

US EPA ARCHIVE DOCUMENT

**OFFICE OF RESEARCH AND DEVELOPMENT**  
**National Homeland Security Research Center**

**Advancing Our Nation's Security Through Science**

**MISSION**

The National Homeland Security Research Center (NHSRC) develops and delivers reliable, responsive expertise and products based on scientific research and evaluations of technology. Our expertise and products are widely used to prevent, prepare for, and recover from public health and environmental emergencies arising from terrorist threats and incidents.

**ADVANCING OUR NATION'S SECURITY THROUGH SCIENCE**

Office of Research and Development  
 National Homeland Security Research Center

**AUTHORITY**

- Bioterrorism Act of 2002
- Homeland Security Presidential Directives 7, 9, and 10:
  - Critical water infrastructure safety and security
  - Surveillance program for chemical, biological, and radiological terrorism threats to public health and the environment
  - Lead role in decontamination efforts in the event of an emergency

Office of Research and Development  
 National Homeland Security Research Center

**RESEARCH PRIORITIZATION PROCESS**

The process starts with three parallel inputs: Threat Scenario Development, Best Scientific Judgment, and Governmental Requirements. Threat Scenario Development leads to Threat Scenario Analysis, Priority Threat Scenarios, Knowledge Gap Analysis, Peer Reviews, and Research Needs. Best Scientific Judgment leads to Stakeholder Reviews, Peer Reviews, and Research Needs. Governmental Requirements leads to Compliance Assessment and Research Needs. All three paths converge into a central 'Alignment' circle, which leads to 'NHSRC's Research Priorities'.

Office of Research and Development  
 National Homeland Security Research Center

**RESEARCH PROGRAM DEVELOPMENT**

**The EPA and Homeland Security: Common Ground and Research Needs**

Protecting Environments  
 Water + Indoor + Outdoor

Dealing with Contaminants  
 Chemical + Biological + Radiological

Concerns  
 Effects on Human Health

Research  
 Contaminant Detection, Disposal, Containment and Mitigation, Decontamination, Improving Response Capabilities, Risk Assessment and Communication, Testing and Evaluation

Stakeholders  
 Emergency Responders, National Ocean Teams, Public Health and Analytical Labs, EPA's Program Offices and Regions, Water Utilities, Emergency Planners, Architects and Building Designers

Office of Res  
 National Home

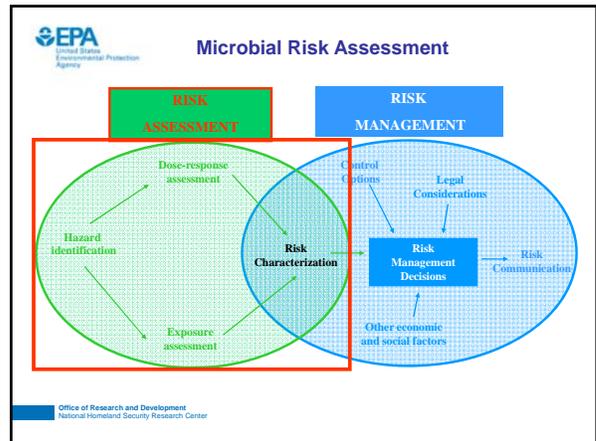
**Security through research: Closing the knowledge gap with risk assessments**

**RISK ASSESSMENT** (left circle): Hazard Identification, Dose-response assessment, Exposure assessment.

**RISK MANAGEMENT** (right circle): Control Options, Legal Considerations, Risk Management Decisions, Risk Communication, Other economic and social factors.

**Intersection:** Risk Characterization.

Office of Research and Development  
 National Homeland Security Research Center



**Hazard Identification Research**

- Quantitative PCR for rapidly determining spore viability
- Drinking water contaminant warning systems
- Water concentrator for pathogen identification
- Health surveillance networks
- Modeling threats to water distribution systems
- Standardized analytical methods (SAM)
- Environmental Response Laboratory Network (ERLN)

**Dose-Response Assessment Research**

- Meta-analysis of historical dose-response studies of inhalational anthrax and plague (PhAME)
- Development of PB/BK models in the rabbit to determine low-dose infectivity of inhalational anthrax

Pathogen Information Catalogue (PI CAT)

# of tests = 56	# of test products = 139	# of exposed animals = 13,070
# of response groups = 1375	# of species = 5	
# of distinct doses = 1047		

Rabbit Morphometry and Spore Deposition Model

**Exposure Assessment Research**

- Surface sampling methods
- Re-aerosolization model for persistent biological agents
- Emissions, transport, and fate models for air and water releases
- Design and evaluation of residential and large-building safe havens
- Drinking water distribution system modeling of contaminant events
- Guides for
  - Fate of threat agents in water, air, and surfaces
  - HVAC design to minimize contaminant spread

**Risk Characterization Research**

- Development of biological clean-up levels
- Background levels for endemic biological threat agents in the US

*Bacillus anthracis*  
*Yersinia pestis*  
*Francisella tularensis*  
*Brucella* species  
*Burkholderia* species

**EPA** **Microbial Risk Assessment Tools**

- Compendium of Microbial Risk Assessment Methods
- Support for Environmental Rapid Risk Assessment (SERRA) Database
- Incident-based Microbial Risk Assessment Framework

**Tier I: Site/Incident Assessment**

**Tier II**

**Hazard Assessment**

**Exposure Assessment**

**Tier III: Risk Characterization**

Office of Research and Development  
National Homeland Security Research Center

**EPA** **Specialized Research Facilities**

Office of Research and Development  
National Homeland Security Research Center

**EPA** **Customers**

- EPA's Office of Solid Waste and Emergency Response (OSWER)
- EPA's Office of Water (OW)

**Collaborators**

- Department of Homeland Security (DHS) (NBACC, CSAC)
- Centers for Disease Control and Prevention (CDC) (NIOSH)
- National Counterterrorism Center (DNI-NCTC)
- Department of Defense (DOD) (ECBC, CHPPM, USAMRIID, NSWC, DTRA)
- Department of Energy (DOE) (Argonne, Sandia, Oak Ridge, Idaho, Livermore)
- U. S. Geological Survey (USGS)
- Food and Drug Administration
- Department of Transportation
- Department of Commerce (NIST)
- Central Intelligence Agency
- Federal Bureau of Investigation
- Public and Private Water Utilities
- Cities of Cincinnati, Milwaukee, Pittsburgh

Office of Research and Development  
National Homeland Security Research Center

**EPA** **NHSRC Microbial Risk Assessment Team:**

Tonya Nichols, PhD  
Sarah Taft, PhD  
Irv Baumel, PhD  
Alan Lindquist, PhD  
Deb McKean, PhD

[www.epa.gov/nhsrc](http://www.epa.gov/nhsrc)

Office of Research and Development  
National Homeland Security Research Center