

# **DTRA Bio-Defense Way Ahead Project**

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# DTRA Bio-Defense Way Ahead Project

1. In your opinion, is the United States spending too much, too little or just the right amount on bio-defense projects today? Why?
2. What present US projects do you see as making the most difference in the next decade if fully funded? Where would you increase investments? Why is that?
3. What new US projects would you be most interested in adding to the research and procurement agenda in the next decade? Why?
4. What projects would you remove from the current agenda? What areas of research would you deemphasize? What is your rationale?
5. What biological threats and scenarios do you see as most likely? Which do you see as most dangerous and costly if they were to occur? And, how would you prioritize your bio-defense spending accordingly?

# US Biodefense Expenditure Post FY 2001

Following the “Amerithrax” events of October and November 2001 in which 22 people were sickened, of whom five died, the US government has authorized \$57 billion for Biological Weapons Prevention and Defense. The proposed current rate of annual authorization for this purpose is ~\$7 billion, which can be expected to continue in the forthcoming years.

Alan Pearson, “Federal Funding for Biological Weapons Prevention and Defense, FY 2001-2009,”

[www.armscontrolcenter.org/policy/biochem/articles/fy09\\_biodefense\\_funding/](http://www.armscontrolcenter.org/policy/biochem/articles/fy09_biodefense_funding/).

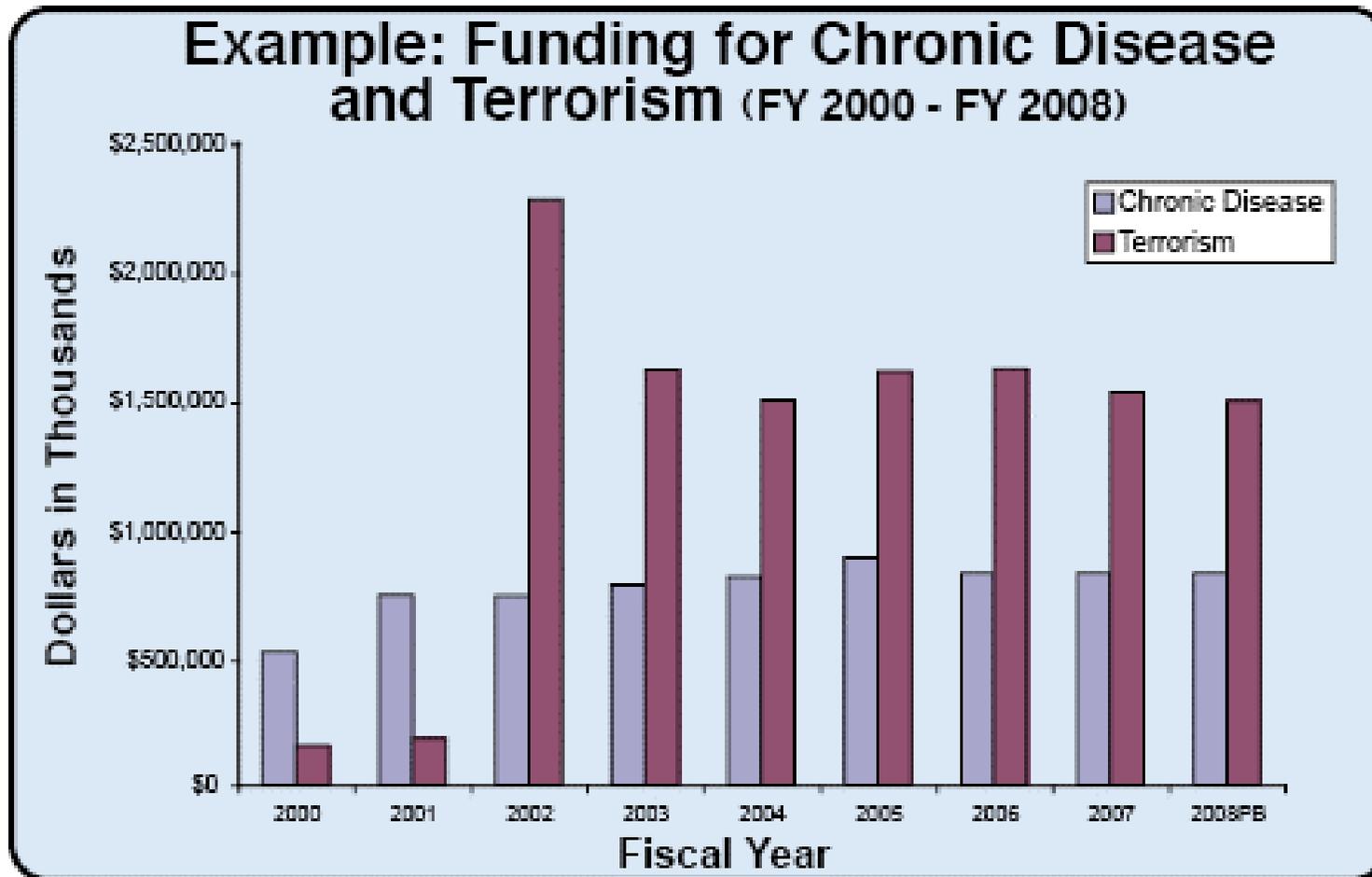
# Annual US Major Disease Mortality

- Various forms of cancer kill roughly 565,000 Americans per year.
- Tobacco kills around 440,000.
- Obesity causes perhaps 400,000 or more deaths.
- Approximately 1.7 million patients develop infections annually while undergoing treatment in US hospitals, resulting in an estimated 99,000 deaths.
- **Together these four causes account for roughly 1.5 million US deaths per year, every year.**
- Bioterrorism killed *zero* U.S. citizens in the twentieth century and five to date in the twenty-first century.

## Other Major Contributors to US Infectious Disease Incidence and Mortality

- Food-borne diseases. annual incidence  
76 million ill / 315,000 hospitalized / 5,000 dead
- Antibiotic resistance  
Cost ~ \$20 b / year
- *Clostridium difficile*  
450,000 infections / 15-20,000 deaths p.y.

# Funding for Chronic Disease and Bioterrorism (FY 2000 – FY 2008)\*



\* Terrorism refers **only** to bioterrorism, and table refers to CDC funding.

**2. What present US projects do you see as making the most difference in the next decade if fully funded? Where would you increase investments? Why is that?**

- Broad-spectrum antibiotics, anti-virals  
[Recent example of anthrax and Cethromycin]
- Greatly increase support for research on basic pathogenesis,
- Support for Regional Centers for Excellence

**3. What new US projects would you be most interested in adding to the research and procurement agenda in the next decade? Why?**

- Research relating to immune enhancement
- Greatly increase support for international capacity for infectious disease surveillance and response, particularly in developing countries
- DTRA should fund serious fact-based studies of the Non State Actor threat

**4. What projects would you remove from the current agenda? What areas of research would you deemphasize? What is your rationale?**

## **Article 1 of the Biological Weapons Convention**

Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise retain:

- (1) Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes.
- (2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict

## **A Recent Intelligence Community Definition [unclassified]**

”Offensive Biological Warfare Program: Offensive BW programs are those whose objective is to research, develop, produce, and weaponize biological agents for overt or covert delivery against civilian or military targets, including personnel and agricultural targets.”

This goes back to NSDM 35 (11/25/69): “This does not preclude research into the offensive aspects of bacteriological/biological agents necessary to determine what defensive measures are required.” (Reiterated in Scowcroft memorandum 1975.)

## **TREATY COMPLIANCE QUESTIONS HAVE ARISEN BEFORE:**

IN FISCAL YEAR 1985, THE HOUSE APPROPRIATIONS COMMITTEE, ASKED THE US DEPT OF DEFENSE TO SUBMIT A REPORT REGARDING THE US ARMY'S PROPOSED CONSTRUCTION OF AN AEROSOL TEST FACILITY AT THE DUGWAY PROVING GROUND, UTAH.

THE COMMITTEE'S REQUEST NOTED THAT CONCERNS HAD BEEN RAISED "...THAT CERTAIN PROPOSED ACTIVITIES MAY UNDERCUT THE UNITED STATES COMPLIANCE WITH THE BIOLOGICAL WEAPONS CONVENTION."

THE COMMITTEE ASKED THE DEPT OF DEFENSE TO SUBMIT A REPORT WHICH ANSWERED SEVEN POINTS, THE LAST OF WHICH REQUESTED

"A THOROUGH EVALUATION OF THE IMPLICATIONS OF THE PROPOSED AEROSOL TESTING ON THE BIOLOGICAL WEAPONS CONVENTION INCLUDING:

A. THE POSSIBILITY THAT SAID TESTING WILL BE VIEWED AS OFFENSIVE, RATHER THAN DEFENSIVE, AND THUS, A VIOLATION OF THE BIOLOGICAL WEAPONS CONVENTION.

B. THE LONG-TERM PROSPECTS FOR THE PROLIFERATION OF BIOLOGICAL WEAPONS AROUND THE WORLD."

**GLOBAL SPREAD OF CHEMICAL AND BIOLOGICAL  
WEAPONS**

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**HEARINGS**  
BEFORE THE  
**COMMITTEE ON**  
**GOVERNMENTAL AFFAIRS**  
AND ITS  
**PERMANENT SUBCOMMITTEE ON**  
**INVESTIGATIONS**  
**UNITED STATES SENATE**  
ONE HUNDRED FIRST CONGRESS  
FIRST SESSION

ASSESSING CHALLENGES AND RESPONSES, FEBRUARY 9, 10, 1989  
EXPORT CONTROLS OVER CHEMICAL/BIOLOGICAL WEAPON MATERIALS  
ORGANIZATIONAL CHALLENGES FOR THE 1990's, MAY 2, 1989 GERM  
WARS  
BIOLOGICAL WEAPONS PROLIFERATION AND THE NEW GENETICS, MAY  
17, 1989

Printed for the use of the  
Committee on Governmental Affairs



U.S. GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1990

24-477



## **Leading Edge of Biodefense**

# **The National Biodefense Analysis and Countermeasures Center**

**LTC George Korch  
Deputy Director  
National Biodefense Analysis and Countermeasures Center  
Science and Technology Directorate  
Department of Homeland Security**





## **NBACC Planned Capabilities**

### **Biothreat Characterization Center**

- Basic Pathogenesis
- Susceptibility to Current Rx
- Aerosol Dynamics
- Novel Delivery of Threat
- Novel Packaging
- Simulation/Modeling (Epidemiology)
- Genetic Engineering
- Environmental Stability
- Bioregulators/Immunomodulators
- Assay Development
- Information Analysis for IC
- Genomics/Proteomics/Transcript
- Red Teaming
- Host Range Studies
- Aerosol Animal Model Development
- Support to Strategic National Stockpile  
(Pharmaceuticals and Biologics)

**Nine of the sixteen elements of the prospective research program for the National Biodefense Analysis and Countermeasures (NBACC), Biothreat Characterization Center (BTCC)**

- Genetic engineering;
- Susceptibility to current therapeutics;
- Host-range studies;
- Environmental stability;
- Aerosol animal-model development;
- Aerosol dynamics;
- Novel packaging;
- Novel delivery of threat;
- Bioregulators and immunomodulators; and
- “Red Teaming,” i.e duplication of threat scenarios.

# BTA Net Assessment–Technical Threat Assessment Task Areas

Acquire, Grow, Modify, Store, Stabilize, Package, Disperse

Assess criminal, terrorist, and state technical capabilities, methods, and devices for delivering BTA against U.S. targets

Assess the nature of nontraditional, novel, and nonendemic induction of disease from potential BTA

Provide high-fidelity models and simulations of disease transmission of BTA for threat assessment, countermeasure development, and emergency management

Assess and evaluate emerging technologies as they relate to BTA analysis and threat assessment

Apply Red Team operational scenarios and capabilities

Evaluate and predict U.S. vulnerabilities to foreign and domestic threats



Homeland  
Security



# BTA Analysis and Technical Threat Assessment

Characterize classical, emerging, and genetically engineered pathogens for their BTA potential

Virulence, infectivity, pathogenesis, host response, and fate

Potential for genetic modification

Aerobiology, aerosol physics, and environmental stability (wet lab & models)

~~Computational modeling of feasibility, methods, and scale of production~~

Physical/chemical properties of dissemination and alternatives to aerosol dissemination (wet lab & models)

- Red Team operational scenarios and capabilities assessments

Baselined on foreign and domestic intelligence collection (strengthens IC capabilities)

Study and assess principles of BTA use and countermeasure ~~effectiveness across the spectrum~~ of potential attack scenarios

High-fidelity modeling and simulation



Homeland  
Security



# US BWC Compliance Example

- 1999, CIA, Non-Proliferation Advisory Group (NAG), CLEAR VISION
- Lederberg to Tenet to NSC: 3 reasons
  - Need “Presidential” (NSC) authority
  - Would be seen to violate the BWC
  - US would assess it as violating the BWC if it found it being carried out in another country
- Project obtained NSC approval after review with Dept of State dissent
- 2004-2005: US administration officials in DOD and State concurred with no. 3 above

Continued

The crux is: Can you do everything but production and continue to say that your program is only “defensive”?

- Many US allies in Europe don't think so.
- The US certainly doesn't think so in regard to Russia.
- And wouldn't in regard to several other countries.

**5. What biological threats and scenarios do you see as most likely? Which do you see as most dangerous and costly if they were to occur? And, how would you prioritize your bio-defense spending accordingly?**

# What is the Current BW Threat to the United States?

- Offensive biological weapons programs being carried out by states; 1975 to 2005 : down, not up
- Evidence of proliferation from state BW programs; NO
- Evidence of state assistance to non-state actors to develop or produce biological agents or weapons; and NO
- Efforts to develop biological agents or weapons by non-state actors that are true international terrorist groups. MINIMAL

# **The Evolution of Non-state Actors (“Terrorist”) Biological Weapon Capabilities**

1984: Rajneesh, The Dalles, Oregon Salmonella

1990-1994: Aum Shinrikyo, Tokyo Botulinum toxin  
and Anthrax – Failed

1998-9 to November 2001: al Qa’ida, Afghanistan,  
Anthrax – Failed

2004: al-Qa’ida affiliates, NO ricin

October – November 2001: United States,  
“Amerithrax”/Anthrax

Outlier: Significance re: anticipation of technical  
proficiency by “terrorists”

**The lessons from each are extremely different.**

# Significance of 2001 Amerithrax events

- Dispersion of a purified dry-powder preparation of *B. anthracis* through US postal system, Sept-Oct 2001
- Identification of institutional source as US government biodefense facility(s) and/or contractor. Resource base includes strain access, technical capacity, highly qualified personnel, providing crucial insight into
  - (a) the ability of true international terrorist groups to develop a similar capability and
  - (b) in what span of time this might occur; i.e., the imminence of the threat.

Non-state actors (cont'd)

Jonathan Tucker, Toxic Terror (1999)

John Parachini, Motive, Means and Mayhem (no longer “forthcoming”)

Together the two books cover some 25 case studies of individuals and groups

- Rajneesh. Aum, US right-wing groups, Tamil Elam, FARC, IRA, Hamas, Hizbollah, Lashkar-i-Taiba, Jemaah Islamiyah, Broederband etc.
- The investigations were carried out in the countries concerned and were exceedingly thorough
- They found trivia for CW and very little for BW. In most cases, nothing at all

# State assistance to non-state actors

- No evidence of any since end of WW II
- US intelligence community does not think that states would provide such support

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Official US threat presentations, February 16, 2005 and March 17, 2005. Greatly reduced depiction of BW threat from non-state actors. And no change since 2005

**TESTIMONY OF CHARLES E. ALLEN, CHIEF INTELLIGENCE OFFICER, DEPARTMENT OF HOMELAND SECURITY, HOUSE COMMITTEE ON HOMELAND SECURITY, THURSDAY, MAY 4, 2006**

- “...we must exercise caution and not confuse the capabilities of bioterrorists with state-level BW programs. There is no doubt that the knowledge and technologies today exist to create and manipulate bio-threat agents; however, the capability of *terrorists* to embark on this path in the near- to mid-term is judged to be low. Just because the technology is available does not mean terrorists can or will use it.”
- “In general, terrorist capabilities in the area of bioterrorism are crude and relatively unsophisticated, and we do not see any indication of a rapid evolution of capability. It is, therefore, unclear how advancements in high-end biotechnology will impact the future threat of bioterrorism, if at all.”
- “With respect to the evolution of bioterrorism, we would expect to see use of traditional biological agents (anthrax, plague, tularemia, and others) before the appearance of advanced BW agents.”

# Intelligence Community Assessment

“We accept the validity of intelligence estimates about the current rudimentary nature of terrorist capabilities in the area of biological weapons.” **[WMD Commission, 12/2008]**

“... For your information, the intelligence community shares your perspective of terrorist capabilities which has been fed to senior administration officials.” [Sent to me in July 2005; one of three similar intelligence community messages.]

# Dennis Blair, Feb 2009, DNI Threat Assessment

- “Most terrorist groups that have shown some interest, intent or capability to conduct CBRN attacks have pursued only limited, technically simple approaches that have not yet caused large numbers of casualties.”
- “In particular, we assess the terrorist use of biological agents represents a growing threat as the barriers to obtaining many suitable started cultures are eroding and open source technical literature and basic laboratory equipment can facilitate production.”

# **Classic Themes since 1985 in the Anticipation of Terrorist Acquisition of Biological Weapons**

- Rapid advances in the microbiological and molecular genetic sciences. Most particularly pronounced over the past decade.
- The knowledge and relevant equipment is internationally diffused.

## **In the Real World However.....**

- Neither of these factors, universally invoked, has driven terrorist interest or acquisition of BW.
- A message from Dr. Ayman al-Zawahiri to his deputy on April 15, 1999, noted that “we only became aware of them [BW] when the enemy drew our attention to them by repeatedly expressing concerns that they can be produced simply with easily available materials.”
- The “recipes” constantly referred to “available on the web” or “on jihadi websites” are useless.

# The Primary Driving Factor Prompting Terrorist Interest

- Gross exaggeration, propaganda, and alarmism about BW are critically counterproductive, inducing interest by non-state actors in precisely the kind of activities that the United States would like to prevent.
- What has been trumpeted abroad for 10-15 years is no longer retrievable.
- If we do see a successful attempt by a terrorist group to use BW in the coming decades, responsibility will rest to a great degree with the threat magnification about bioterrorism in the United States, thereby emphasizing its desirability to terrorist organizations.

# **A Parallel Case: “We invented nuclear terror.”**

## **Brian Jenkins, RAND, 2008**

- “... The threat preceeded any terrorist actually thinking about the issue. ...we educated the terrorists on the subject.”
- “The message clearly coming out of Washington for the last seven years has been a relentless message of fear.”
- “Nuclear terror...it’s about our imagination.”
- **“The first thing we have to do is truly understand the threat.”**

See *National Journal*, 10/18/2008, pp. 50-51.

The years between 1995 and 2005 were characterized by:

- spurious statistics (hoaxes counted as “biological” events)
- unknowable predictions
- greatly exaggerated consequence estimates
- gross exaggeration of the feasibility of successfully producing biological agents by non-state actors, except in the case of recruitment of highly experienced professionals, for which there still was no evidence as of 2000
- the apparent continued absence of a thorough threat assessment
- thoughtless, ill-considered, counterproductive, and extravagant rhetoric

## Continued

- “Fact Free Analysis” [Brian Jenkins, RAND, 1999]
- Substitution of vulnerability analysis for threat assessment, utilization of absolute optimum mathematical possibilities [example of Runge, 2008, Providence, Rhode Island]
- Exercises with preposterous assumptions; justified by the desire to prompt official action for the public good [Atlantic Storm, 1/2005]
- Postulated future scenarios with extravagant assumptions [Danzig]
- Government exercises with rigged variables (pathogen transmission rates, RO)
- Massive exaggeration overall

# The Essential Issue ...

... is reality versus (extravagant) imagination.

Imagination, in the form of future scenarios, has been justified for purposes of planning.

The claim has been made that if we anticipate and prepare for a maximum event we will be best prepared for less serious events as well.

Also used in part as a justification for certain lines of US biodefense research.

The costs of excessive imagination: counterproductive consequences, misallocated resources.

# US BIOTERRORISM EXERCISE SCENARIOS

1. 1988, Mexico-Texas border: “Alibek” smallpox chimeric viral agent
2. TOPOFF1, May 2000: aerosolized pneumonic plague, FEMA, and US Department of Justice
3. [Unnamed], July 2000: aerosolized plague, US Department of Justice and DOD/DTRA [used fallacious RO of 10:1]
4. Dark Winter, June 2001: aerosolized smallpox, Johns Hopkins Center for Biosecurity and 3 collaborating groups [also used RO of 10:1]
5. Sooner Spring, April 2002: smallpox, National Memorial Institute for the Prevention of Terrorism (MIPT), Oklahoma
6. TOPOFF2, May 2003: aerosolized pneumonic plague, US Department of Homeland Security and US Department of State [used fallacious RO of 6:1]
7. Atlantic Storm, January 2004: aerosolized dry powder smallpox, Center for Biosecurity (now affiliated with the University of Pittsburgh Medical Center) [used appropriate RO of 3:1]
8. TOPOFF3, April 2005: aerosolized pneumonic plague, US Department of Homeland Security [again fallacious RO, 6:1]

***CATASTROPHIC BIOTERRORISM,***  
**RICHARD DANZIG, 2003**

- Case 1: a large-scale outdoor aerosol anthrax attack
- Case 2: a large-scale outdoor aerosol smallpox attack

----- **The above 2 highly unrealistic** -----

- Case 3: an attack that disseminates botulinum toxin in cold drinks.
- Case 4: an attack that spreads foot and mouth disease among cattle, sheep and pigs.

# National Planning Scenarios: Department of Homeland Security (Homeland Security Council) 2004

- Scenario #2: Biological Attack, aerosolized anthrax, 5 cities in sequence
- Scenario #4: Biological Attack, aerosolized plague in three areas of a single city

----- **The above 2 highly unrealistic** -----

Scenario #13: Biological Attack, liquid anthrax placed in ground beef in a factory – producing intestinal anthrax; mortality in low hundreds

- Scenario #14: Biological Attack, foot and mouth disease. Economic loss; no human mortality

## Planning scenarios (cont'd)

Danzig, 2003: ...these cases are real, possibly imminent and very substantial dangers. Virtually all experts and policy makers agree with this.”

- **Not** “real”: conjecture, conceived, contrived
- **Not** “imminent,” certainly not the scenarios depicted
- “Very substantial dangers”: **definitely**, if they occurred as conceived but half the scenarios are highly unlikely
- ... all experts agree: **not so**, preceding quotations from Allen (DHS), 2006, WMD Commission, 12/2008, and Blair (DNI), 2/2009, indicate that is not the case

## The Crux is...

- High-end, postulated theoretical expectations, projected into the future, based on the abilities provided by advanced knowledge and technology
- versus Charles Allen, DHS 5/4/2006, WMD Commission 12/2008, Blair DNI 2/2009
- Jenkins, 1999: it will always be possible to write an infinite number of scenarios that are “dramatic, emotionally powerful, but analytically feeble,” ie not supported by an intelligence base

Continued

- **Vulnerability** (and risk) assessments versus **threat** assessments.
  - Example of Runge (2008), Providence, RI  
“the effect a biological attack might have in a city like Providence...[to demonstrate] the current biological threat environment.”

# What Scenario to Expect?

- No BW analogue to Harvey McGeorge for CW
- No attack on BW production facility or transport
- NSA/tgs highly unlikely to isolate pathogen from nature
- Will obtain from type culture collection or by proxy
- Will begin at the beginning: simple agents, no molecular genetics, wet preparation
- Most likely distribution via food (repeat of the Rajneesh method): bot tox, ricin, anthrax?

# Addendum – Oversight and Regulation of Domestic Biosecurity

- Responses by NSABB authors (Winter 2008), expression of fear of oversight or regulation of biodefense research; “threat to science”
  - Conflates a [small] fraction of 1 percent or less of life scientists who work with BW agents with “the life sciences enterprise” as a whole
  - More serious oversight and/or regulation would be unlikely to have any negative effect on US science, US health, or US economic competitiveness.
  - Arguments offered are analogous to those made by US commercial/industrial firms against regulation (air, water, toxic compounds, ozone depletion, etc) since 1930s.

# ***Assessing the Biological Weapons and Bioterrorism Threat, Milton Leitenberg, 2005***

[www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=639](http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=639)

