# *Biological Weapons Nonproliferation: International Applications for U.S. Counter-Terrorism Initiatives*

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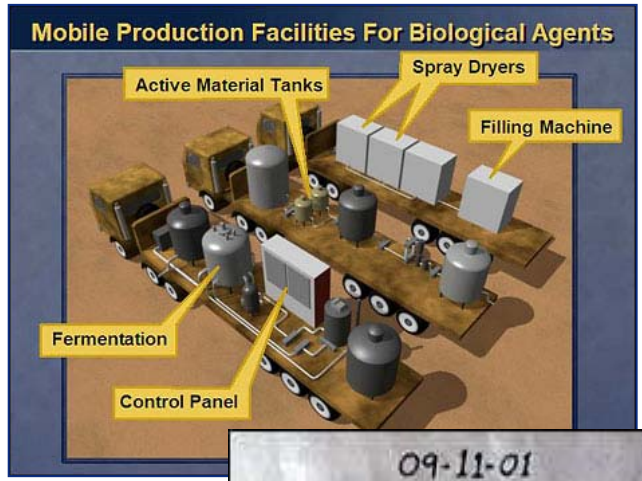
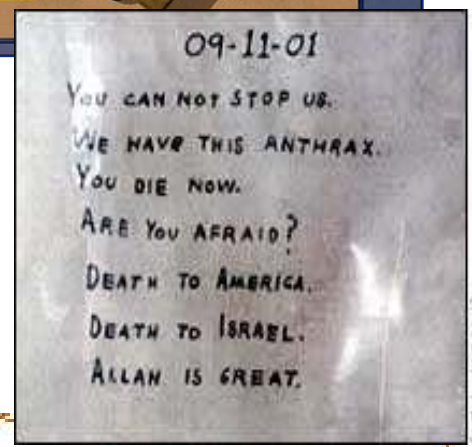
# Biological Weapons (BW) Threat

- Dissemination of *Bacillus anthracis* through the U.S. postal system in 2001: a watershed event
- Rapid advances in biotechnology
- Dual use agents and technologies
- Pathogens and toxins stored and used in laboratories and culture collections throughout world
- Frequent outbreaks of exotic, highly infectious disease in humans, animals, and plants
- Record of both state and non-state BW development




*U.S. Anthrax letter*

# U.S. BW Nonproliferation Approaches

- Biological Weapons Convention (1972)
- Export Control
  - Australia Group
  - U.S. Commerce Control List
- Limited U.S. bilateral interactions
  - Nunn-Lugar programs

*Dismantlement of Kazakh BW facility*

*Fermentation vessel*

# U.S. BW Counter-Terrorism Initiatives

- **USA Patriot Act of 2001 (Public Law 107-55); Bioterrorism Preparedness Act of 2002 (Public Law 107-188)**
  - **Focuses mostly on bioterrorism response initiatives**
  - **Tightens regulations for possessing or transferring specific pathogens and toxins**
  - **Introduces security regulations for facilities and individuals working with specific pathogens and toxins**
- **Pending "Project BioShield" will increase bioterrorism response capabilities**

4A ••• The Burlington Free Press

Bush signs security bill

By Sandra Sobieraj
*The Associated Press*

WASHINGTON — President Bush signed legislation Wednesday allocating $4.3 billion to protect Americans and their food and water from biological warfare.

"We're under attack; that's just the way it is," Bush told the first meeting of his Homeland Security Advisory Council.

It was a busy day for domestic security issues as Bush presided over the bill-signing ceremony in the Rose Garden, then addressed a get-acquainted meeting of the 16-member panel, a mix of business executives, academics and government officials.

"You're going to help us leave a legacy, so that future presidents, future administrations and future congresses can deal more effectively with how to do the most important job any elected official has, which is to protect innocent life," Bush said.

Homeland Security Director Tom Ridge, meanwhile, met privately with about 200 lawmakers on the House floor for 90 minutes, fielding questions and objections to the president's plan for combining 22 agencies into a new Cabinet-level department for defending America against terrorists.

Many questions focused on whether the new agency should have greater authority over the CIA, FBI and other intelligence agencies, Ridge said afterward.

Ridge said "there is a great deal of interest" among lawmakers from both parties in ensuring that intelligence is shared and analyzed better than it was before Sept. 11. Bush believes that can happen without moving the FBI and CIA into the new department, Ridge said.

DOUG MILLS, *The Associated Press*

**President Bush is applauded Wednesday as he arrives to sign bioterrorism legislation at the White House. From left are: Sen. Bill Frist, R-Tenn.; Bush; Tom Ridge, director of home land security; and Tommy Thompson, secretary of health and human services.**

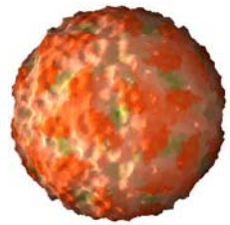
# Gaps in Current Approaches

- Current BW nonproliferation efforts do not comprehensively address BW threat
- U.S. counter-terrorism initiatives could strengthen BW nonproliferation but have not been implemented globally
- Majority of BW nonproliferation and counter-terrorism efforts have focused on response, not prevention, initiatives
- No U.S. or international standards for securing biological materials

***Critical to connect biosecurity practices to BW nonproliferation initiatives***

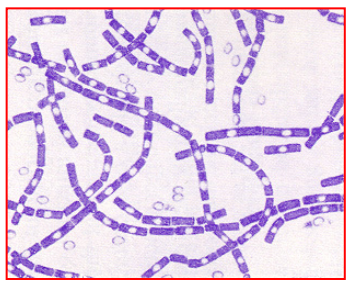
# Need to Secure Certain Biological Materials

- **Aim of biosecurity is to mitigate BW threat at the source**
  - **Prevent terrorists or proliferant states from acquiring certain biological materials from government, commercial, or university facilities**
  - **Agents from laboratories and culture collections are apt to be more virulent and viable than agents isolated from nature**
- **Securing pathogens and toxins is an important tool to a comprehensive BW nonproliferation program**
  - **Cannot prevent BW terrorism or proliferation**
  - **Must be augmented by BWC, export controls, and other mechanisms**



*FMD virus*

*Bacillus anthracis*



*Variola major*

*Yersinia pestis*

# Sandia and Biosecurity

- Extensively engaged in this activity in the U.S. for three years
- Worked for several federal agencies, bioscience laboratories, and universities
  - Developed and implemented biosecurity methodologies
  - Conducted vulnerability assessments
  - Designed security systems
- Assisted federal rule-makers to understand the various nuances of biosecurity
- Supported U.S. Delegation to the BWC's efforts to develop an international biosecurity initiative

# Challenges to Securing Biological Material

- **Dual use**
  - Valuable for many legitimate, defensive, and peaceful commercial, medical, and research applications
  - Exist in many different process streams in legitimate laboratories
- **Nature of the material**
  - Living and self-replicating organisms
  - Used in very small quantities
  - Cannot be reliably quantified
  - Contained biological samples are virtually undetectable
- **Laboratory culture**
  - Biological research communities have not been accustomed to operating in a security conscious environment

*U.S. BSL-4 researcher*

*Kazakh plague researcher*

# Biosecurity Cost-Benefit Considerations

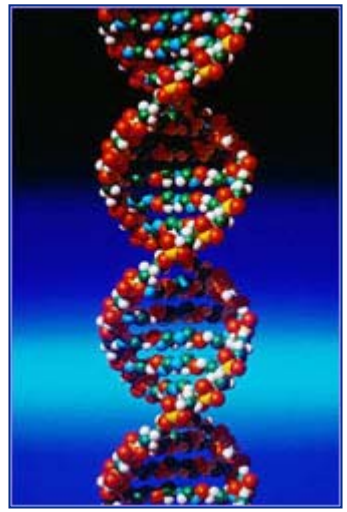
- Bioscience research laboratories are not unique repositories
- Consequences of terrorist/state use of biological material
  - Very few agents could be maliciously deployed to cause mass human casualties
- Need a rigorous methodology to make informed decisions about how to design effective and efficient biosecurity systems
  - No security system can protect every asset against every conceivable threat
  - Security resources are not infinite

*Plum Island, N.Y.*

*Dispersal Device*

# Sandia Biosecurity Methodology

- **Asset identification and prioritization**
  - **Consequences of diversion**
  - **Attractiveness to an adversary**
- **Threat identification and prioritization**
  - **How and why would an adversary likely attempt to steal the target assets?**
  - **What would be the consequence of those actions?**
- **Priorities should be driven by consequences**
  - **Primary: national security event (bioterrorism)**
  - **Secondary: assist in achieving a primary consequence or gaining access to a primary asset**
  - **Tertiary: could affect operations**

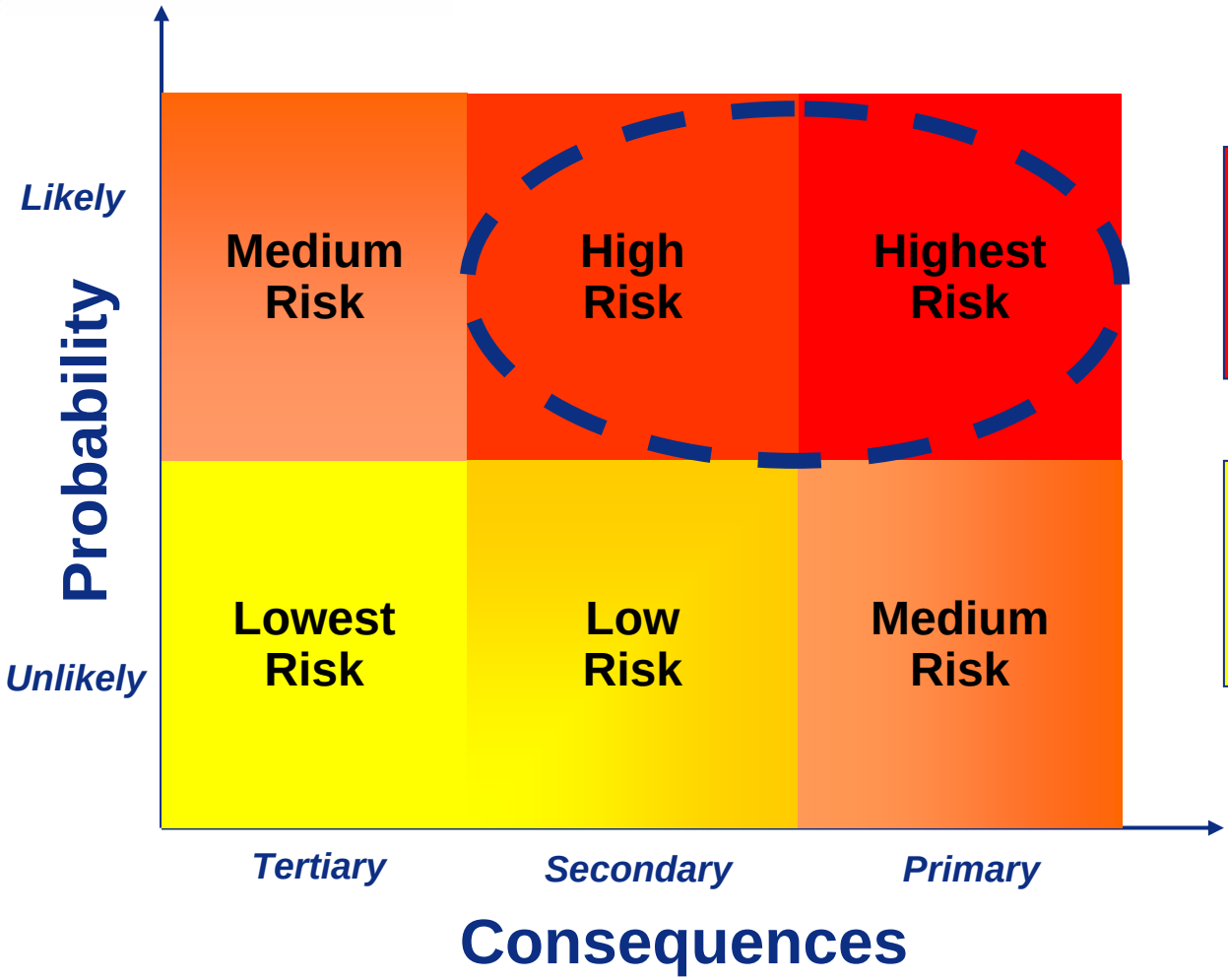


# Future Priority: Agent-Based Risk Assessment

- **All biological agents do not need the same level of protection**
  - Some agents are more likely to be diverted than others
- **Infectious disease risk**
  - Infectivity
  - Pathogenicity
  - Lethality
  - Transmissibility
- **Likelihood agent would be used as a weapon**
  - Availability
  - Ease of amplification
  - Ease of processing
  - Environmental hardiness
  - Availability of countermeasures/immunity

- **Result of this assessment: High Consequence Pathogens and Toxins (HCPTs)**
  - Those microorganisms and their by-products that are capable, *through their use as a weapon*, of severely affecting national or international public health, safety, economy, and security

# Generic Threat Prioritization




- Protect against high risk scenarios

- Develop incident response plans for medium and low risk scenarios

# Results of Generic Risk Analysis

- **Highest risk**
  - Insider, visitor, or outsider with limited access attempting to steal HCPTs covertly
- **High risk**
  - Insider, visitor, or outsider with limited access attempting to steal certain HCPT-related information covertly
- **Medium risk**
  - Small outsider groups that would aim to destroy or deface the facility
- **Terrorist commando assault unlikely**
  - Agents available elsewhere
  - Overt attack using force would signal authorities to take medical countermeasures


***Serve as Biosecurity Design Parameters***

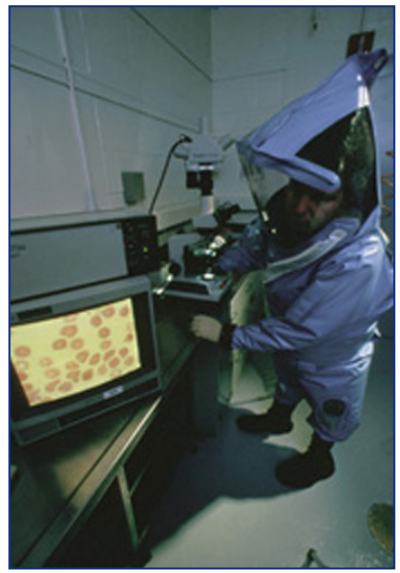
# Biosecurity Protection Principles

- Program management and oversight
- Personnel reliability program
  - Visitor screening and escort procedures
- Information technology security
- Intrusion detection, access controls, alarm assessment, and response for agent containment areas
- Material accountability program
  - Chain-of-custody procedures
- Training and auditing

***Typically excludes substantial perimeter systems and armed guard forces***

# Potential Path Forward

- **Multilateral biosecurity engagement through BWC structure**
  - **Develop internationally recognized biosecurity guidelines**
- **Coordinate U.S. and AG biological export controls with new biosecurity regulations**
- **Expand bilateral and regional engagement on biosecurity issues**
  - **International lab-to-lab engagement could support and strengthen political discussions**
- **Ensure that various bilateral and regional biosecurity initiatives complement other BW nonproliferation efforts**



***FMD outbreak, U.K.***

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