

Adapting Lethality to Homeland Defense and Security

Biodefense and the Global War on Terror

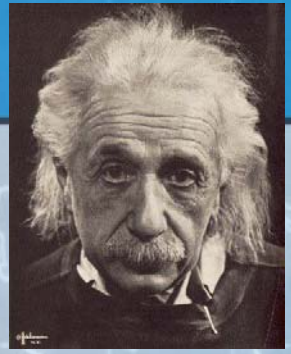
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University of Medicine and Dentistry of New Jersey

15-June-2005





**“Today's problems
cannot be solved with
the same thinking that
created them.”**

- Albert Einstein

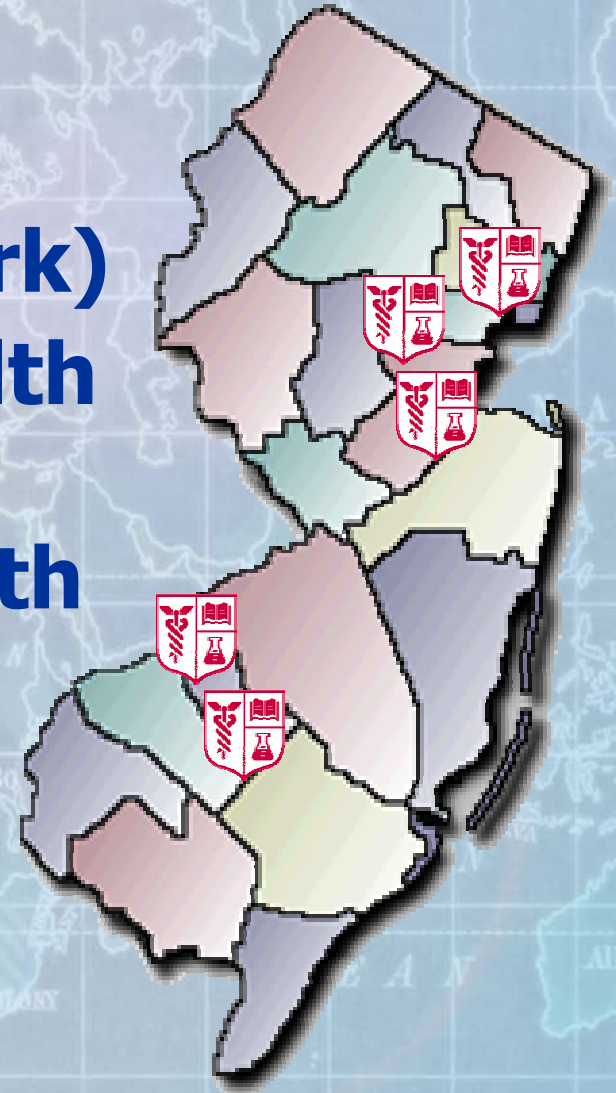
UMDNJ

- **Largest independent academic institution of its kind**
- **20,000+ students, faculty, staff, and other personnel**
- **Recognized leader in health care delivery, biomedical research, medical and health education, and community service**



UMDNJ

- **Statewide institution**
- **4 major campuses plus satellite campus**
- **Integrated hospital (Newark)**
- **Network of behavioral health centers**
- **Affiliations with many health care and educational institutions**



CIA: "Al Qaeda Ready to Use WMD"

- Al Qaeda's goal is the use of chemical, biological, radiological or nuclear weapons to cause mass casualties



"Mega Terrorism"

June 3, 2003

Source: Washington Times

Research

- **Basic Research**

- Blood detection assays
- Human genetics of susceptibility
- Plume modeling
- Effects of pharmaceuticals on radiation detectors

- **Applied Research**

- Tissue digestion cassette
- Bioinformatics
- Broad application respirators

Preparedness

- **Standardized (off the shelf)**
 - HazMat Emergency Response
 - WMD/Domestic Preparedness
 - Incident Command System
 - Forensic Epidemiology
- **Novel (custom designed)**
 - EMS Response to the Large Scale Incident
 - 40-hour Terrorism Program (Public Health)
 - Case-based Training Institute
 - Graduate concentration in biodefense

Current Projects

- **Research**
 - **Host Response to Select Agents**
- **Preparedness**
 - **Case-based Training**

“Progress occurs when courageous, skillful leaders seize the opportunity to change things for the better.”

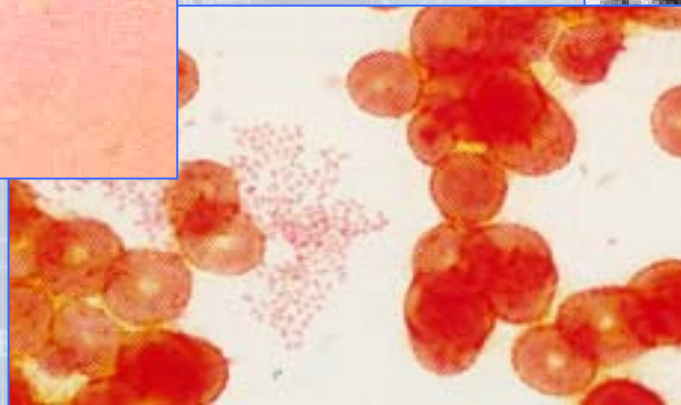
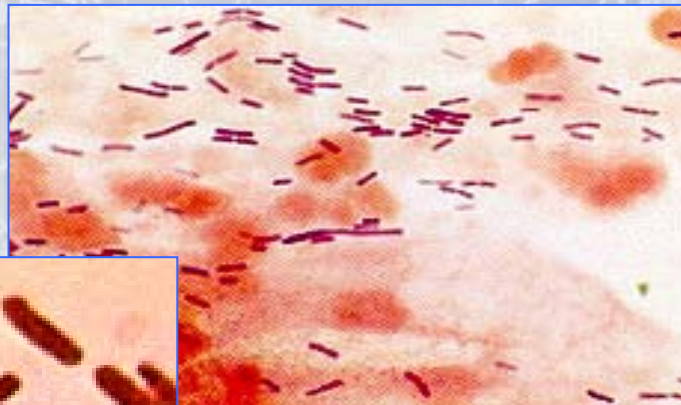
- Harry S. Truman



Biodefense research at UMDNJ

- **HOST RESPONSE**

- **Can infection-specific signatures be detected?**

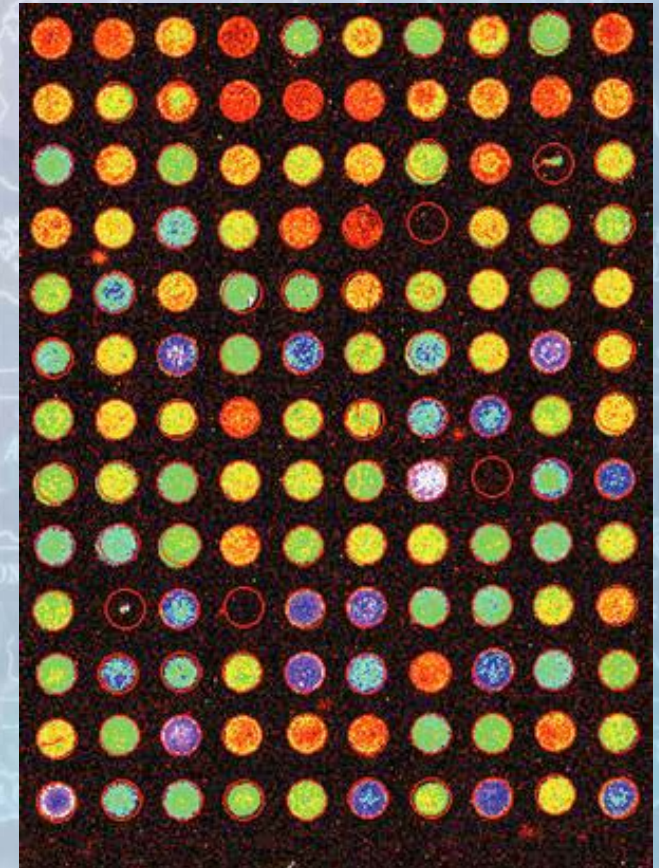
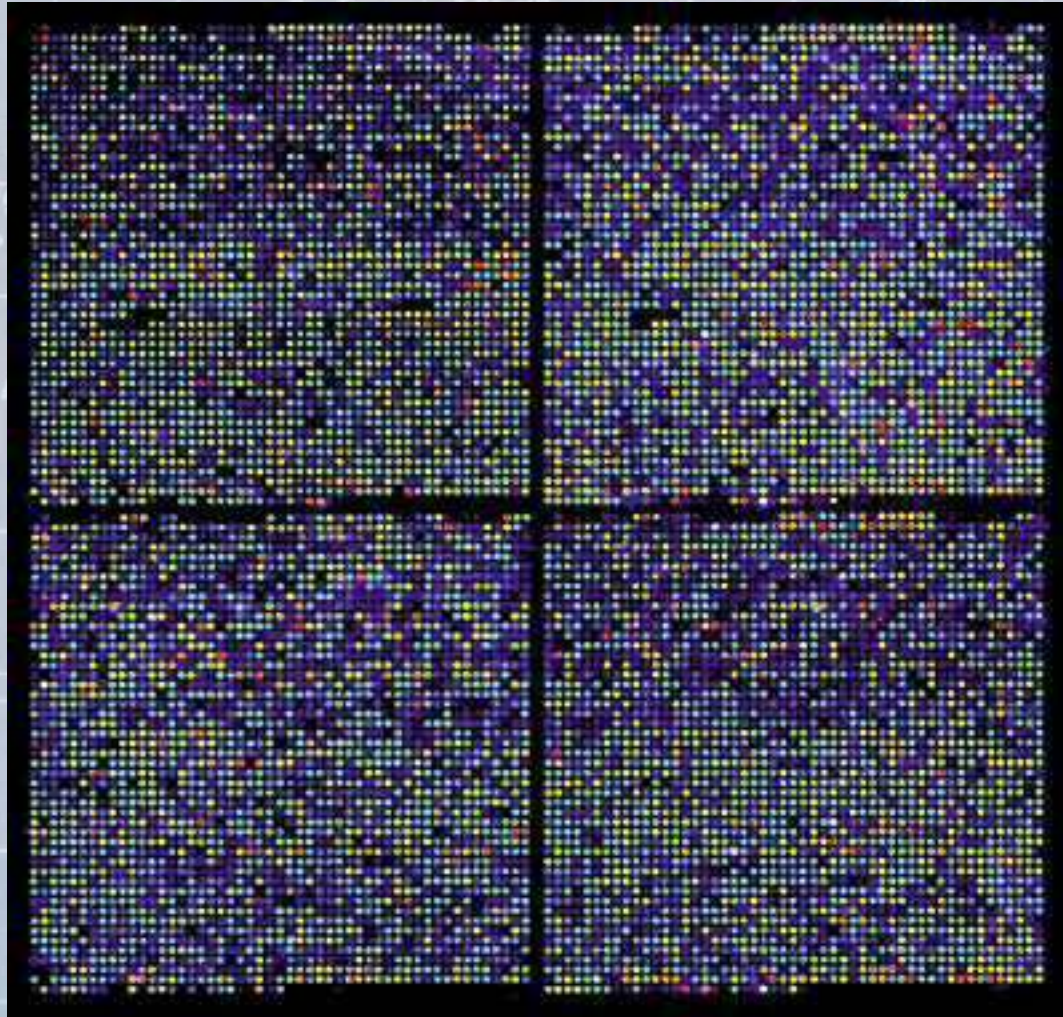


Transcriptional Profiling

Transcriptional profiling: gene expression in infected cells

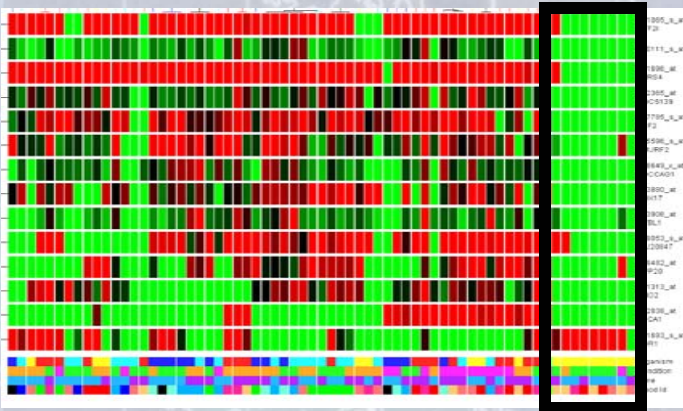
- **Detect host response to infection**
 - Infect human blood cells with agents
 - Perform DNA microarrays
 - Determine which genes are up-regulated or down-regulated
 - Identify signature profiles of gene expression for each infection

Transcriptional Profiling

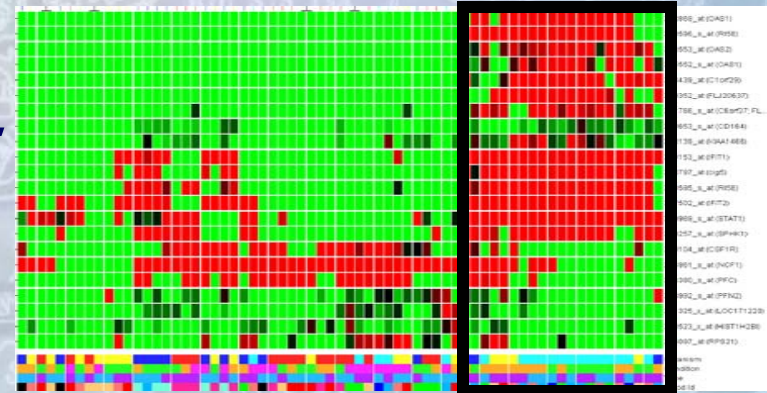


Transcriptional Profiling

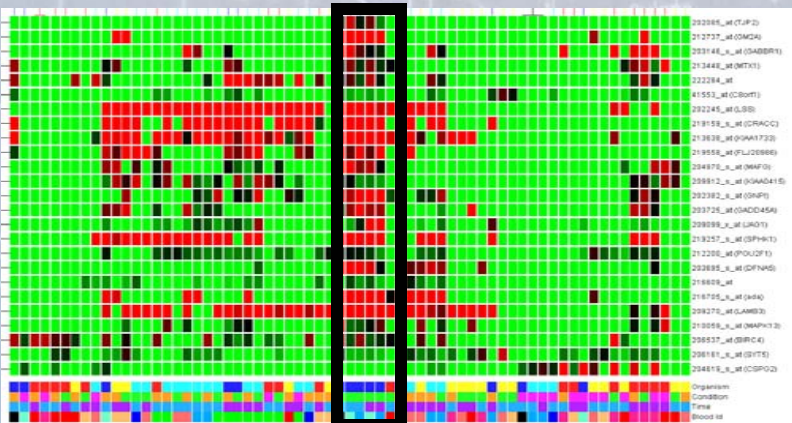
Bacillus anthracis
(anthrax)



Burkholderia mallei
(glanders)

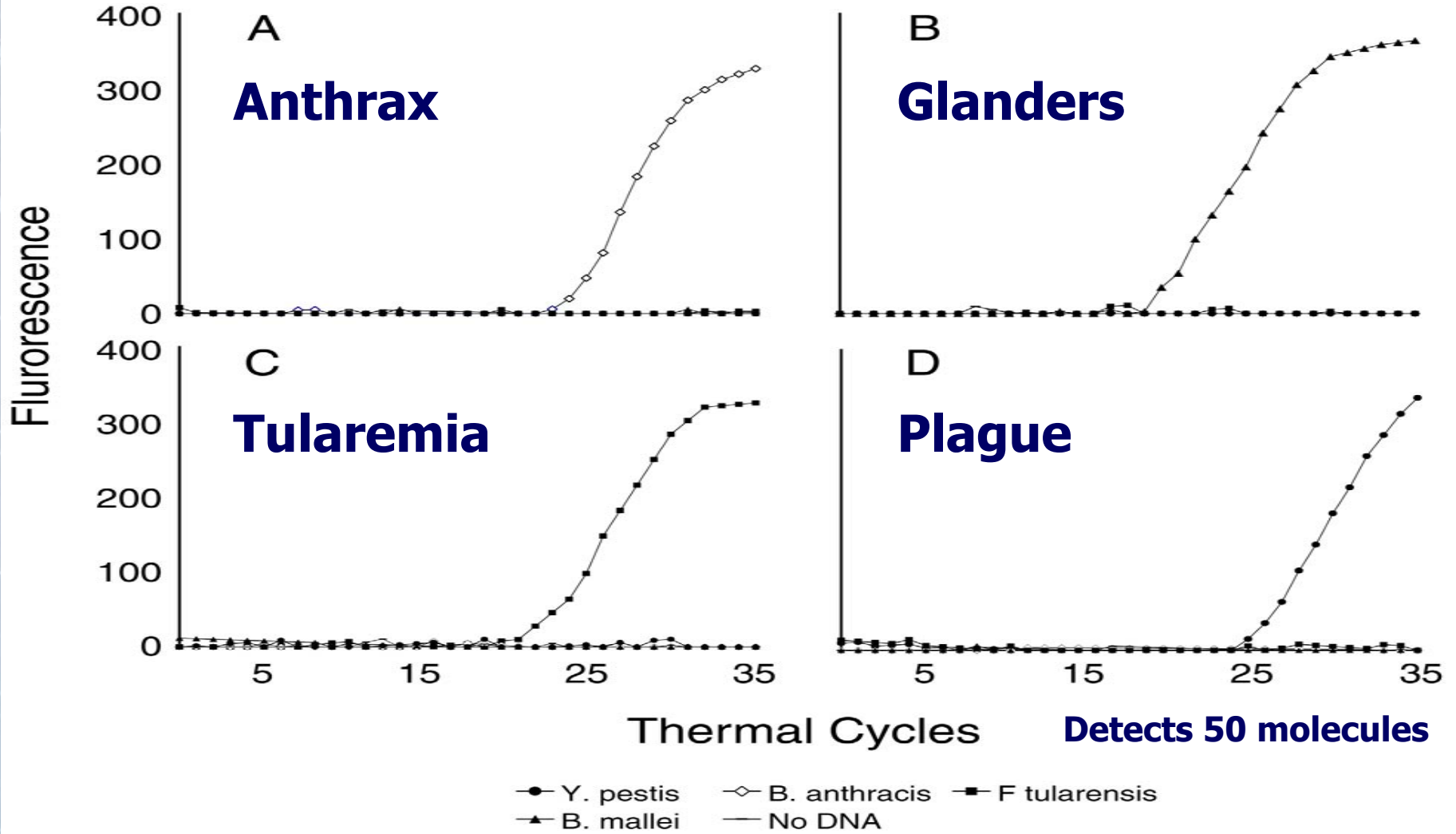


Yersinia pestis
(plague)



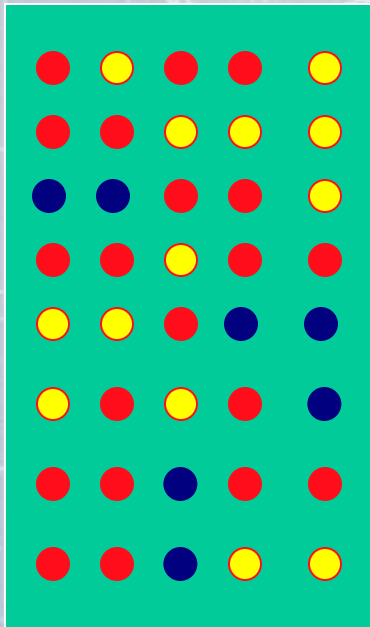
Transcriptional Profiling

A four-color, single-well multiplex assay to detect select pathogens

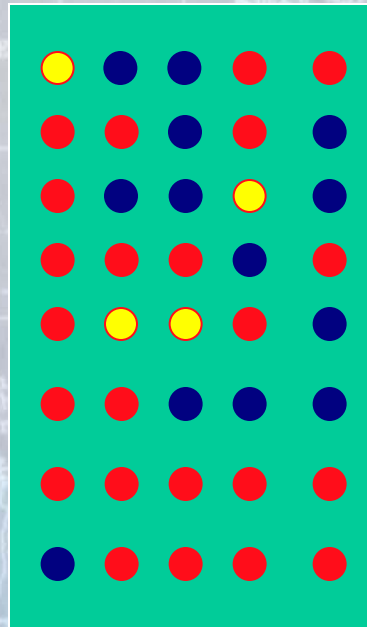


Transcriptional Profiling

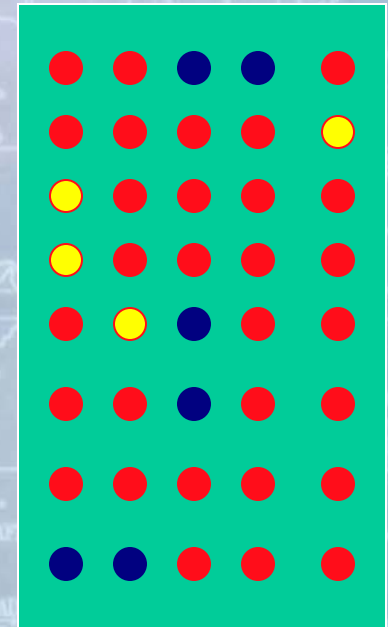
Transcriptional profiles may reflect particular infection



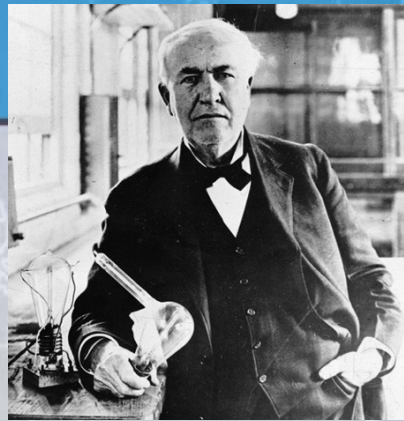
anthrax



plague



influenza



“The three great essentials to achieving anything worthwhile are: first, hard work, second, stick-to-it-iveness, and third, common sense.”

- Thomas Edison

History of Case-Based Training

- CDC Epidemic Intelligence Service
- Military War Colleges (Naval War College)
- Harvard Business School
- Medical Schools



Case-based Training

- **Vicarious experience**
- **Learn what to do AND how to do it**
- **Learn multiple roles**
- **More effective at triggering memory**
- **Know what to expect when event occurs**

Case-based Training

- **A role play of an event that actually happened**
- **Based on historical events or simulated scenarios**
- **Similar to a table-top exercise**
- **Subjects:**
 - **Foodborne illness, chem/rad events, investigating infectious disease outbreaks**

The HD/HS Effort at UMDNJ

- **Multidisciplinary approach -**
 - **First responders, public health, scientists and clinicians**
 - **Microbiology/immunology/genetics/molecular biology**
 - **In vitro and in vivo models**
 - **Training, planning, and exercising**



Homeland Defense/Security Team

• Research

- Nancy Connell
- Grant Gallagher
- David Alland
- Liz Raveche
- Jerry Ellner
- Kevin Fennelly
- Steve Schutzer
- Nick Megjugorac
- Jessica Mann
- Rebeka Pestoff
- Carolina Sofer
- Catina Crismale

• Preparedness

- Jason Emmel
- Andrea Marcus
- James Smith
- Tim Phelan
- Nikiesha Nicholas
- Kathy Wioland
- Mary Paczkowski
- Jamie Steiger
- Dennis Boos
- Henry Cortacans
- Nancy Hamstra
- William Halperin

Thank You

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