BioWatch Overview

Current Operations
Future Autonomous Detection

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BioWatch Mission and Tasks

**Mission:**

Provide, maintain and support a continuous aerosol bio-terrorism monitoring capability in selected metropolitan areas

- *State of the Union Address, 2003*

**Tasks:**

- Detect and characterize attacks against our Nation’s cities, other high value assets, and special events
- Increase and improve bio-aerosol threat monitoring capability and capacity while constraining costs
- Provide guidance and assistance to federal, state, and local agencies
- Ensure interoperability with other national bio-aerosol threat monitoring and response systems
BioWatch Network

**Current Architecture:**

- More than 30 jurisdictions are operational
- Jurisdictional personnel (approximate)
  - 150+ field
  - 130+ laboratory
  - 100+ public health
- Outdoors and Indoors

*More than 7 million assays — zero false positives*
BioWatch Partnerships

- Field Operations
- Laboratory Operations
- Public Health Operations
- Emergency Management
- Law Enforcement
- First Responders
- Facility Owners
- Contractors

FEDERAL
- Environmental Protection Agency
- Department of Defense
- Federal Bureau of Investigation
- Centers for Disease Control and Prevention
- Assistant Secretary for Preparedness and Response
- U.S. Secret Service
- National Laboratories
- BioWatch Systems Program Office

STATE AND LOCAL

OTHER

Homeland Security
BioWatch Program Scope (First 24-48 hours)

**Route Operations (First 24-48 Hours)**
- Filter collection
- Sample preparation
- Preliminary screen
- Agent-specific test
- Results review

**Bar Interpretation**
- BAR declaration (optional technical laboratory consultation)
- Federal and jurisdiction notifications
- Jurisdictional conference call
- Initial situational assessment
- National conference call

**Response and Recovery**
- Declaration of Emergency
- Movement and dispensing of prophylaxis
- Protective actions such as limitations on movement
- Mass notification

**Bar = BioWatch Actionable Result**
**NRF = National Response Framework**
BioWatch Daily Operations

Field Operations

Laboratory Analysis

Public Health and Preparedness
Field Operations

- Deploy, sustain, and maintain a 24/7 air sampling detection technology
- Collect and deliver filters daily to the local/state BioWatch laboratory
- Ensure adherence to standard operating procedures through independent audits
  - Formerly done through the BioWatch Evaluation Program (BWEP)
- Maintain field operator health and safety
Laboratory Operations

- Performs agent detection and identification
- More than 20 BioWatch laboratories; most are co-located with Laboratory Response Network (LRN) laboratories
- Procedures and assays are developed, validated, and approved by the Centers for Disease Control and Prevention (CDC)
  - Each assay has been tested to understand sensitivity and specificity
  - Reagents are provided by CDC and DoD’s Critical Reagents Program (CRP)
- A BioWatch Actionable Result (BAR) is determined by the local Laboratory Director or Designee
  - May conduct technical consult with CDC and DHS
Real-time PCR Assay Overview

- **Primary screen**
  - ✓ Low pass survey for organism identification

- **Verification panel**
  - ✓ Expanded analysis with highly discriminating DNA signatures

- **Sub-speciation assay**
  - ✓ Provides additional information for results

High confidence detection is achieved through the use of an assay panel.
A BioWatch Actionable Result (BAR)

**Definition:** PCR-verified positive result from a BioWatch collector

**A BAR means:**
- The filter contains genetic material from an organism tested by the BioWatch system
- A qualitative assessment can be made as a possible indicator of the amount of genetic material on the filter
- The collector location identifies a temporal and spatial relationship
- The result is ACTIONABLE

**A BAR does not necessarily mean:**
- A terrorist attack has occurred
- A viable biological agent was released
- The agent is infectious
- There is a risk to the public’s health

Results Are Accurate and Valid, No Further Confirmation Needed
Public Health and Preparedness Operations

Provides programmatic and scientific leadership in coordination with local, state, and federal partners and improves the jurisdictions’ and BioWatch Program’s ability to detect and provide effective initial assessment of a BioWatch Actionable Result (BAR)

- BioWatch exercise program
- Guidance documents and supporting planning documents
- Workgroups and focus groups
- Jurisdictional coordinator program
Public Health & Preparedness Operations

Exercise Program

■ Objectives
  • Assure BioWatch jurisdictions have the capability to respond to a BAR
  • Evaluate local and state implementation of BioWatch guidance documents (BioWatch preparedness)
  • Inform the revision and writing of BioWatch guidance, other program related documents and broader BioWatch Program planning

■ Topics
  • BAR interpretation and notifications
  • Environmental sampling
  • Multijurisdictional response coordination

■ Multiple benefits
  • Strengthen BioWatch stakeholder partnerships
  • Improve national preparedness
Special Events Operations: National

National Special Security Events are planned and usually have a high-ranking government official in attendance or a potential for significant population exposure.

Special Events Operations: Local

Participation is determined by local officials and supported on a case-by-case basis.
AUTOMATED DETECTION
Benefit of Early Detection
Reducing Casualty Rate and Fatalities following a release

“Casualty Rate” is a measure used by the program office to evaluate the operational utility of Early Detection as it relates to the expected burden on the Nation’s health care system and number of fatalities following a release. “Fatalities” is the expected number of people that may die following a release.
Comparisons of Detection Timelines

Event-to-Detection and Confirmation

**Current:** Real-Time PCR

hours from exposure to confirmation

**Future:** Automated Detection

hours from exposure to confirmation
Autonomous Detection
*Increased Capability and Coverage*

- Key characteristics: autonomous and networked
- Exposure to confirmation time reduced

**Agents and jurisdictions:**
- Based on threat risk assessment
- UASI risk formula
- Fraction of population (outdoor)
- Indoor facilities

- Indoor/Outdoor guidance documents
- CONOPS

- Increased coverage and sampling frequency leads to a more efficient response
Autonomous Detection Technology
A Tool of Public Health

- Integration of technology into public health is vital to the success of any detection program
- Detection without Response Plans is ineffective
- Exercises provide a link between technology, planning, and response
- Successful deployment of an automated system is dependent upon its application as a tool of the Public Health Community

Users of BioWatch Autonomous Detection must leverage the shorter time to detection to facilitate earlier decision making.
BioWatch Program Summary

- Nationwide network of continually operating environmental monitoring systems
- Activities span from early detection and initial response to providing support during and after the transition to an all-hazards response
- Operated by a team comprised of field operators, laboratorians, and public health and preparedness officials from city, county, state, and federal organizations
- Guidance documents provide an overall picture of BioWatch program activities and the information necessary to respond to a BAR
  - Developed in collaboration with local, state, and federal partners on which notification protocols and jurisdictional response plans are based
- BioWatch exercises are used to assess jurisdictional response plans (first 24-48 hours following a BAR)
BioWatch Goals for the Workshop

- Identification of various technologies applicable to daily environmental surveillance for aerosolized biological agents associated with bioterrorism

- How would the automated technologies work in an over-all system?
  - Non-materiel focus on day-to-day functionality required by the state/local public health officials and other key stakeholders
  - Local need for hands-on laboratory expertise reduced and replaced by different requirements
  - How should the BioWatch program approach lifecycle support?

- Balance between obsolescence and chasing the leading edge of technology advancement for deployment
  - How does the BioWatch program incorporate technological advances rapidly in a balanced way?
Why is BioWatch Important?

*Early Detection = Early Treatment = Lives Saved*

Clinical “signal” arrives after presentation of symptoms, identification of disease, then medicines can be distributed.