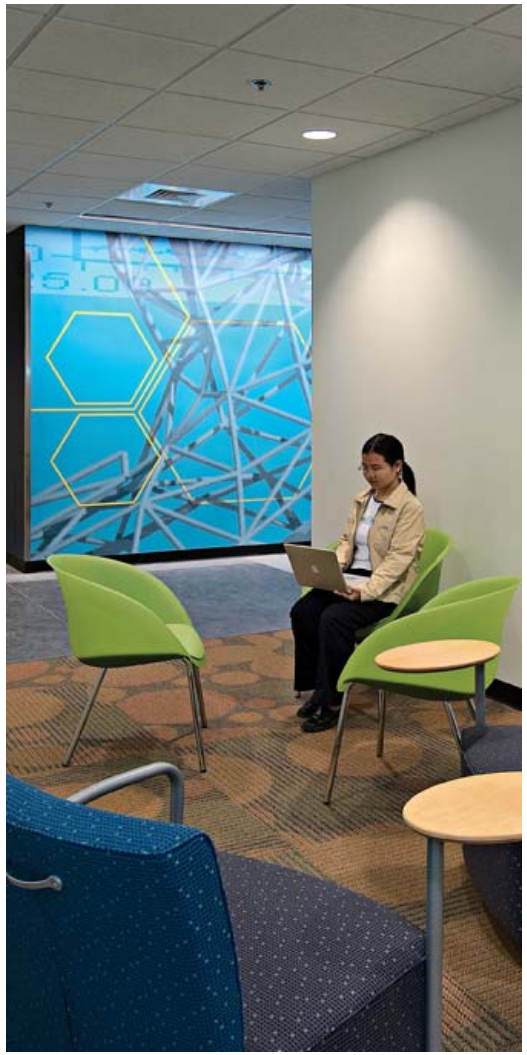
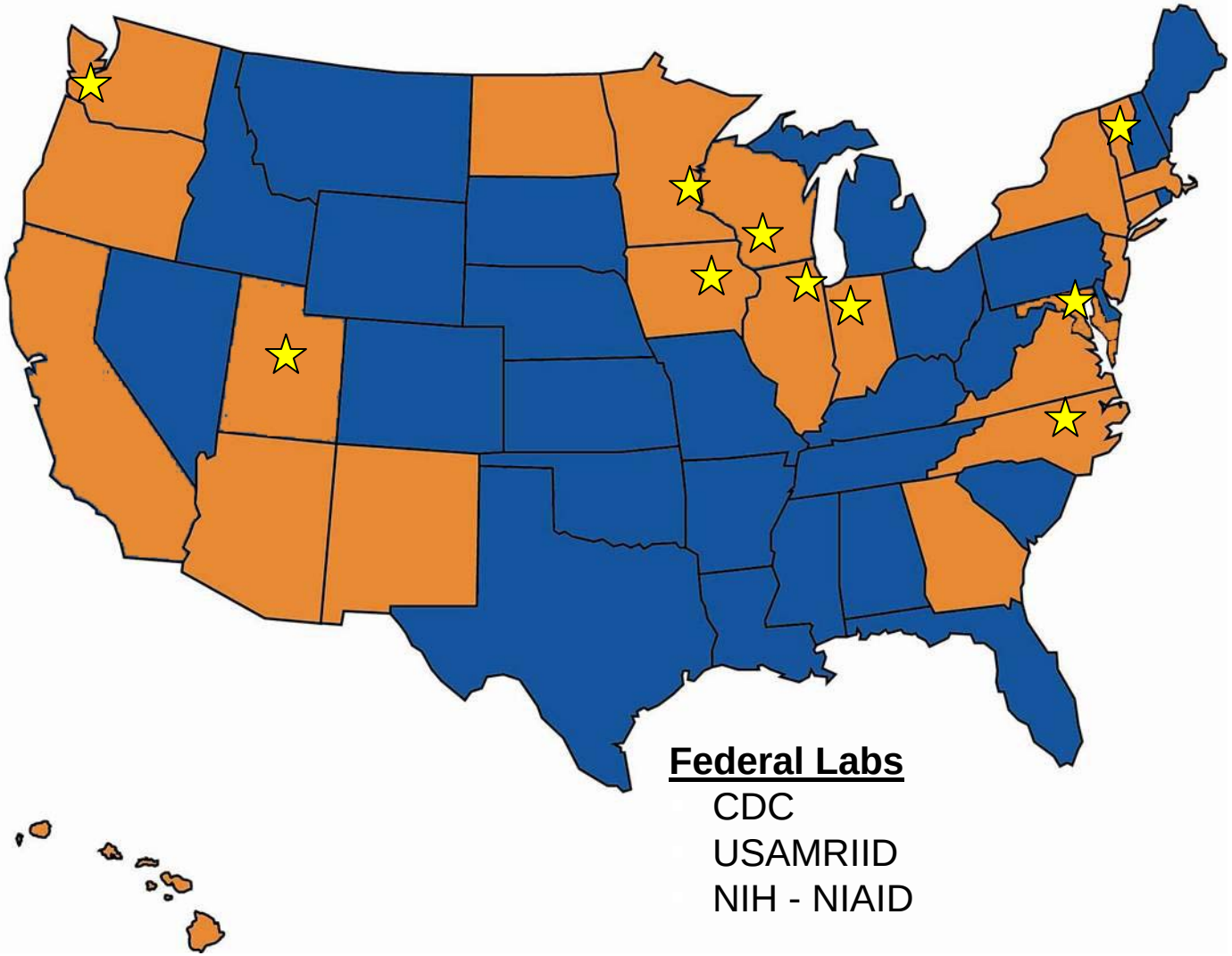


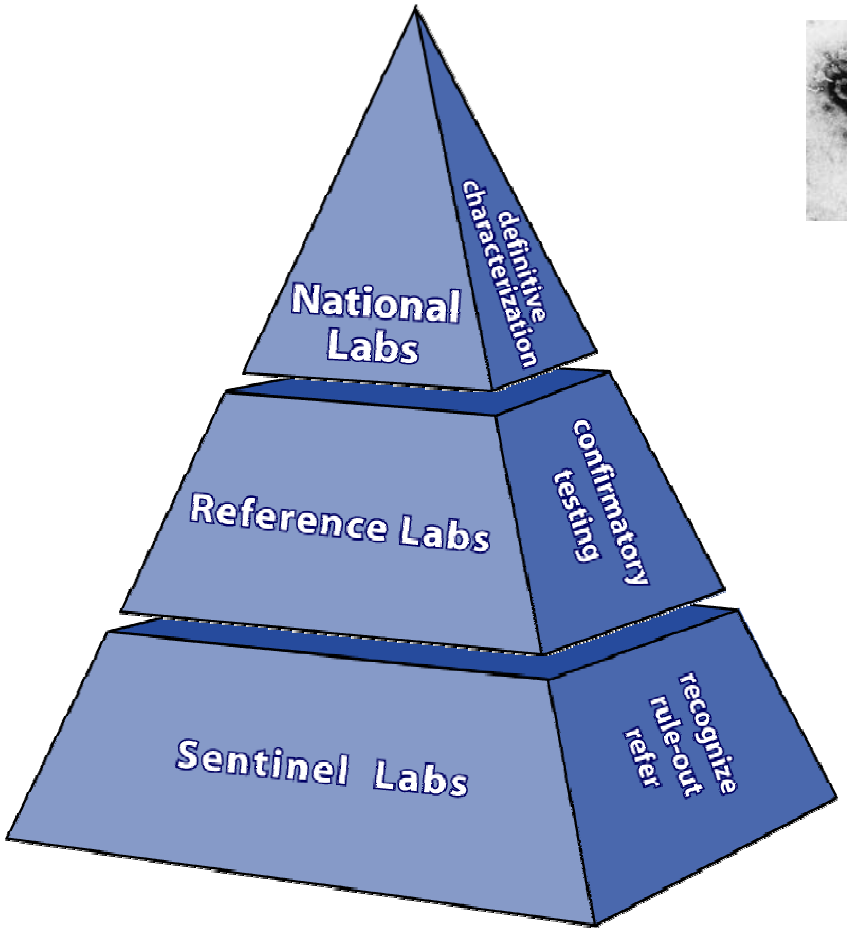
Background – Public Health Experience

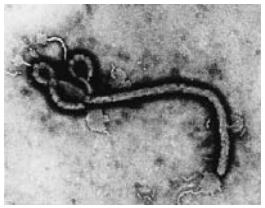
Arizona
California
Georgia
Hawaii
Illinois
Indiana
Iowa
Maryland
Minnesota
New Jersey
New Mexico
New York
North Carolina
North Dakota
Oregon
Utah
Virginia
Vermont
Washington
Wisconsin
Wyoming

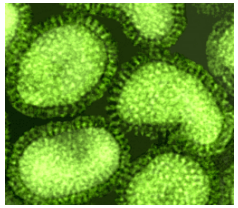


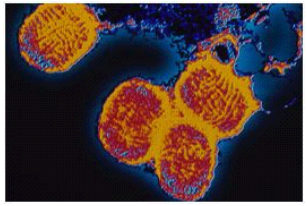
Federal Labs
CDC
USAMRIID
NIH - NIAID

Overview


National Labs
definitive characterization
Reference Labs
confirmatory testing
Sentinel Labs
recognize rule-out refer







Issues and Drivers

Improving the Health of the People of the State

Mission

- Diagnostic & Analytical Services
- Disease Surveillance
- Outbreak Investigation
- Outreach Programs
- Training & Consulting

Method

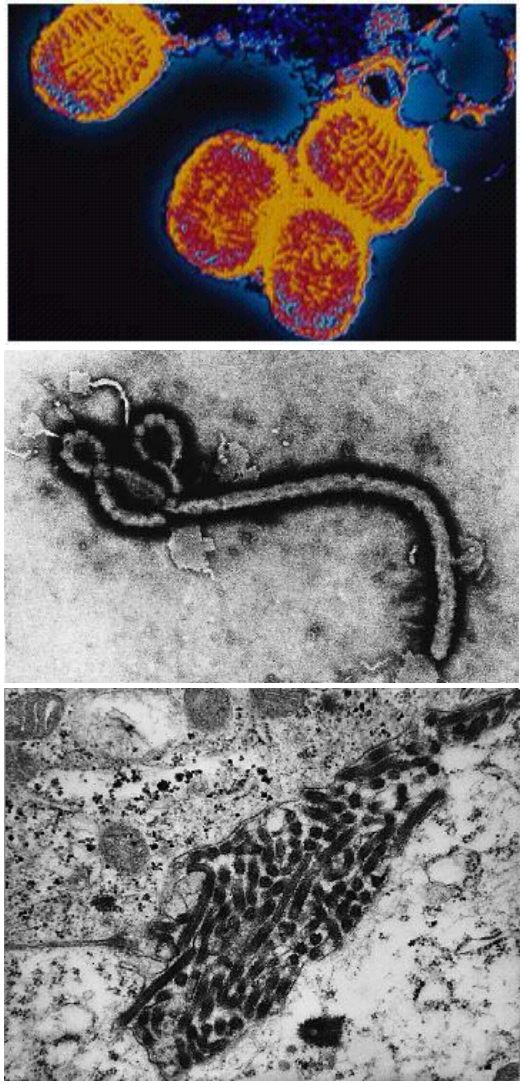
- Quality Scientific Talent & Equipment
- Laboratory Building as a Partner
  - ✓ Enables the Sciences
  - ✓ Creates a Safe Workplace
  - ✓ Provides Appropriate Security Measures
  - ✓ Flexible, Adaptable, Easily Changed
  - ✓ Facilitates a Quality Work Environment

"Can Do"

Not just

"Make Do"

Issues and Drivers



Site Protection & Chain of Custody

- Secure Testing & Contaminant Control
- Sample Intake Security
- Secure Storage

Unknown Agents (BSL3-E to Glovebox 4)

- Increased Virulence
- Multiple Drug Resistance
- Modified Path of Transmission
- Modified Diagnostic Characteristics

Select Agents (CDC & USDA)

- Increased Environmental Containment

Design Strategies

Design for the Lab Hazards

- Biological - Chemical - Radiological - Physical
- Safe Layout: Consider Safe Paths of Travel
- Interrelated HVAC & Primary Containment
- Transparency – See and Be Seen

Layout as a Flow Diagram

Central Accessioning / All Hazards

Receipt = First Line of Defense

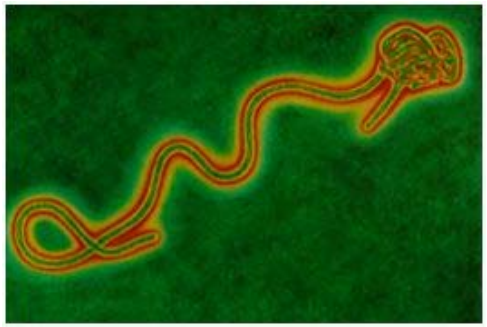
Open Labs Wherever Possible

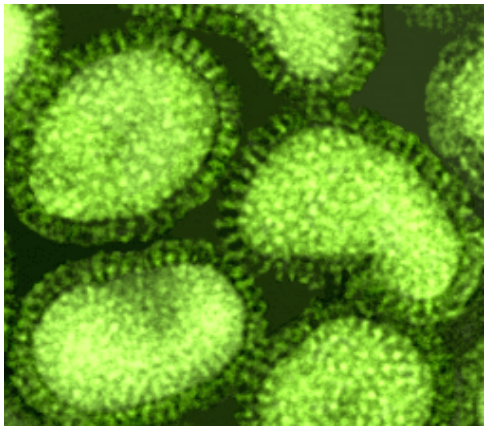
Closed Labs as Required

Layers of Flexibility in Labs and Systems

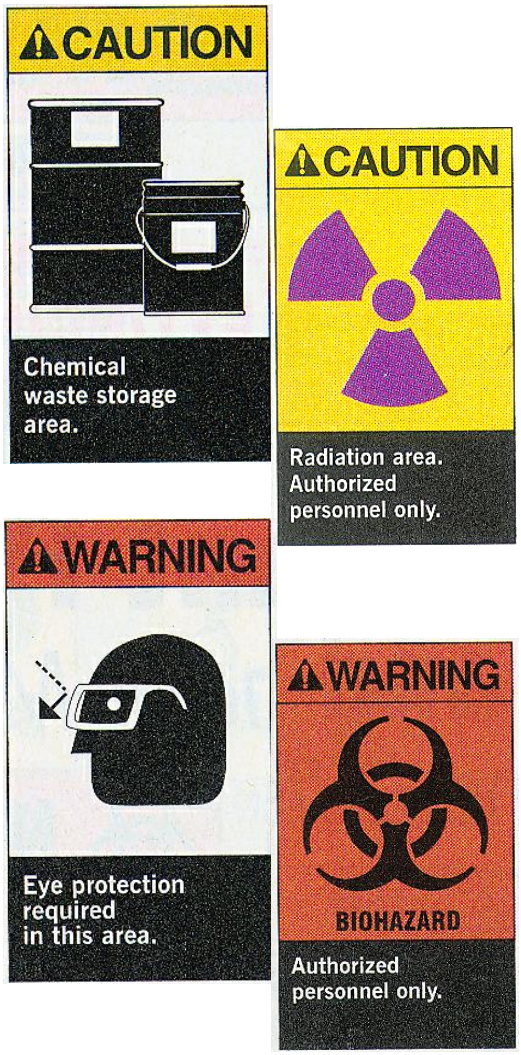
Quality Working Environment

Laboratory Hazards





Laboratory Hazards



Chemical:

Flammables, acids, corrosives, reactive chemicals, carcinogens, mutagens, teratogens, toxins, compressed gases

Radiological:

Radionuclides and equipment that produces ionizing radiation

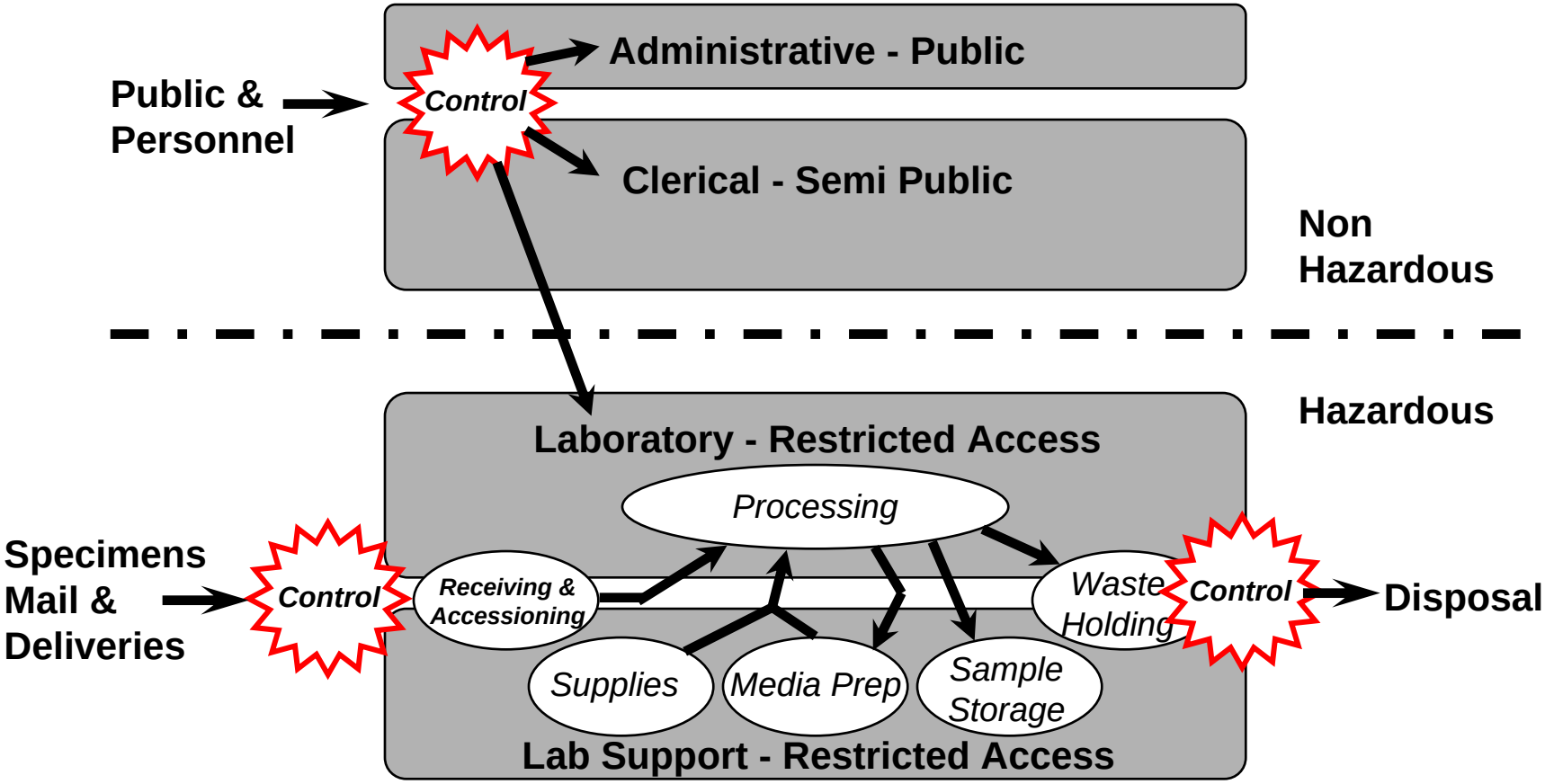
Physical:

Lasers, magnetic fields, moving parts, high voltage, high noise, ultraviolet light, extreme heat or cold, high pressure vessels

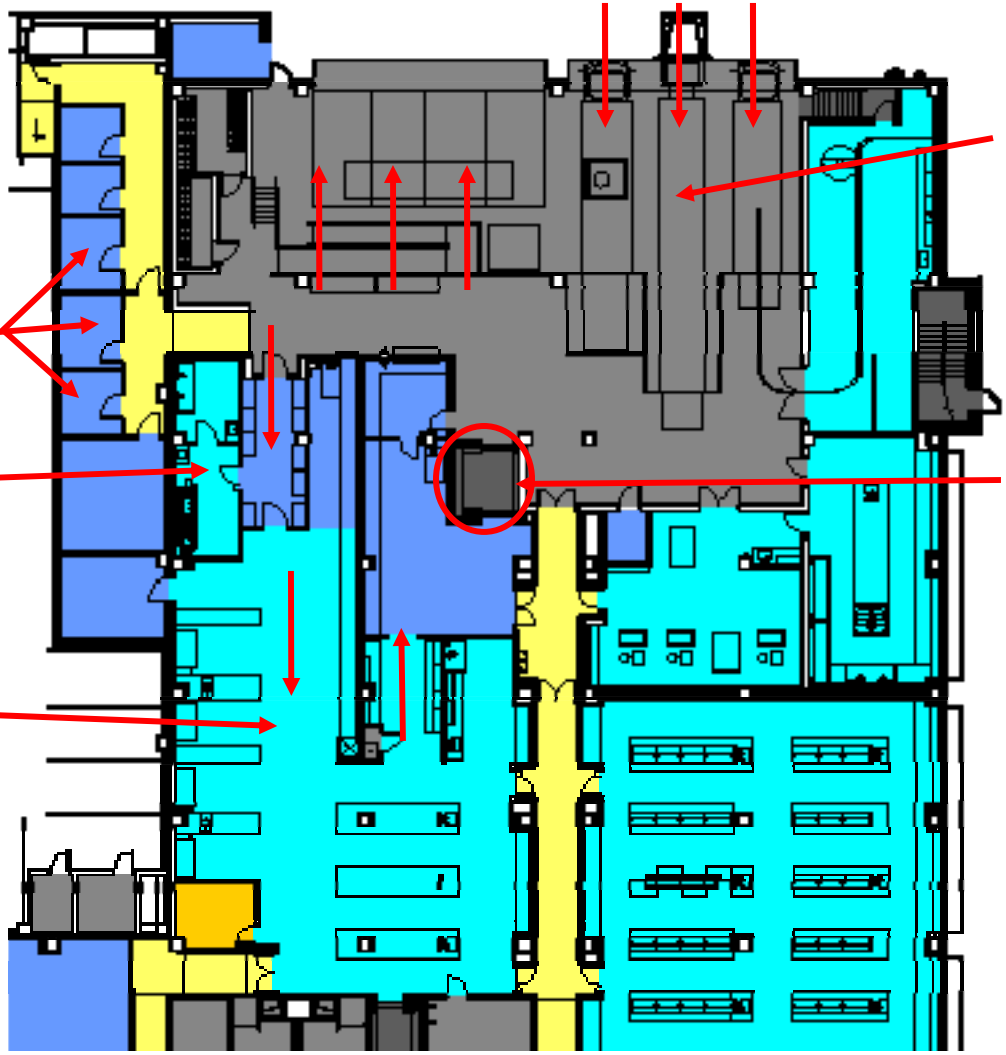
Biological:

Etiologic agents, material containing etiologic agents, organisms with recombinant DNA, toxins, allergens

Building As Flow Diagram



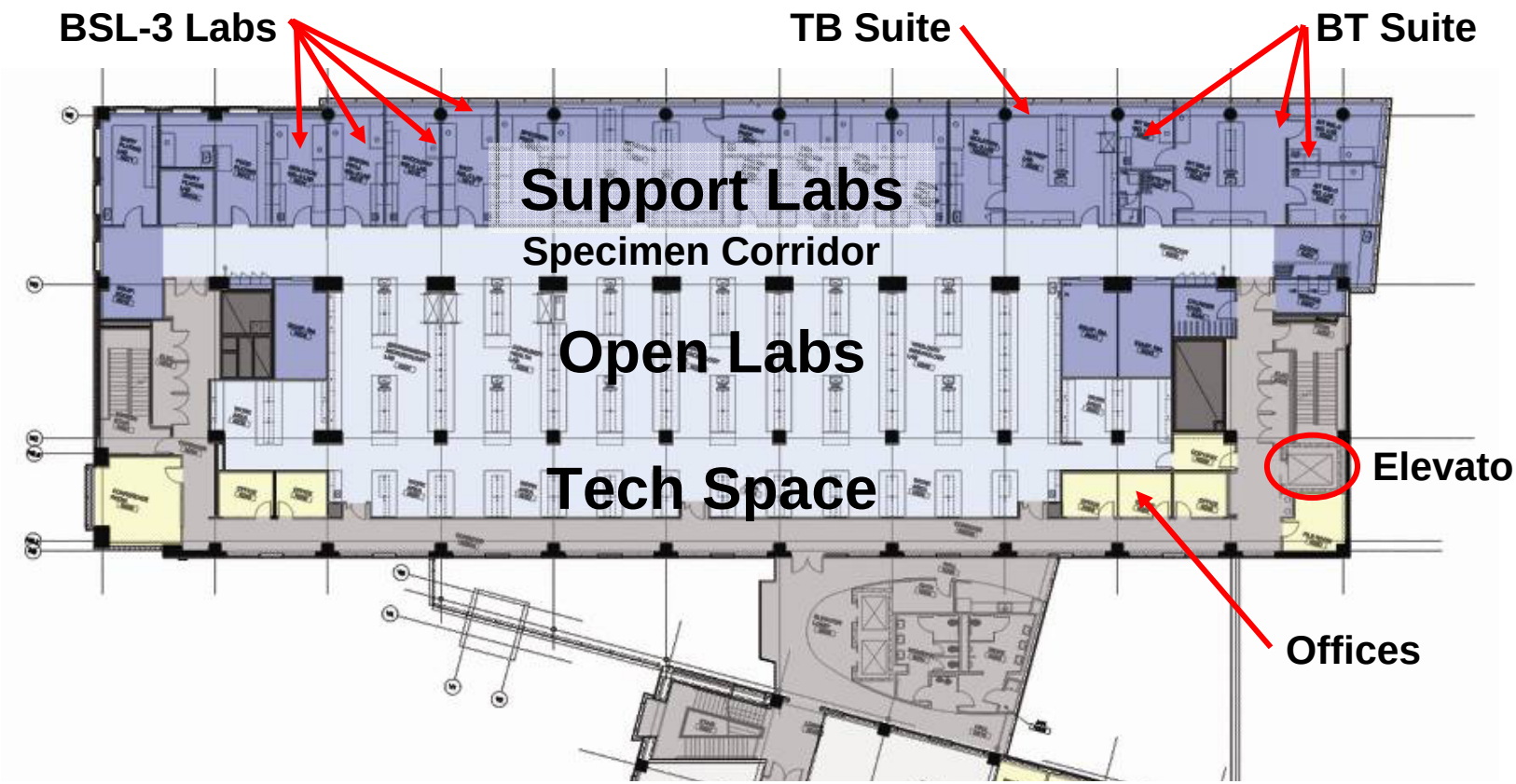
Securely Managing the In/Out Flow



Samples of Unknown Origin: CT/BT/Radiological

Central Accessioning for Routine Specimens

Open Laboratory Concept



Open Laboratory Concept

Concepts of Biocontainment

Containment Barriers

- Primary - BSC's, PPE, Glovebox,
- Secondary - Rooms, systems
- Tertiary - Containment around systems

Access Control and Separation

- Key card, Cameras, Biometric
- Safety Starts with Good Personnel Protocol

Redundancy and Reliability

- Mechanical Systems
- Security
- Flexibility of Spaces
- Surge Capacity

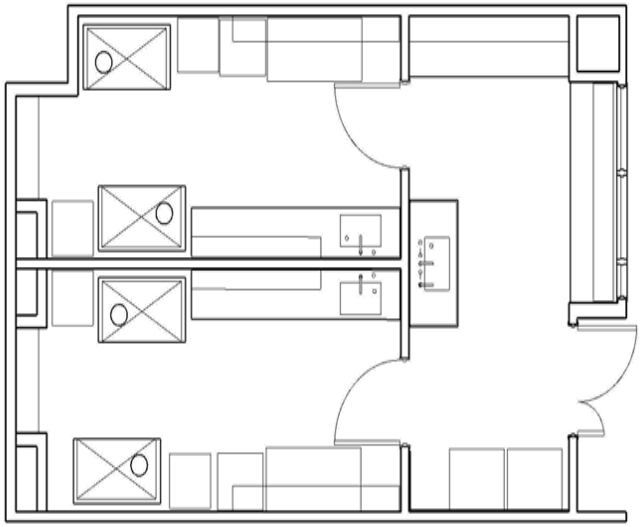
Barrier Minimization

- Flow of Personnel
- Flow of Specimens for Analysis

Decontamination

- Strategies
- VHP, Autoclaves, Incinerators, Digestors

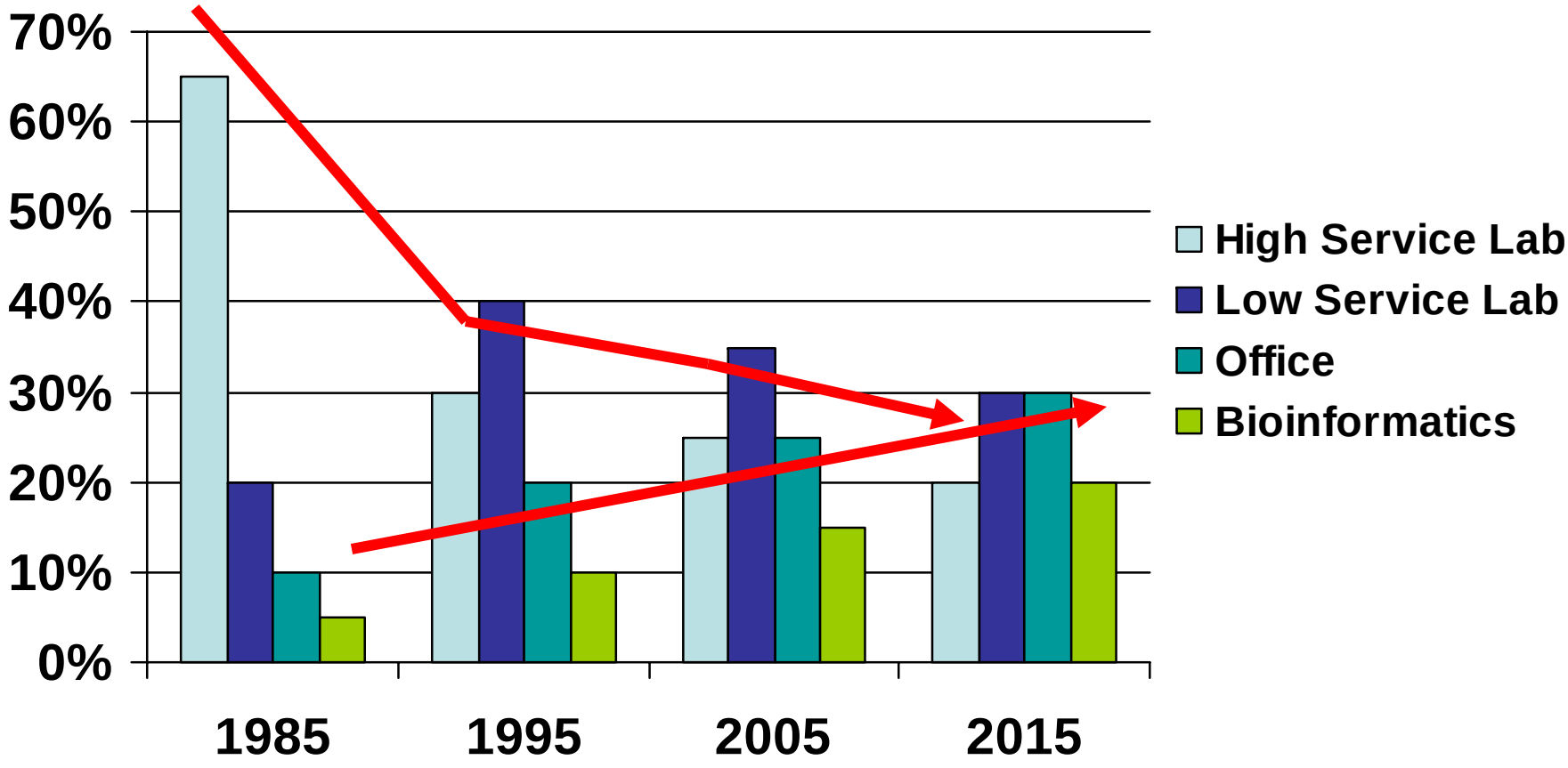
Concepts of Biocontainment



Concepts of Biocontainment – BSL -3 Enhancements

- Autoclave in Containment
- Gown In / Shower Out
- HEPA Filtered Exhaust
- Effluent Decontamination

Space Changes - Flexibility



Flexibility

Flexibility

Quality Environment

Lighting

- Views and Daylight
- Lighting Levels
- Glare Control

Ventilation

- Temperature Control
- Air Movement and Ventilation
- Humidity Control
- Air Quality

Structure

- Contamination Control
- Vibration Isolation
- Noise Attenuation

Quality of Space

- Facilitation of Interaction
- Attracting and Retaining Staff
- Multidisciplinary Facility
- Flexible and Adaptable

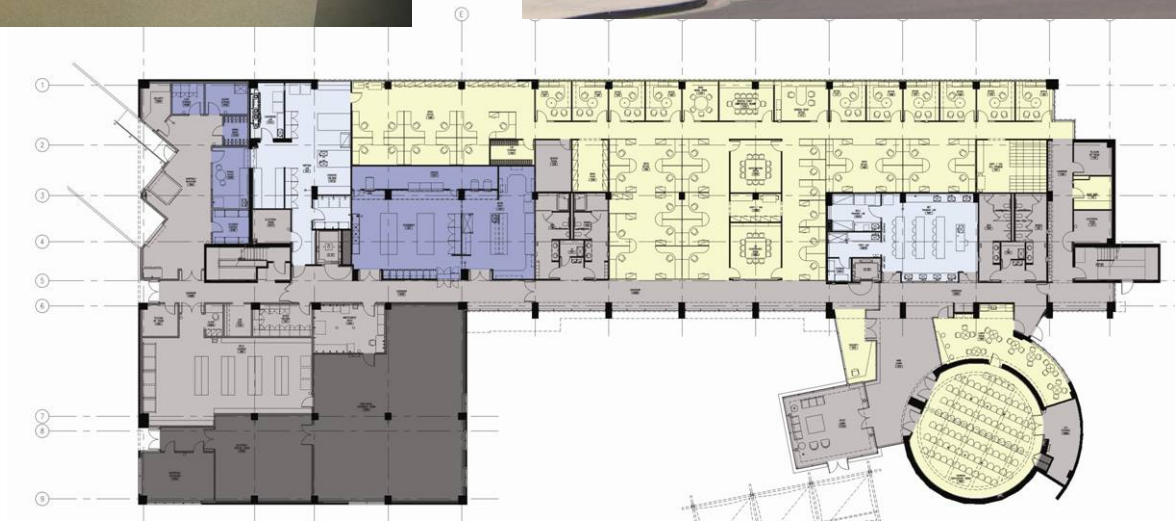
Quality Environment - Casework

Quality Environment – Containment Devices

Quality Environment – Training Labs and Classrooms

Quality Environment – House Systems

Recently Completed - Arizona



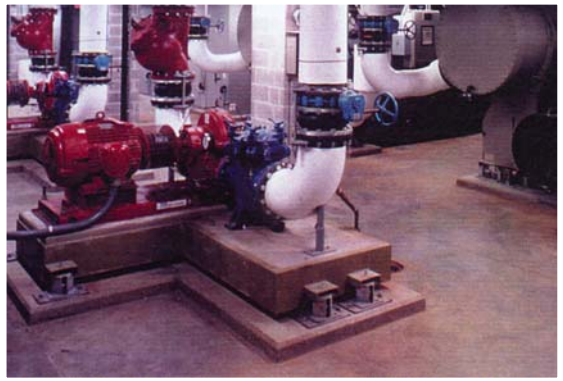
Recently Completed – Indiana Health and Forensic Sciences

Recently Completed – Minnesota Depts. Of Health and Ag.

Recently Completed – Virginia DCLS

In Construction – Iowa University Hygienic Laboratory

Engineering Philosophy



Safety

- For Scientific and Maintenance Staff

Flexibility

- Modular in Design for ease of Renovation
- Maintenance Ability to easily service all systems to achieve optimum operation

Reliability and Redundancy

- Reliability is not Redundancy
- Adequate backup to protect research
- Reliability Critical Systems based on reliable capacity
- Controls Ensure appropriate level of control for temperature, humidity, pressurization and filtration

Energy Conservation

- Utilization of energy recovery techniques and controls methodology
- Integrated Systems working together