Laboratory Response in the Commonwealth of Virginia to the Intentional Release of *Bacillus anthracis*

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Commonwealth of Virginia

Division of Consolidated Laboratory Services

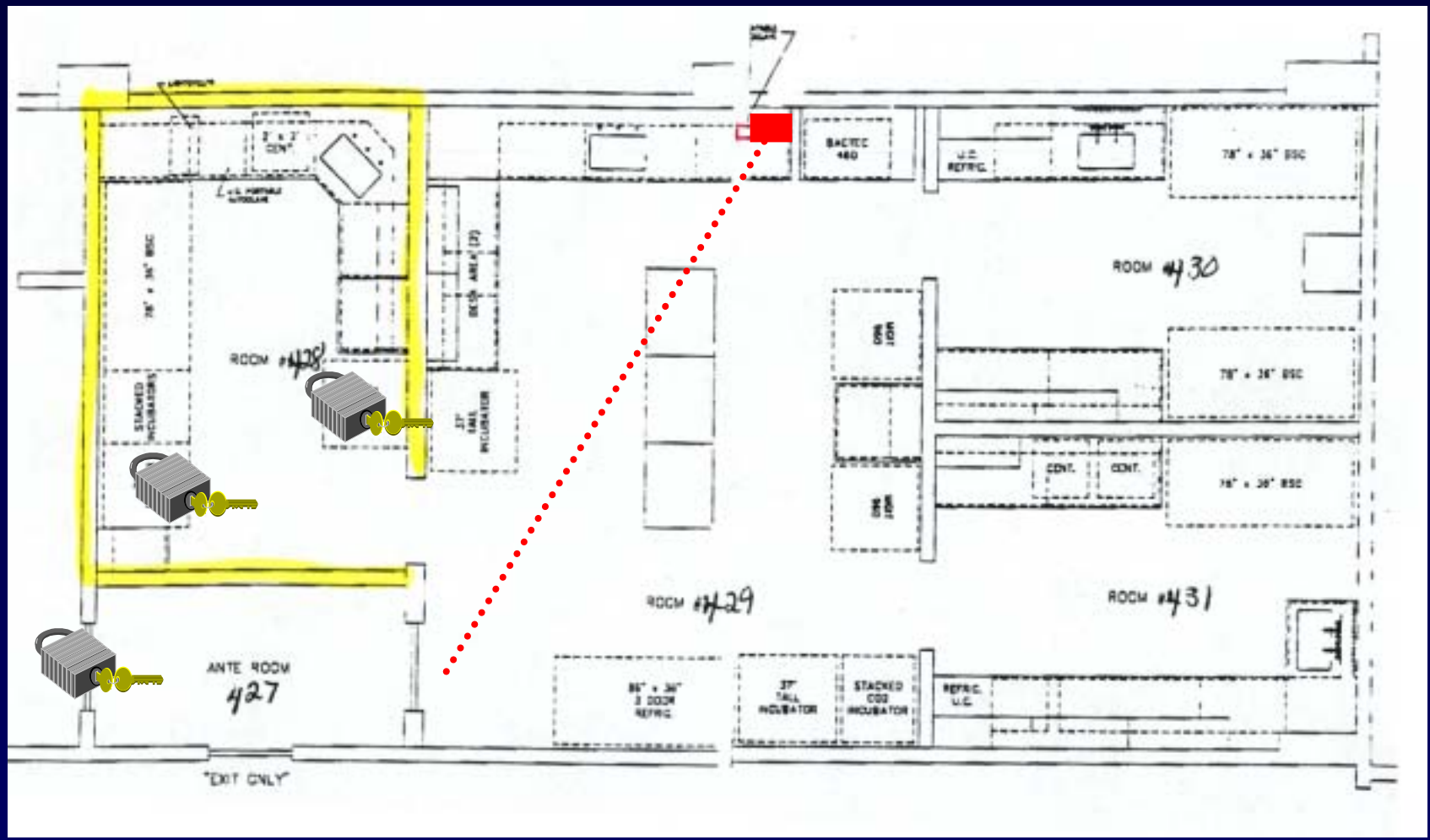
Virginia Preparations

- **1999 Public Health Preparedness and Response to Bioterrorism Award**

  To enhance laboratory capacity for the detection of biological and chemical agents associated with terrorism

Bioterrorism

Virginia Preparations



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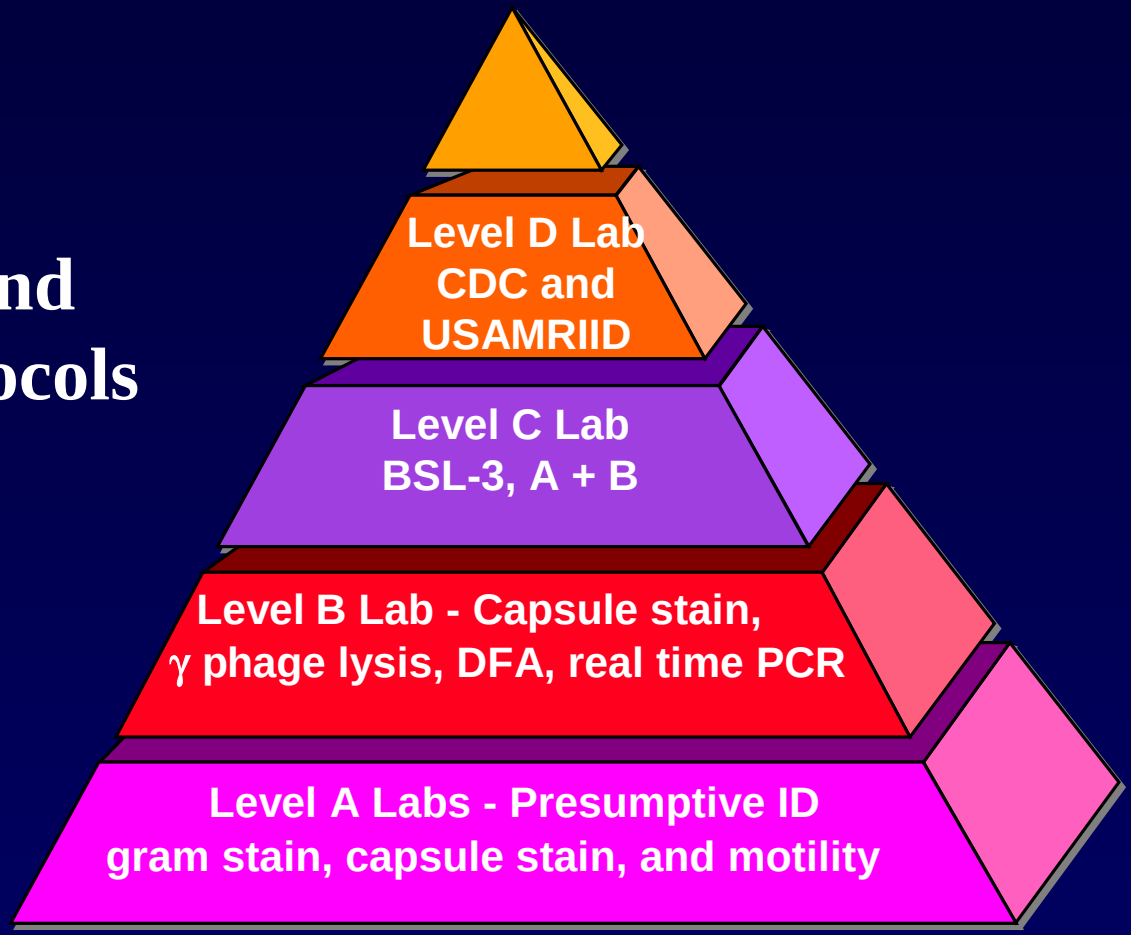
- **Activities initiated**
  - **BSL 3 laboratory renovation**
  - **Establishment of the Laboratory Response Network in Virginia**
    - **Provided Level A laboratory training**
    - **Received Level B laboratory training**

Laboratory Response Network

- Implementation and validation of protocols
- Reagents



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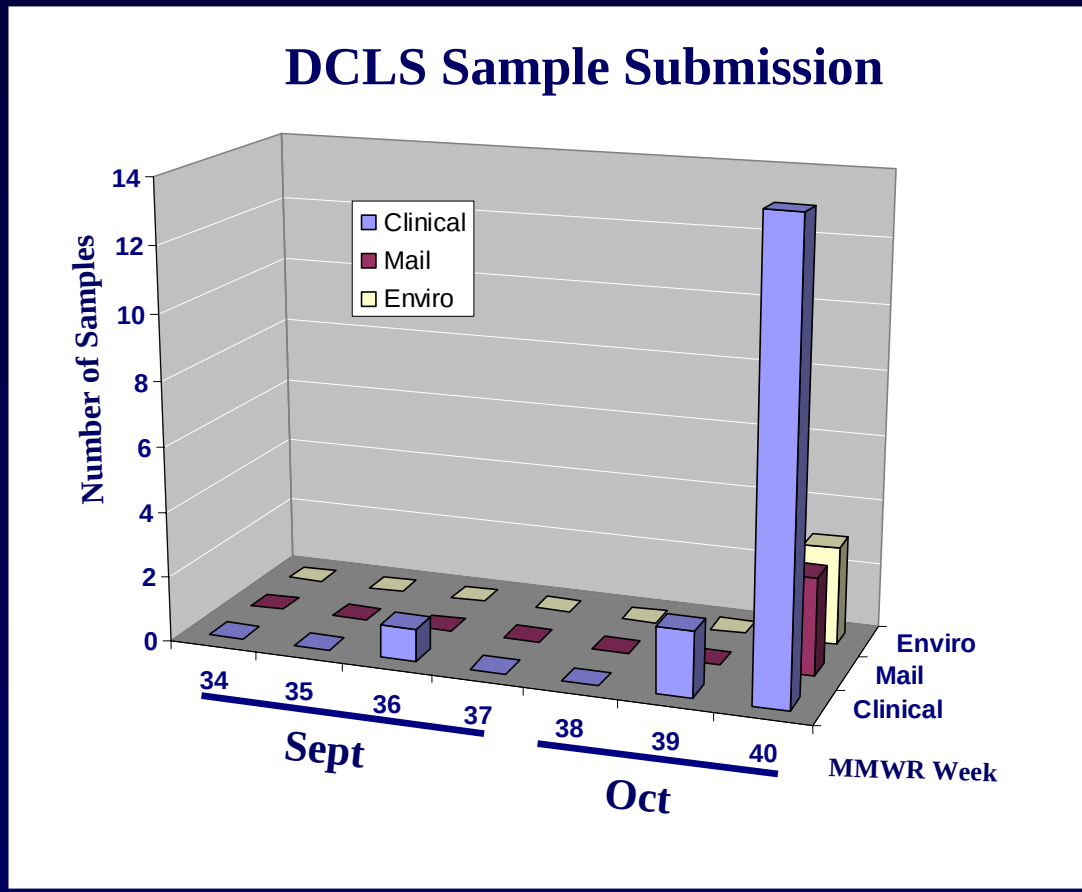
  - **Establishment of the Laboratory Response Network in Virginia**
  - **Built partnerships with local, state, and federal agencies**

Collaboration

- Federal
  - CDC
  - FBI
  - DOD
  - USAMRIID
  - DARPA
  - USDA
  - FDA
  - EPA
  - DOJ
- Local/State
  - Law Enforcement
  - HAZMAT
  - AG's Office
  - Environmental Crimes Task Force
  - FBI
  - Fire Departments
  - DEQ
  - VDACS
  - VDH
  - National Guard

The Test of Preparedness

- October 4th (wk 39)
  - Florida resident
  - Inhalation anthrax
- October 9th (wk 40)
  - New York resident
  - Cutaneous anthrax



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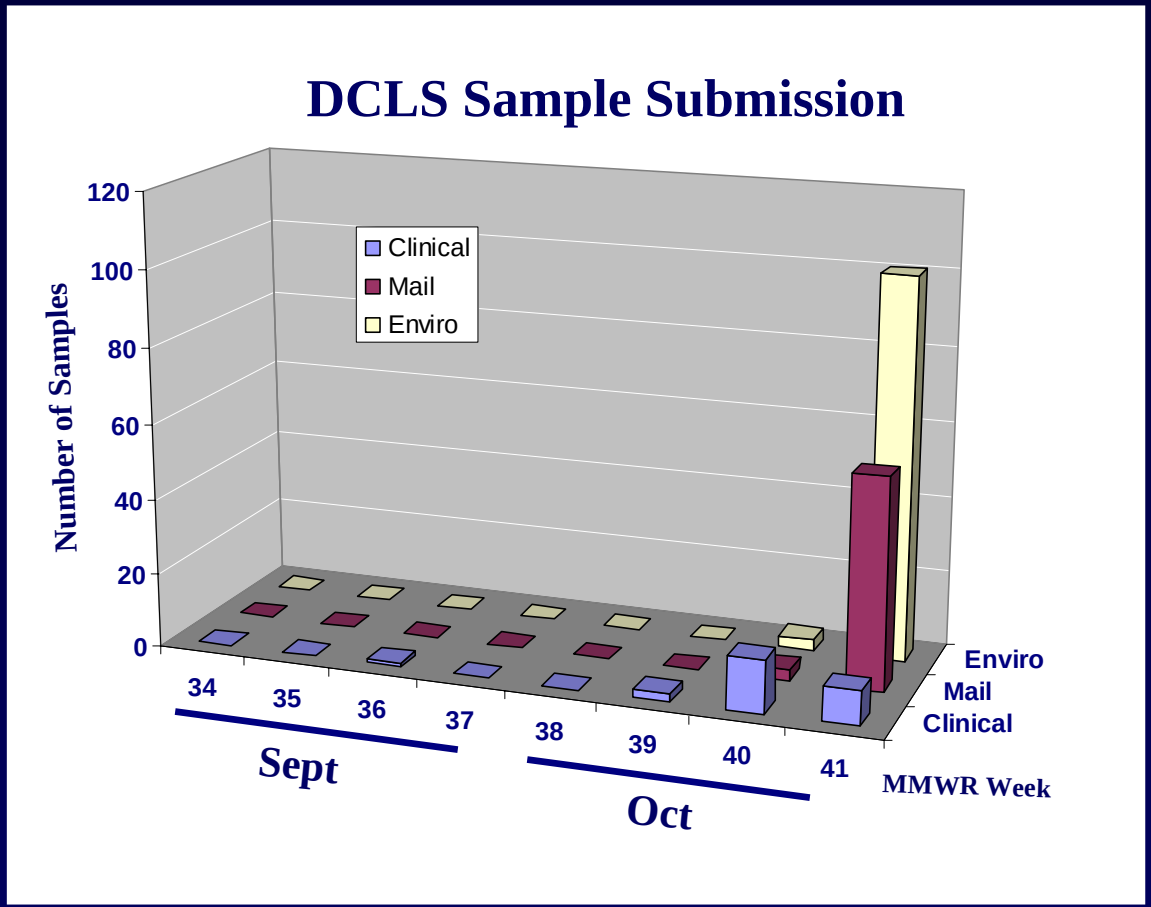


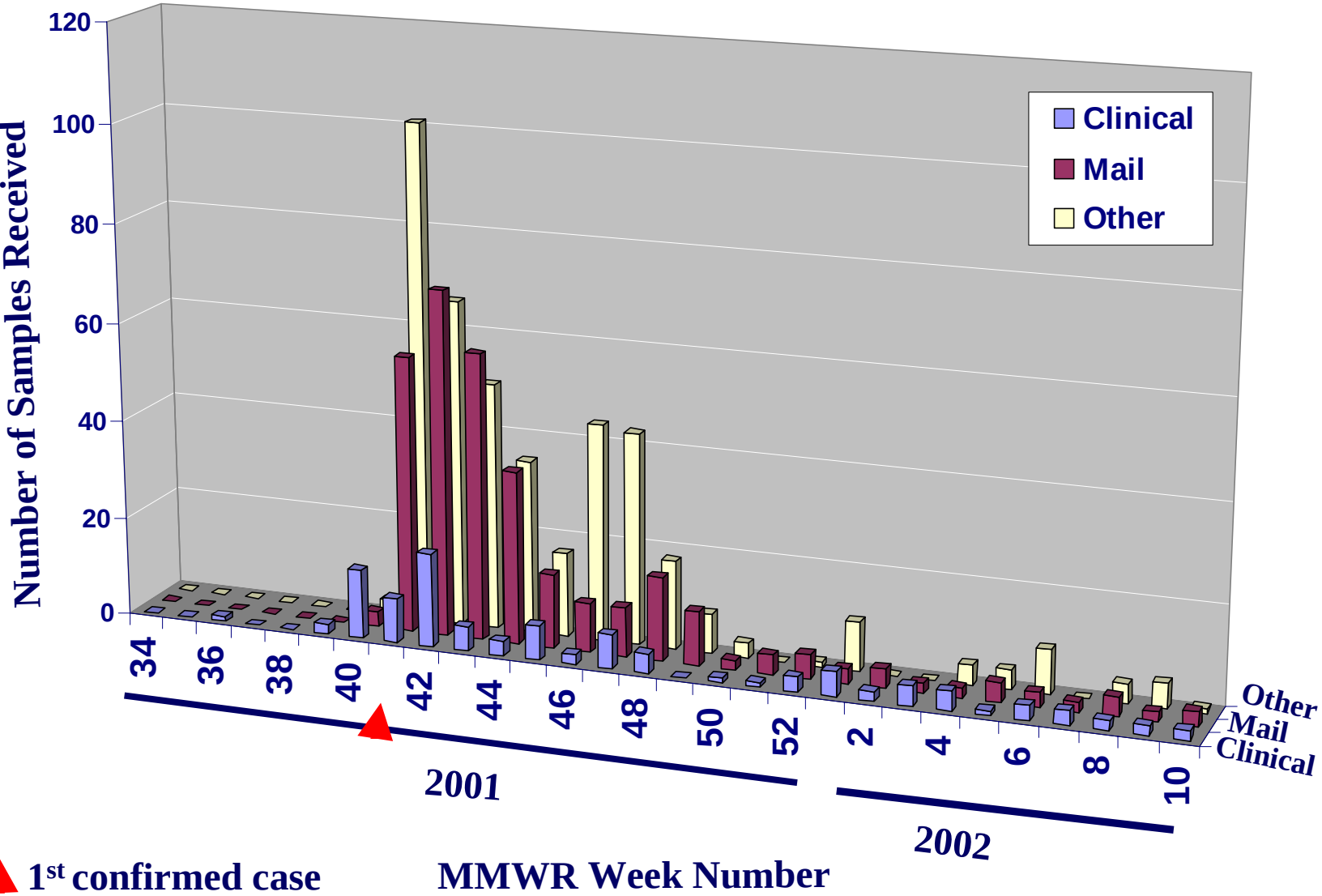
The Test of Preparedness

Bacillus anthracis
Vegetative cells

- October 16th
  - Letter to U.S. Senate office confirmed positive
- October 19th
  - Enhanced regional surveillance activity identifies a suspicious patient
- October 20th
  - Level A presumptive positive
  - Level C confirmed positive

Sample Submission

B. anthracis

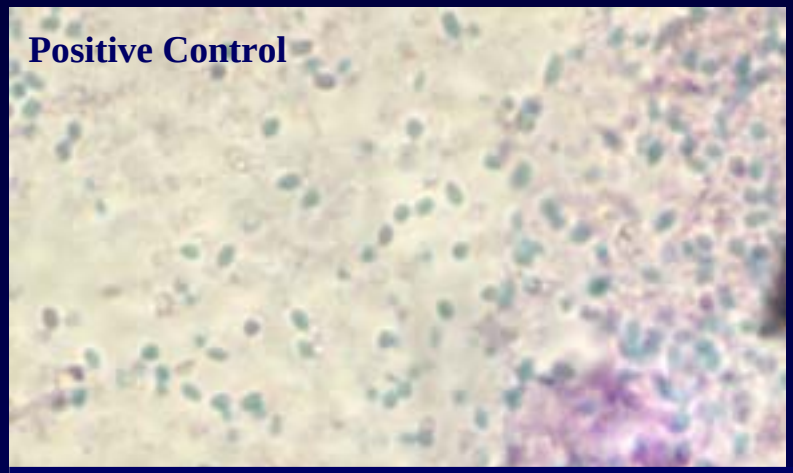


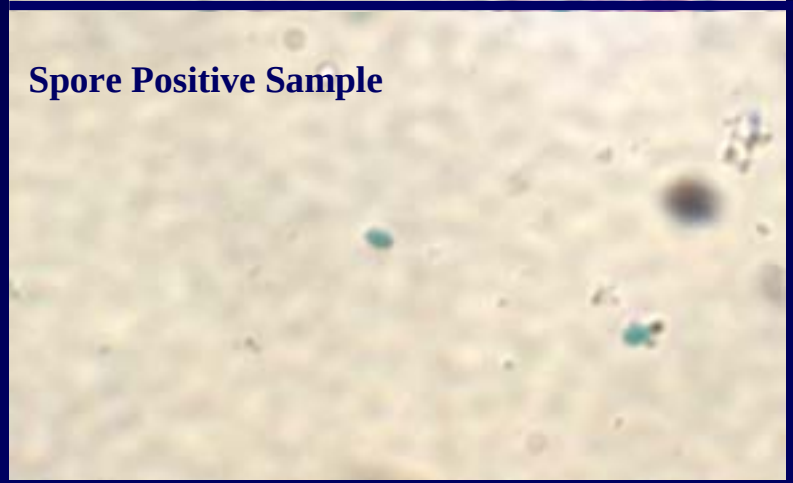
Bioterrorism

Clinical Isolate Analysis

- 106 Clinical specimens
  - 66 isolates from Level A labs
    - 3 *B. anthracis* confirmed
    - 19 *B. cereus*
    - 15 No *Bacillus* sp. recovered or unable to speciate
    - 9 *B. subtilis*
    - 9 *B. brevis*
    - 4 *B. megatarium*
    - 3 *B. licheniformis*
    - 2 *B. circulans*
    - 2 *B. firmus*
  - 40 Specimens with NSG

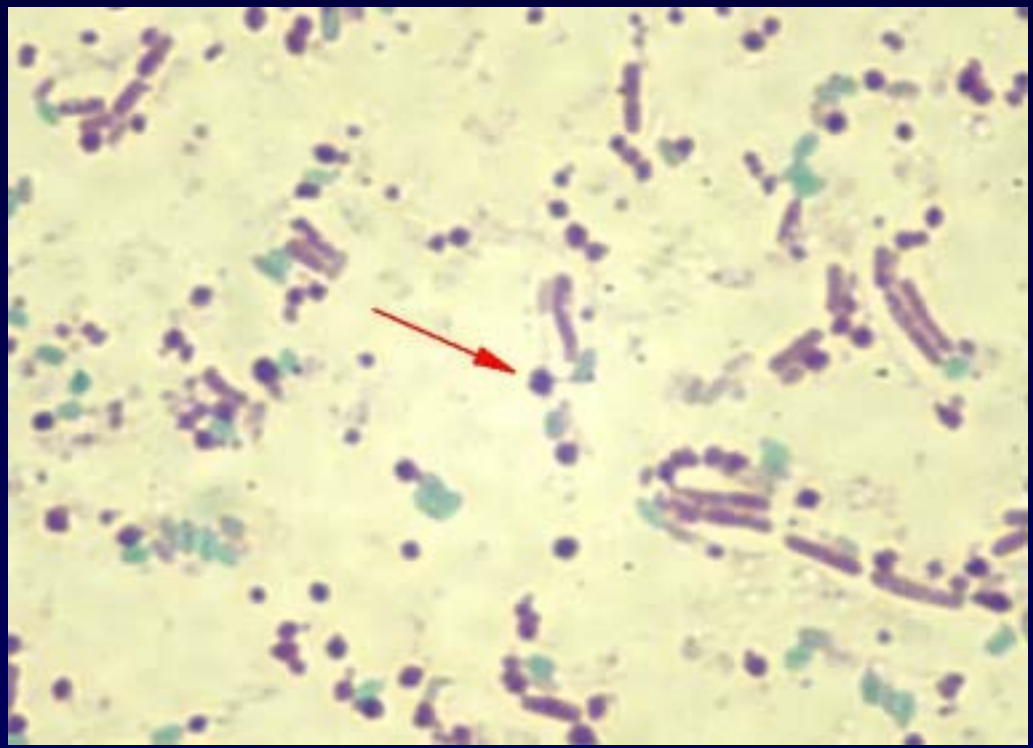
Analysis of Mail





- 323 items analyzed
  - 317 No spores observed
  - 6 Spores detected
- Spore characterization
  - Real time PCR negative
  - Culture
    - GPR
    - Beta-hemolytic
    - Motile
    - *B. cereus* group

B. cereus vs. *B. thuringiensis*



Bacillus thuringiensis
Spores and parasporal crystals

- **Parasporal crystal in *B. thuringiensis***
- **Malachite green modification**
  - **Heat fix smear**
  - **Flood with 5% malachite green, steam**
  - **Rinse**
  - **Cover with 0.1% carbol fuchsin (30 sec)**
  - **Rinse**

Analysis of Environmentals

- 741 samples
  - 560 NSG
  - 181 GPR
    - 60 Beta-hemolytic
    - 121 Non-hemolytic (morphology indistinguishable from anthrax)
      - 40 Motile
      - 81 Non-motile
        - » Negative gamma phage
        - » Negative DFA
        - » Negative real time PCR
        - » Similar biochemical profiles

Laboratory Response

- **Protocols**
  - Sample submission
  - Shipping and packaging
  - Chain-of-custody
- **Sample receipt**
  - Intake interview
  - Triage (?)
  - Evidence custodian
  - Evidence rooms

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- **Communications**
  - **Submitting agency**
  - **VDH**
  - **CDC**
- **Train additional staff**
  - **Management: emergency call**
  - **Scientists**
- **Sample storage**
- **Evidence return**

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Summary of the VA Experience

- **Over 800 samples were processed to identify or confirm the presence or absence of *B. anthracis.***
- **3 of 66 clinical isolates submitted from Level A Laboratories were confirmed to be *B. anthracis.***
- ***B. anthracis* spores were not identified in any environmental samples submitted.**
- **Parasporal crystals were identified in 8 environmental samples.**
- **Characterization of significant environmental isolates revealed no clinically significant *Bacillus* species.**

Acknowledgements

- DCLS Staff
- Centers for Disease Control and Prevention
- Association of Public Health Laboratories
- Virginia Department of Health
- Local, State and Federal Partners

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