

Safely Handling Samples of Unknown Origin & Samples of Combination Biological, Chemical & Radiological Hazard in Public Health Laboratories

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Pamela Kostle, CIH
pamela-kostle@uiowa.edu
Mark Fitzgerald
mark.fitzgerald@hdrinc.com



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HDR, Inc.

- Employee-owned Architecture, Engineering and Planning Firm
- Founded in 1917
- More than 7,800 Employees
- 185 Office Locations - Worldwide
- Completed Projects in 50 U.S. States and 60 Countries
- Three Focus Areas:
 1. Science & Technology
 2. Healthcare
 3. Civic

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State Hygienic Laboratory at the University of Iowa

- Two Locations
 - Coralville, Iowa -160 employees
 - Ankeny, Iowa - 60 employees
- Key Capabilities:
 - Bacteriology
 - Virology
 - Rabies
 - Parasitology
 - Mycobacteriology
 - Immunology / Serology
 - Newborn Screening
 - Biological Threat Preparedness
 - Chemical Threat Preparedness
 - Food-borne Outbreak & Response
 - Radiochemistry
 - Air Quality
 - Limnology
 - Environmental Chemistry (Organic, Inorganic, Pesticide Formulation)
 - Asbestos Testing
- New Coralville Laboratory Building Completed in October 2010



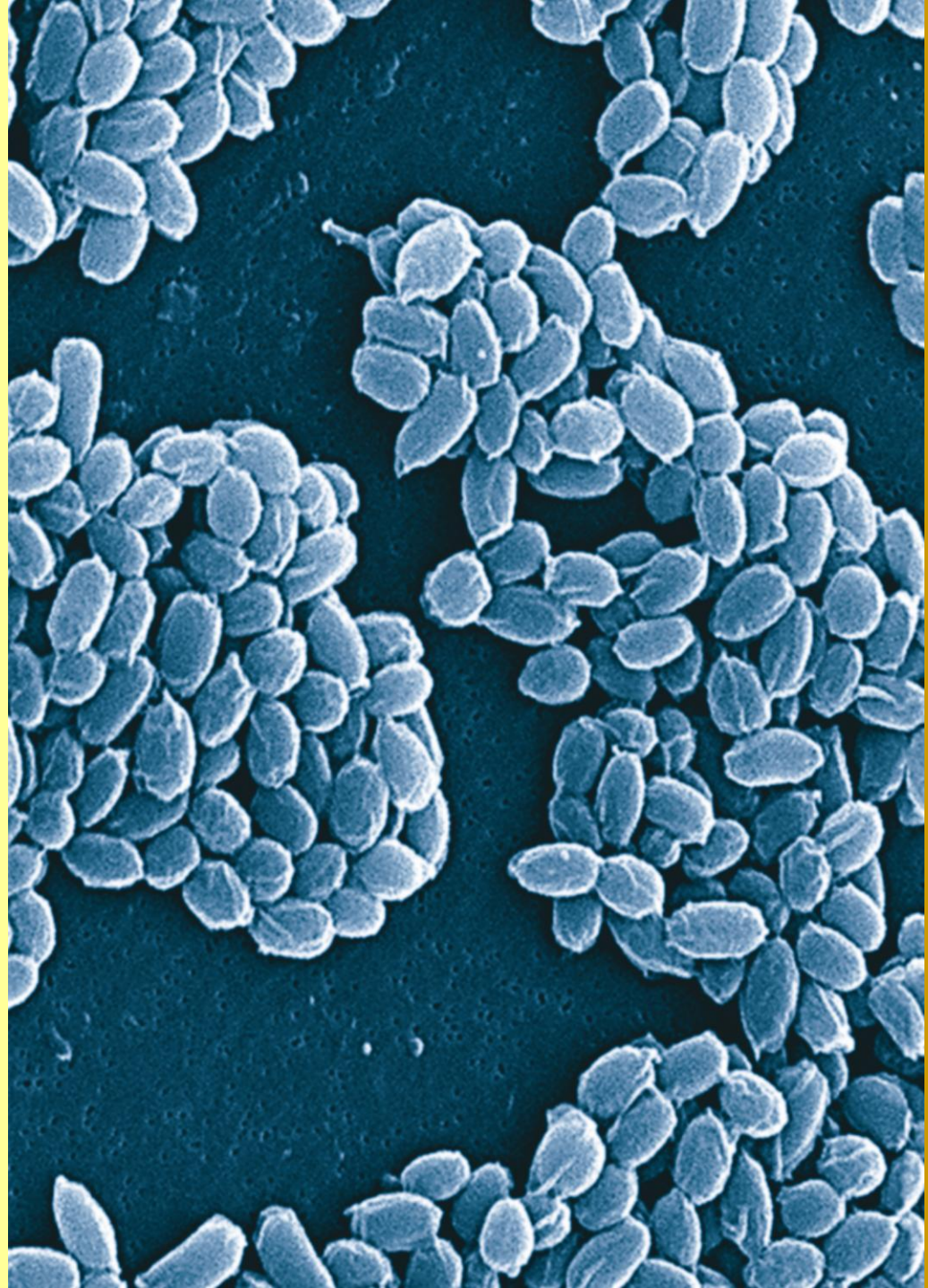
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Why Plan for Unknowns & Multi-Hazard Samples?

Historical Events

- 1984 - First modern Bio-terror attack in the United States. The Rajneeshee, a cult, spread salmonella bacteria over salad bars at restaurants in Oregon.
- March 1995 - Tokyo Subway Sarin gas attack by *Aum Shinrikyo* cult
- October 2001 - Investigation by Department of Justice of letters containing anthrax sent through US Mail named, "Amerithrax"
 - Resulted in 5 Deaths and 17 illnesses.



Local Events

- Tularemia
- Rabies
- SARS
- West Nile Virus
- H1N1 Influenza
- Food-borne Outbreaks



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Theoretical Scenarios

- Dirty Bomb
- Deliberate Chemical Release
- Deliberate Biological Release
- Contamination of the Water Supply
- Food Contamination
- Environmental Contamination



"It's perfectly safe. If there's the tiniest leak, a siren goes off—a very, very loud siren—and everyone just evacuates the state."

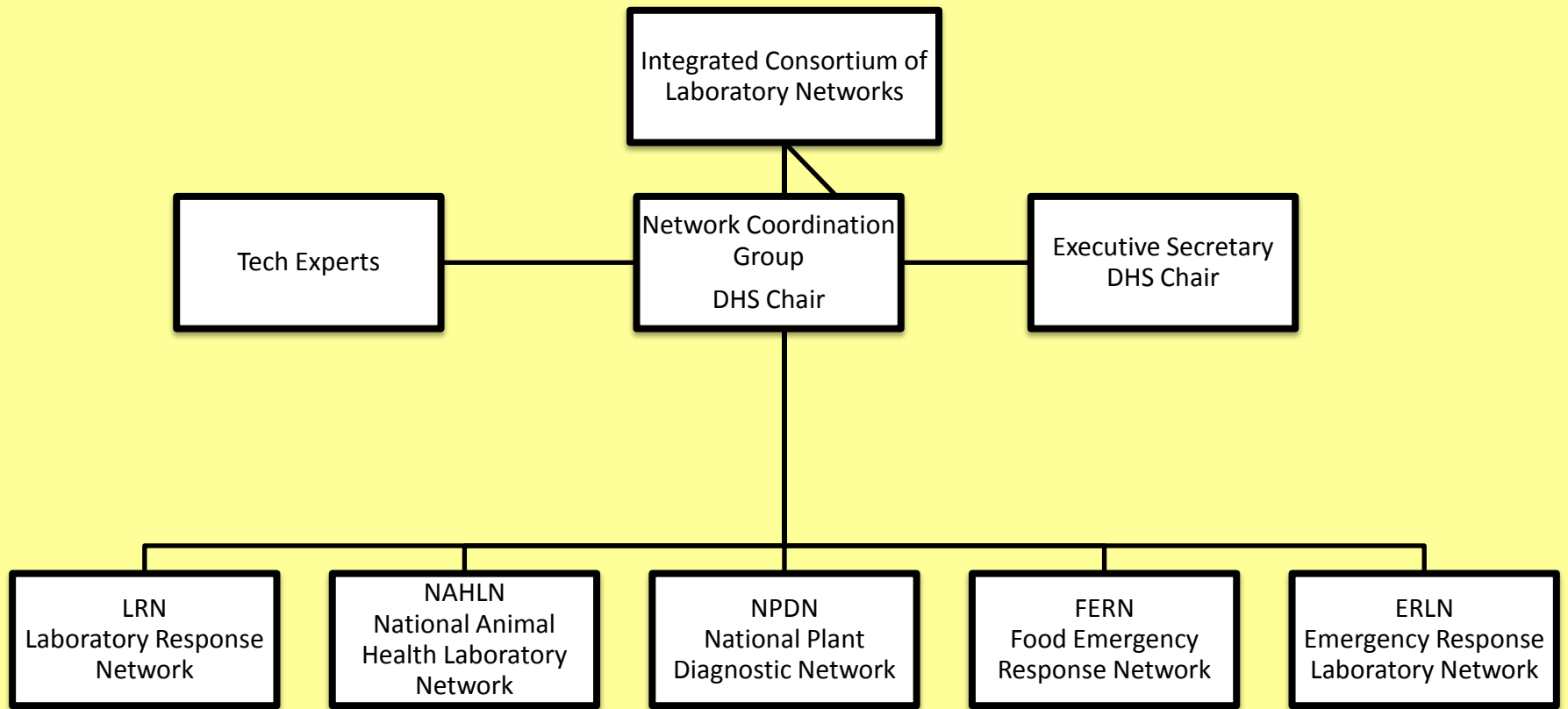


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Who is Involved?

National Networks



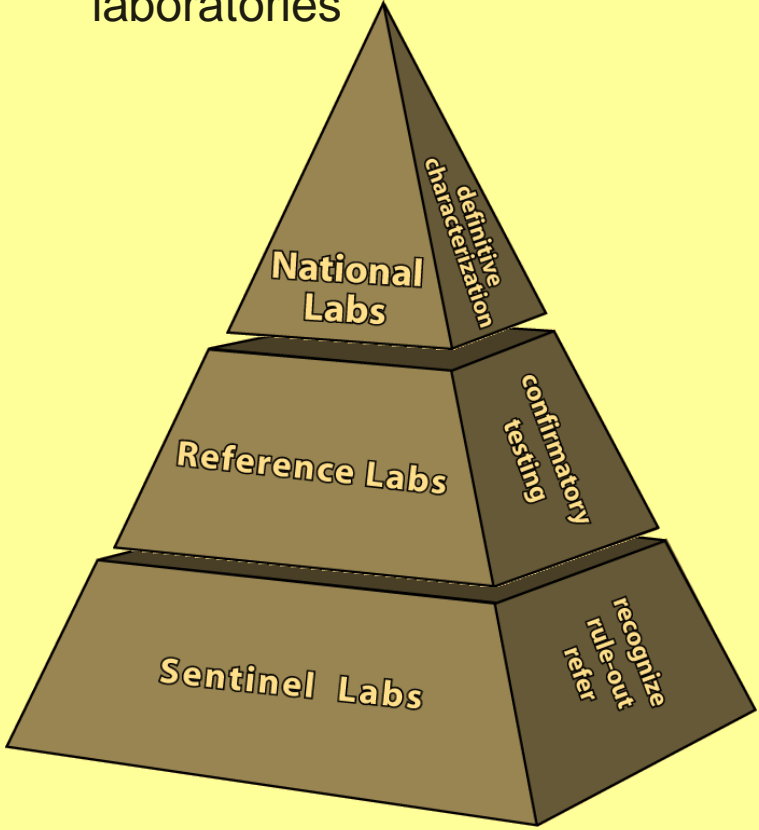
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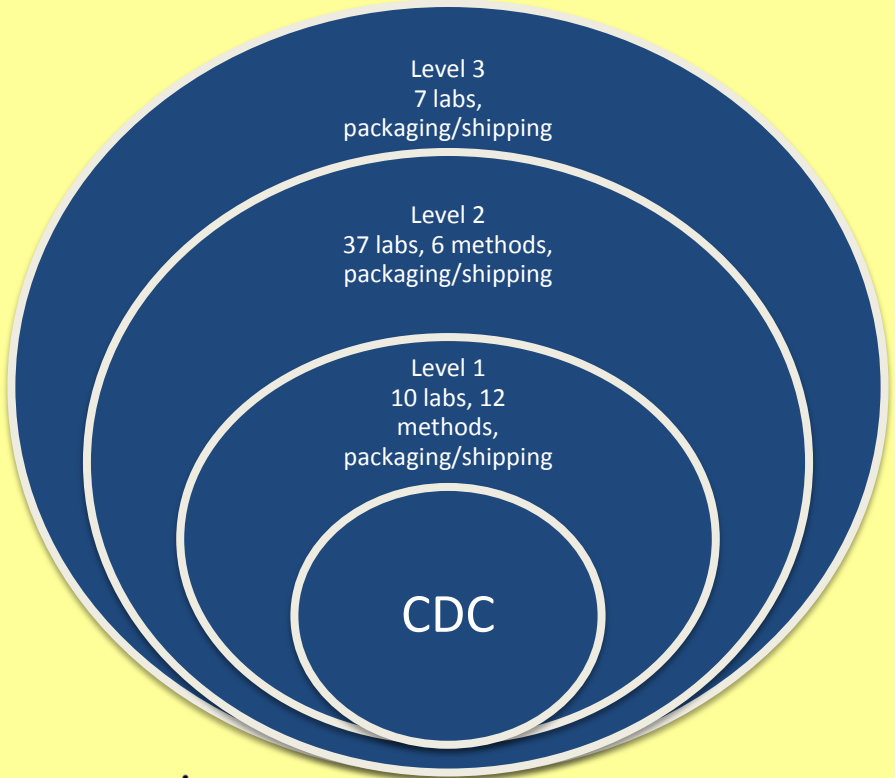
National Networks

- Laboratory Response Network (LRN)
Founded by the CDC in 1999 in collaboration with APHL & FBI

- LRN-B (Biological) - Currently 170 state and local public health, military, international, veterinary, agriculture, food and water testing laboratories



- Laboratory Response Network for Chemical Terrorism Preparedness (LRN-C) Laboratories



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National Networks

- EPA United States Environmental Protection Agency
- Environmental Response Laboratory Network (ERLN)
 - ERLN Mission: *Provide known laboratory capabilities, capacities, and quality data during nationally significant incidents.*
 - ERLN Members include laboratories with analytical capabilities and capacity in the event of natural, intentional and unintentional water contamination.
 - ERLN members include:
 - Local & State Public Health Laboratories
 - Colleges/Universities
 - Commercial
 - EPA
 - Government Owned, Contractor Operated
 - Public Utilities



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National Networks

- *The Food Emergency Response Network (FERN)* integrates the nation's food-testing laboratories at the local, state, and federal levels into a network that is able to respond to emergencies involving biological, chemical, or radiological contamination of food. The **FERN** structure is organized to ensure federal and state inter-agency participation and cooperation in the formation, development, and operation of the network.



FERN laboratories include:
State and Local Public Health
Agriculture
Environmental
Veterinary Diagnostic



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All Hazards Receiving Facilities

- All Hazards Receipt Facilities
 - Prototypes in NY and Boston
- All Hazards Receipt Facility Screening Protocol
 - Initial Survey and Assessment
 - Container Screening
 - Direct Screening
 - Shipment to Receiving Laboratory
- *Collaboration of US Department of Homeland Security, USEPA and Association of Public Health Laboratories*
- Algorithm and Guidelines for Responding to an Incident Involving a Suspicious Non-Clinical Sample - *APHL*



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What Facilities and Equipment are Needed?

Routine Sample Accessioning

- Samples of Known Origin
- Centralized Receiving
- Outer Packaging Removed
- Sample Integrity Verified
- Barcode Applied
- Data Entry into LIMS
- Delivery to Labs for Testing



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Unknowns Accessioning

- 24 Hour - 365 Day Capability
- Samples of Unknown Origin
- Potential Combination Hazard Samples
- Incident Response Capacity
- Surge Capacity for Sample Receiving During Outbreak Response



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Facility Features

- Primary Containment Device(s)
- Monolithic Floor, Walls & Ceiling
- Sample Storage
- Supply Storage
- Decontamination Capability
- Gowning / Shower Area
- Windows for Safety and Observation



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Equipment Considerations

- Class III Biological Safety Cabinet
- Floor Mounted Fume Hood
- X-ray Screening Equipment
- Explosion Containment Device
- Autoclave
- Hands Free Sink
- Emergency Eyewash



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Engineering Systems

- Back-up Power
- HEPA Filtration
- HEGA / TEDA Filtration
- Dedicated Exhaust Fans
- Isolation Dampers
- Directional Airflow Indicators
- Liquid Effluent Decontamination



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*How are Unknowns Accessioning
Facilities Organized?*

Benchmark Data

- Key Design Elements
 1. Loading Dock
 2. Central Accessioning
 3. Unknowns Accessioning
 4. Storage
 5. Specimen Elevator

IMAGE REMOVED AT CLIENT'S REQUEST



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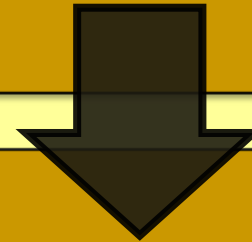
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What Happens to an Unknown Sample?

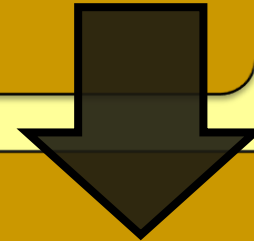
Initial Sample Flow

Administrative Decision to Accept



Sample Accessioning

- Proper Packaging
- Complete Documentation
- Field Screening results



Sample Preservation

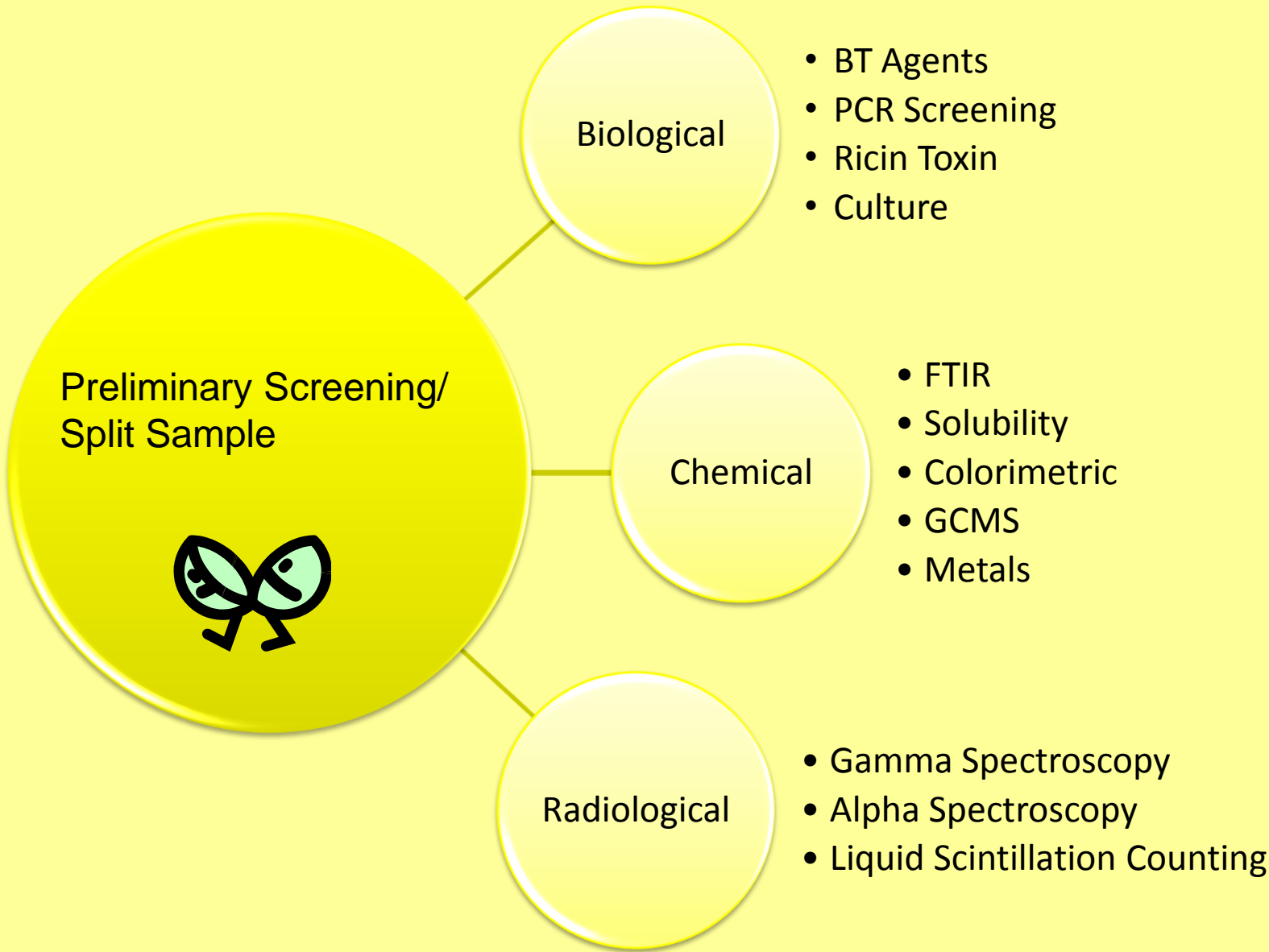
- Photo documentation
- Chain of custody



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All Hazard Sample Flow



Radiological Sample Flow

1. Accessioning
2. If acceptable level - transfer to testing laboratory
3. If levels exceed license - isolate

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Biological Sample Flow

1. Unknowns Accessioning
2. Split sampling
3. Transfer to BSL3

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Chemical Sample Flow

1. Unknowns Accessioning
2. Split sampling
3. Transfer to BSL3
4. Initiate testing after biological is complete

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Questions?

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