

Biological Threat Characterization

University Programs Summit

Kevin Anderson, Ph.D.

Scientific Director (Acting)

National Biodefense Analysis and Countermeasures Center

Science and Technology Directorate

Department of Homeland Security

19 March 2008



**Homeland
Security**

Understanding Biological Threats: shortfalls in the world infrastructure for dealing with infectious diseases and bioterrorism

- Increasing antibiotic and antiviral resistance
- Few novel antibiotics are in the pipeline
- Vaccines are not commercially attractive
- Cost and time from concept to regulatory approval is large
- Regulatory and liability concerns delay rapid deployment of new mitigation measures
- Similar issues in agriculture and food
- Large number of possible pathogens and toxins



Homeland
Security

The Mission of the BTCC is to Increase Threat Awareness

Biological Threat Characterization Program

- Produces laboratory-based assessments of biological threats and vulnerabilities that will directly increase threat awareness
- Executes critical targeted research projects that:
 - may occur under high containment (BSL-4)
 - employ various model systems including non-human primates
 - may be classified
- Provides validation of potential technical capabilities identified by intelligence sources

Risk Assessment Program

- Conducts in-depth risk assessments of current and emerging biological threats
- Identifies knowledge gaps and vulnerabilities to biological threat agents

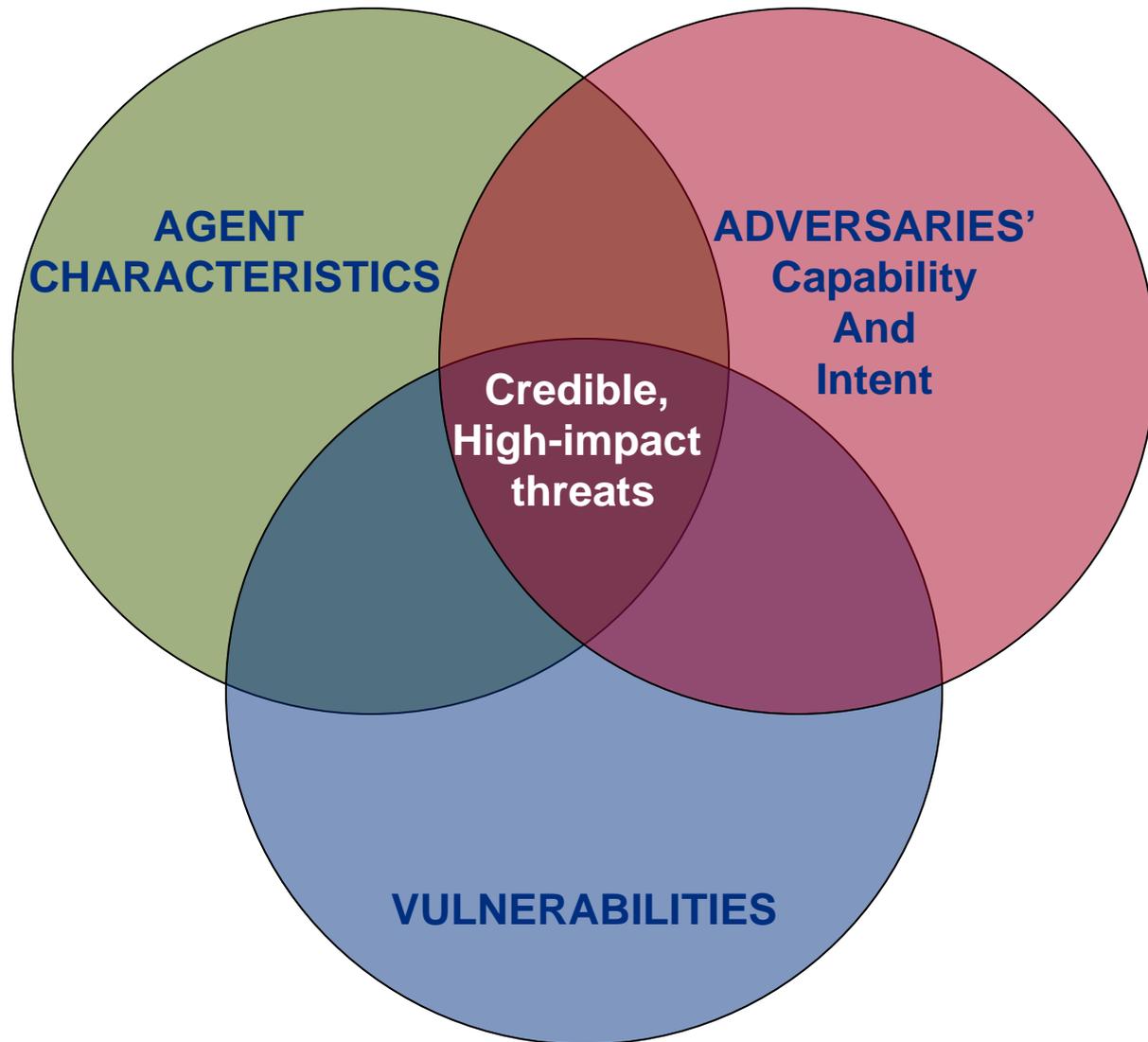
BTCC results will inform biodefense policy and countermeasures strategies



**Homeland
Security**

Both Science and Intelligence Inform the BTCP Process

- **Intelligence** reporting and open source information are used to identify credible immediate and future threats
- **Scientific and technical knowledge** are integrated with intelligence to determine which threats are realistic
- **Threats and vulnerabilities** are evaluated in collaboration with federal agencies (NIH, FDA, USDA, Customs and Border Patrol) and industry partners



**Homeland
Security**



A Scientific Approach is Required to Conduct Rigorous Risk Assessments

Likelihood

Threat – technical feasibility of an adversary to deliver on threat

- Intelligence analysis
- Scientific information analysis
- Laboratory analysis

Impact

Vulnerability – biodefense strategy weakness that can be exploited

- Scientific information analysis
- Laboratory analysis
- Biodefense strategy analysis

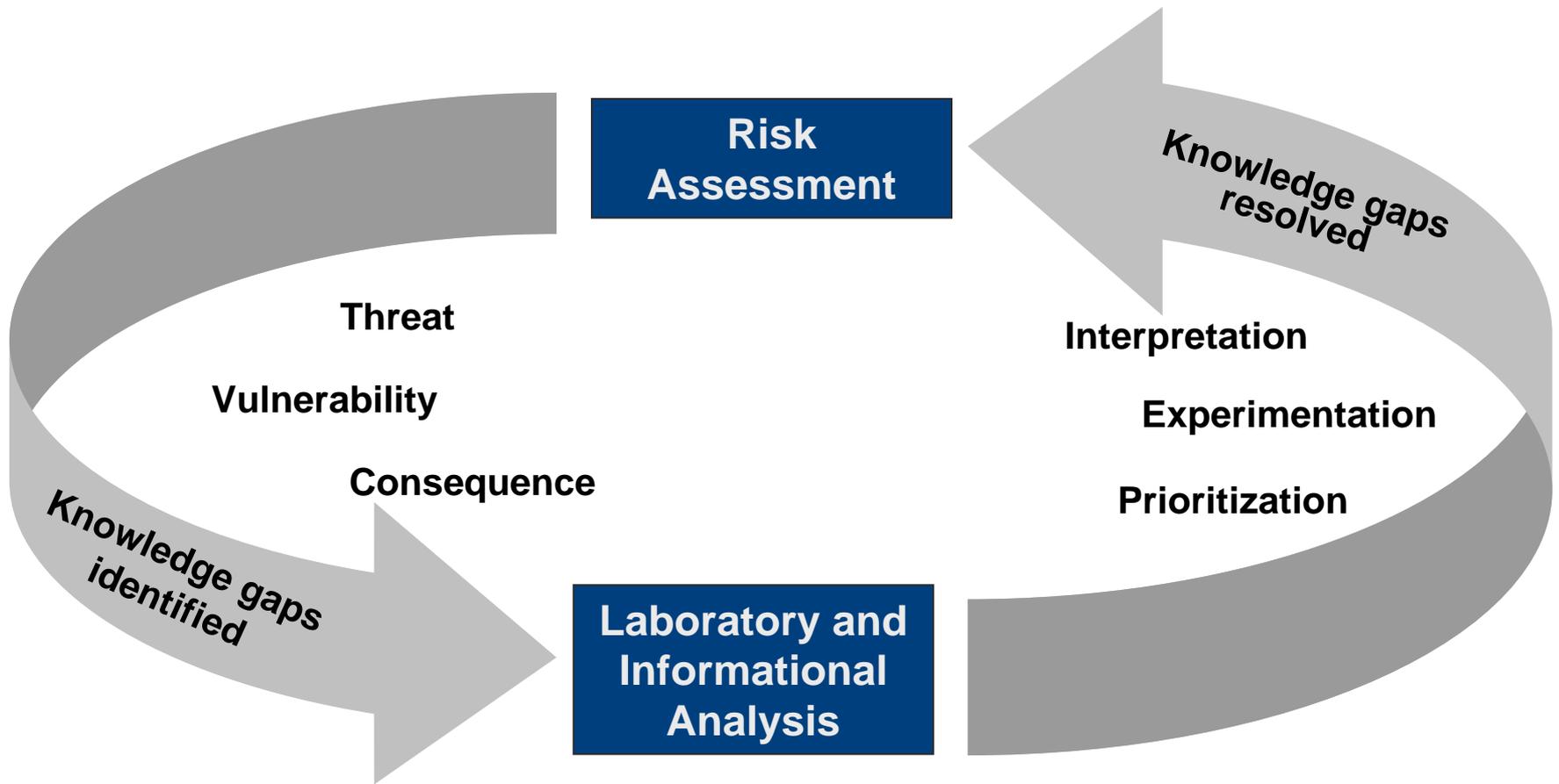
Consequence – measurable loss of something of value (public health, economy, society)

- Scientific information analysis
- Laboratory analysis



**Homeland
Security**

Closing Critical Risk Knowledge Gaps



BTCC Assesses the Near-term and the Long-term Threat

Traditional	Enhanced	Emerging	Advanced	Inform Novel Defensive Strategies and Architectures
<p>Naturally occurring bacteria, viruses and toxins. Simple delivery mechanisms</p> <ul style="list-style-type: none"> ● Assessing BW-enabling characteristics ● Comparing virulence by exposure route ● Threats to Food 	<p>Agents selected or modified to increase virulence, stability or circumvent counter-measures</p> <ul style="list-style-type: none"> ● Assessing difficulty of selection for enhanced organisms (<i>Yersinia pestis</i>) 	<p>Newly emerging diseases or traditional agents acquired, produced or delivered in a new method</p> <ul style="list-style-type: none"> ● Establish process to identify & evaluate emerging bio threats ● Assess potential bio hazard posed by highly pathogenic Avian Influenza virus 	<p>Non-naturally occurring, engineered agents. Complex or novel delivery systems</p> <ul style="list-style-type: none"> ● Establish process to identify & evaluate enabling technical advances ● Craft procedure to identify, evaluate & integrate technical & Intel information 	

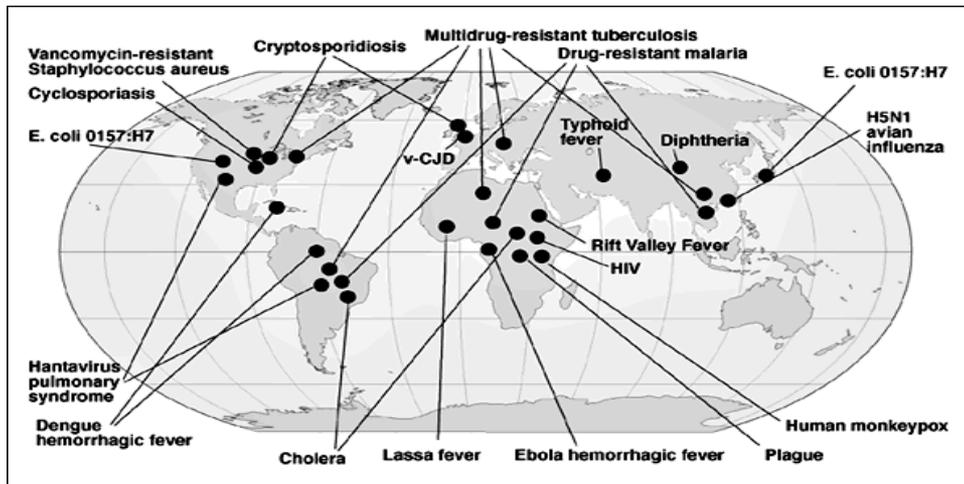


Homeland Security

The BTCC is addressing knowledge gaps with focused experiments and extensions to the analysis

Future R&D will better inform biodefense priorities

- Develop an approved strategy for emerging and non-naturally occurring threats
- Improve understanding of potential future threats
- Incorporate impact of animal diseases in risk assessment
- Link risk and economic impact



**Homeland
Security**

The BTCC is Creating Infrastructure to Accomplish Its Mission

Facilities

- NBACC Facility (under construction)
- BSL 3 Aerosol Suites
 - Lovelace Respiratory Research Institute
 - Walter Reed Army Institute of Research
- BSL3 Antibiotic Sensitivity Testing Suite
 - United States Army Research Institute for Infectious Diseases



160,000 gross, 71,000 net; 9,000 BSL-4, 9,500 BSL-2/3E sq ft

Processes

- Scientific oversight
- Regulatory oversight (BWC compliance, NSABB)
- Community integration and coordination

Scientific Foundations

- Evaluation of existing animal models
- Development of animal models (orthopoxviruses)



**Homeland
Security**



Homeland Security



Homeland
Security