NSABB Ethics Panel

Jonathan D. Moreno

January 7, 2016

How do biosecurity considerations introduce additional dimensions to the RBA and ethics analyses and what are they?

Risks

White Paper
Gain-of-Function Research: Ethical Analysis
(Draft 7 Dec 2015)

- Biosafety—i.e. dangers associated with laboratory accidents;
- ***Biosecurity***—i.e., dangers associated with crime and ***terrorism*** if pathogens are not physically secure and/or if ***malevolent actors*** gain access to them;
- Proliferation—i.e., dangers that might grow proportionally with an increased rate of GOFR, potentially in different settings with varying biosafety standards;
- Information risk—i.e., if published studies facilitate ***malevolent action*** (e.g., by ***terrorists***) or, possibly, breach of intellectual property;
- Agricultural—i.e., risks to agriculturally-relevant animals if enhanced pathogens arising from GOFR are accidentally or ***intentionally released*** into animal populations, and possible implications for human health;
- Economic risks—i.e., ***financial implications*** of (accidental or intentional) pathogen release or, possibly, opportunity costs; and
- Loss of ***public confidence***—i.e., compromise of trust (in the scientific enterprise) that could result from (accidental or ***intentional***) pathogen release.

Gryphon Report

- “Given the frequency with which these events [laboratory attacks] have happened, this analysis suggests that biosecurity be given as much consideration as biosafety.”

- As Tom Inglesby noted, even these significant incidents only tell us about known events at relatively well-managed labs.

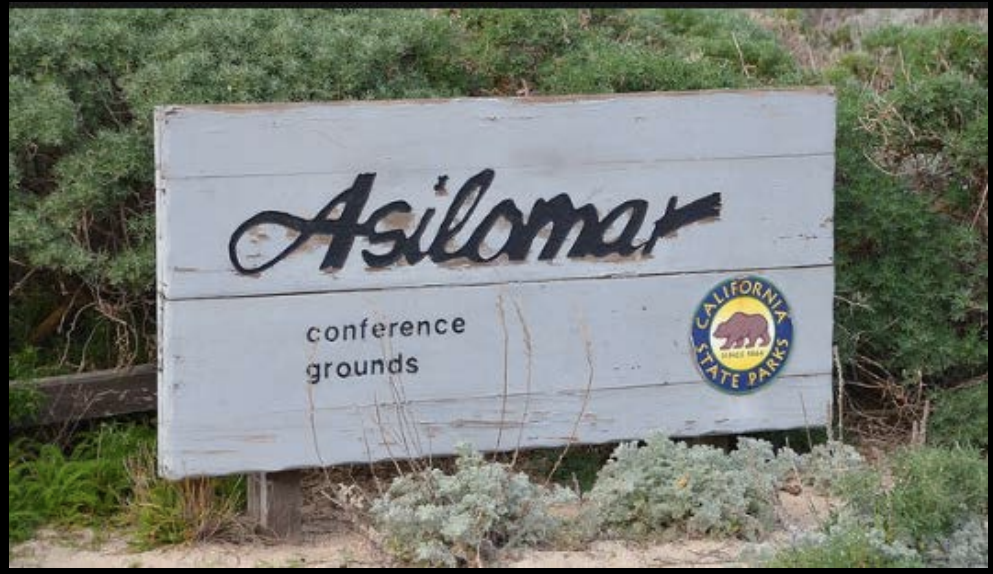
Criteria for GOF Studies of Concern

1. Highly transmissible
2. Highly virulent
3. Likely resistant

This sets a high bar for additional review. Isn't virulence enough to justify additional review?

Confidence levels for each criterion may be different if seen through a biosecurity lens, even if a long way from a "doomsday" scenario.

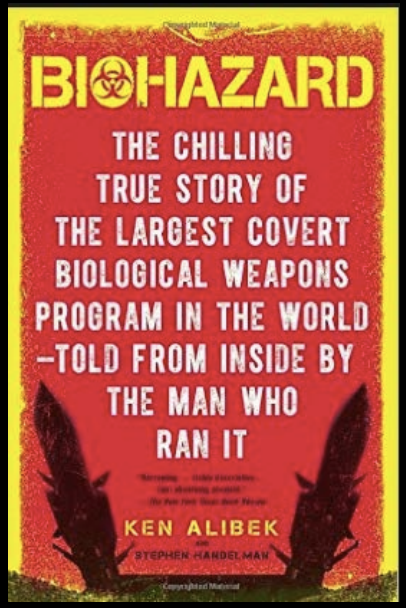
An ethnographic note on biosafety v. biosecurity in the recent history of science



Plasmid Working Group

"We believe that perhaps the greatest potential for biohazards involving alteration of microorganisms relates to possible military applications. We believe strongly that construction of genetically altered microorganisms for any military purpose should be expressly prohibited by international treaty, and we urge that such prohibition be agreed upon as expeditiously as possible."

(quoted in Krimsky 1982, Genetic Alchemy, p. 130)


BIOHAZARD
THE CHILLING TRUE STORY OF THE LARGEST COVERT BIOLOGICAL WEAPONS PROGRAM IN THE WORLD —TOLD FROM INSIDE BY THE MAN WHO RAN IT
KEN ALIBEK
STEPHEN HANDELMAN

SOVIET BIOLOGICAL WARFARE INSTALLATIONS
SWEDEN
NORWAY
FINLAND
POLAND
ROMANIA
TURKEY
IRAQ
IRAN
AFGHANISTAN
CHINA
MONGOLIA
JAPAN
URAL MOUNTAINS
Moscow
Leningrad
Minsk
Kirishi
Zagorsk
Rostov
Kubinka
Pokrov
Gorkhovo
Vladimir
Lyubuchany
Obolensk
Kirov
Yoshkar-Ola
Penza
Omutninsk
Saratov
Shikhany
Volgograd
Sverdlovsk
Kurgan
Stepnogorsk
Novosibirsk
Berdsk
Aralsk
Nukus
Aral Sea
Tashkent
Otar
Almaty
Zima
Lake Baikal
Irkutsk
Vladivostok
Kamchatka
Sea of Okhotsk
Bering Sea
Kara Sea
Laptev Sea
East Siberian Sea
Black Sea
Caspian Sea
Persian Gulf
Lake Balkhash
Sea of Japan

DANGER ОПАСНО
BIOSAFETY LEVEL
4
УРОВЕНЬ БИОБЕЗОПАСНОСТИ

Globalsecurity.org

“Reports suggested that the Ebola virus was researched and weaponized by the former Soviet Union's biological weapons program Biopreparat. Dr. Ken Alibek, former the First Deputy Director of Biopreparat, speculated that the Russians had aerosolized the Ebola virus for dissemination as a biological weapon. The Japanese terrorist group Aum Shinrikyo reportedly sent members to Zaire during an outbreak to harvest the virus.”

Public confidence: Biosecurity focuses the public mind

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The Observer

Top-secret military warning on Ebola biological weapon terror threat

Porton Down memo marked 'UK secret UK eyes only' reveals scientists analysed use of virus by al-Qaida or Isis

Jamie Doward

Saturday 21 February 2015 15.05 EST

This article is 11 months old

Save for later

Healthcare workers tackle the Ebola outbreak in Sierra Leone. Photograph: Tanya Bindra/AP

Scientists at the top-secret military research unit at Porton Down, Wiltshire, have been assessing the potential use of Ebola as a bioterrorism weapon, according to confidential documents.

A three-page memo, marked 'UK secret UK eyes only', reveals that the unit, where chemical, radiological and biological threats are analysed, was tasked with evaluating whether terrorist organisations such as al-Qaida and Islamic State (Isis) could use the deadly virus to attack western targets.

The heavily redacted document, which has been released under the Freedom of Information Act, reveals that the unit was asked last October to provide "guidance on the feasibility and potential impact of a non-state actor exploiting the Ebola

Most popular in US

New Segway transforms into a cute robot companion when you're not riding it

Texas state trooper who arrested Sandra Bland indicted for perjury

Lemmy's funeral to be live streamed on YouTube

Public confidence: Biosecurity focuses the public mind

SCIENCE | THE STATE OF THE UNIVERSE. | OCT. 10 2014 11:39 AM

Slate

Ebola Is Not a Weapon

Conspiracy theories are highly contagious. Here's why they're wrong.

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By Nicholas G. Evans

Don't let this stock image of a mad scientist gaslight you. Ebola is not a bioweapon and never will be.

Photo by science photo/Shutterstock

Stop it. Just stop it. Ebola isn't a potential weapon for terrorists.

It isn't, as reported by *Forbes* and the *Daily Mail*, a **low-tech weapon of bioterror for ISIS.** It isn't the final refuge of a **lone wolf on a suicide mission**, in the words of Fox News. It isn't a U.S.-built race-targeting bioweapon, as **the leader of the Nation of Islam declared.**

Malevolence and Intent

Jihadi v. non-Jihadi killings in U.S. since 9/11

New America Foundation, December 2015

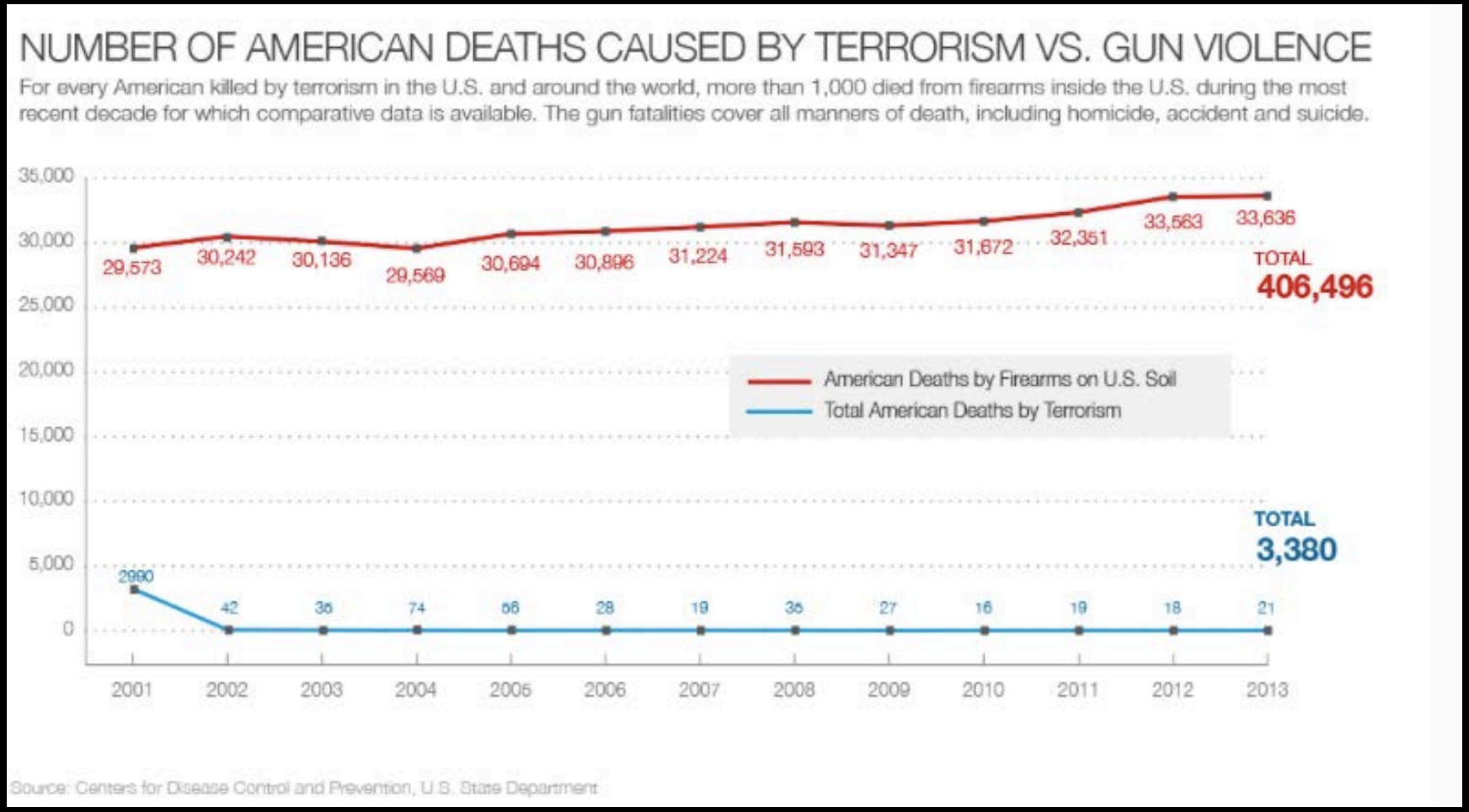
Total number of people killed: 45

Plot name	Persons killed
2015 San Bernardino Shooting	14
2015 Chattanooga, TN Military Shooting	5
2014 Washington and New Jersey Killing Spree	4
2014 Oklahoma Beheading	1
2013 Boston Marathon Bombing	4
2009 Little Rock Shooting	1
2009 Fort Hood Shooting	13
2006 Seattle Jewish Federation Shooting	1
2002 Los Angeles Airport Shooting	2

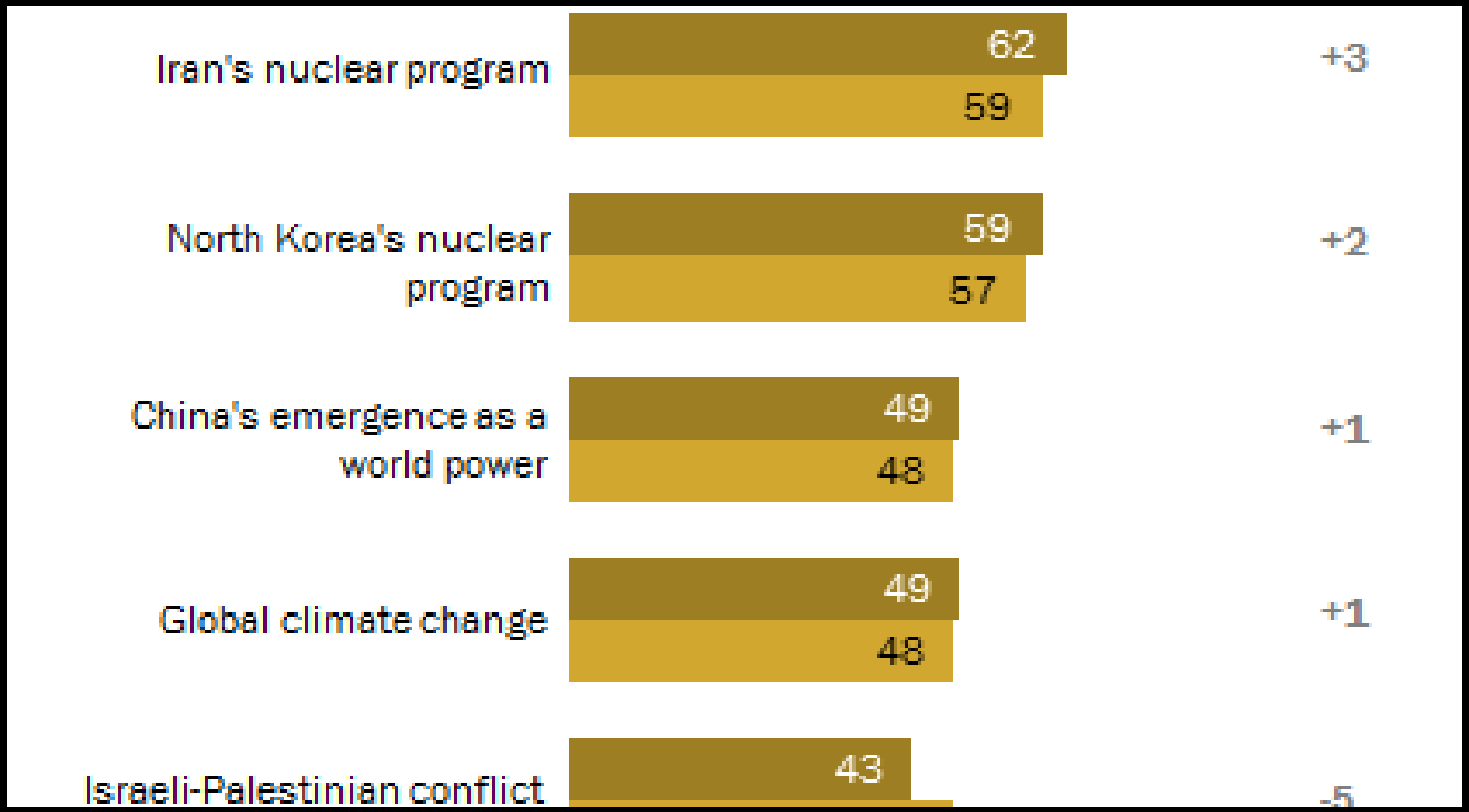
Total number of people killed: 48

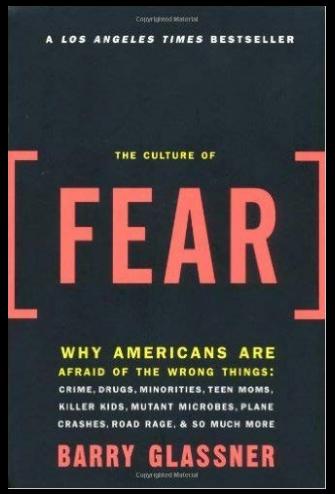
Plot name	Persons killed
2015 Colorado Planned Parenthood Shooting	3
2015 Charleston Church Shooting	9
2014 Las Vegas Police Ambush	3
2014 Kansas Jewish Center Shooting	3
2014 Blooming Grove Police Shooting	1
2012 Tri-State Killing Spree	4
2012 St. John's Parish Police Ambush	2
2012 Sikh Temple Shooting	6
2011 FEAR Militia	3
2010 Carlisle, PA Murder	1
2010 Austin, TX Plane Attack	1
2009 Pittsburgh Police Shootings	3
2009 Holocaust Museum Shooting	1
2009 George Tiller Assassination	1

Malevolence and Intent



Malevolence, terrorism and public confidence



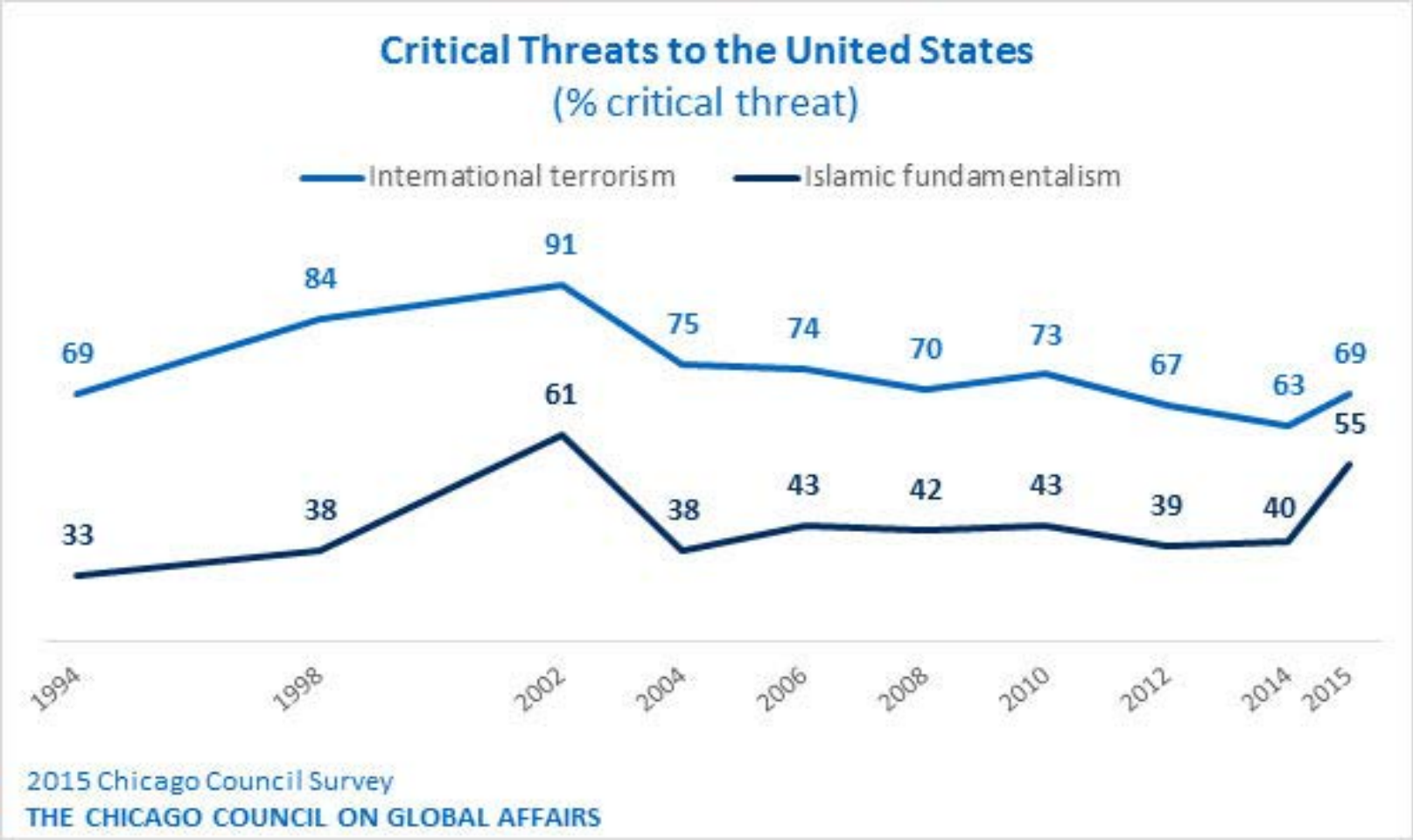


Rationality plays a very modest role in everyday risk assessment.

(see, e.g., B. Glassner, *The Culture of Fear*, 1999)

Terrorism fears are easily stimulated and provoke a loss of public confidence.

Malevolence, terrorism and public confidence



ISIS executes Head of Physics Department for refusing to develop bioweapons in Mosul

November 14, 2015 - 5:10 PM

Source : **IraqiNews** News Code : **719877**

A local source in Nineveh province said that ISIS has executed the head of the Department of Physics at the University of Mosul because of his refusal to develop biological weapons.

A local source in Nineveh province said that ISIS has executed the head of the Department of Physics at the University of Mosul because of his refusal to develop biological weapons.

The source said: "militants belonging to ISIS executed the president of the Department of Physics at the Faculty of Science in the University of Mosul," adding that, "the execution came on the back of his rejection to cooperate with the organization in the development of biological weapons, which ISIS is seeking to possess and use in the fighting against government forces."

The source, who requested to remain anonymous, noted: "The execution took place in a public square in the center of Nineveh," pointing out that, "the organization has handed over the body to the forensic medicine department."

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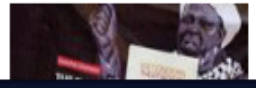
PICTORIAL

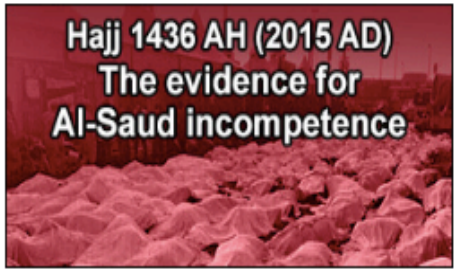
Photos: Imam Khamenei receives participants of Intl. Islamic Unity Confab

December 29, 2015 - 4:22 PM

Photos: ISIS executes Iraqi youth in Mosul

December 29, 2015 - 3:54 PM





LAST NEWS MOST NEWS CULTURAL

Grand Ayatollah Makarem Sent an Open Letter to Sheikh of al-Azhar Warning of Anti-Shia Activities

December 29, 2015 - 10:35 PM

Belgium police arrests two suspects over 'New Year plot

December 29, 2015 - 5:55 PM

Sheikh Zakzaky in good health condition: Nigerian cleric

Considering the importance of scientific freedom and the benefits of discovery for human well-being, concerns in the scientific community about alarmism with regard to what are often imponderable risks are reasonable.

Nonetheless, paraphrasing David Hume, the future only *tends* to resemble the past.

Compared to physicists and engineers, biologists are far less accustomed to scrutiny for low probability/high magnitude risks that may eventuate from their work.

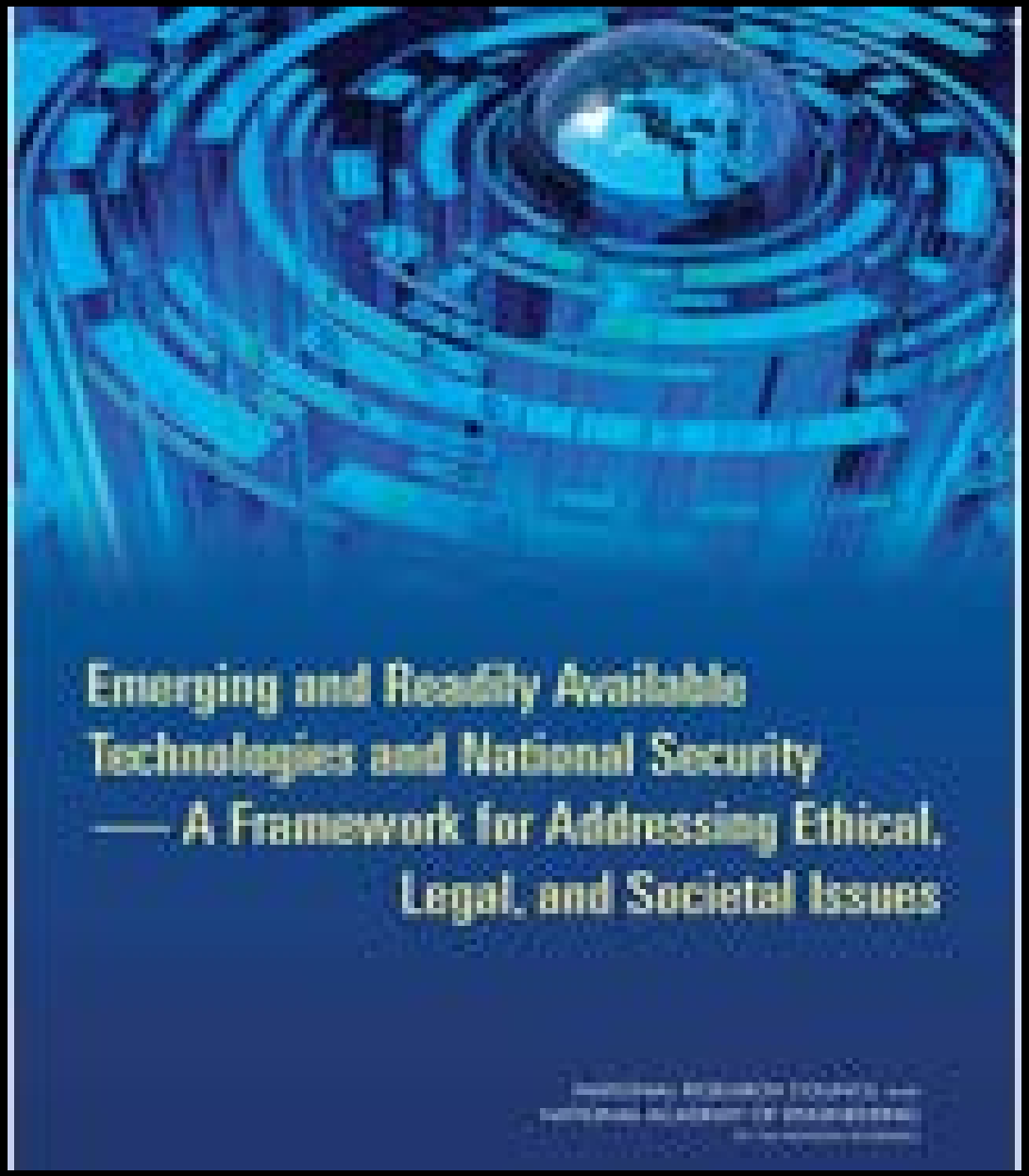
The Collingridge Dilemma

A methodological quandary in which efforts to influence or control the further development of technology face a double-bind problem:

- An information problem: impacts cannot be easily predicted until the technology is extensively developed and widely used.
- A power problem: control or change is difficult when the technology has become entrenched.

Report (2014) considered three “foundational technologies”: information technology, ***synthetic biology***, and neuroscience

“ERA technologies by their nature are associated with a very high degree of uncertainty about their future developmental paths, and thus a correspondingly broad range in the ethical, legal, and societal issues that are likely to emerge. Such breadth means that the ELSI concerns that may be associated with a given technology development are very hard to anticipate accurately at the start of that development.”



Biologic and Toxin Weapons Convention

Article I

Each State Party to this Convention undertakes never in any circumstances to **develop**, produce, stockpile or otherwise acquire or 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**;

Article III

Each State Party to this Convention undertakes **not to transfer to any recipient whatsoever**, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, toxins, weapons, equipment or means of delivery specified in article I of this Convention.

Article IV

Each State Party to this Convention shall, in accordance with its constitutional processes, take any necessary measures to **prohibit and prevent** the **development,** production, stockpiling, acquisition, or retention of the agents, toxins, weapons, equipment and means of delivery specified in article I of the Convention, within the territory of such State, under its jurisdiction or under its control anywhere.

Article V

The States Parties to this Convention undertake to **consult one another and to cooperate** in solving any problems which may arise in relation to the objective of, or in the application of the provisions of, the Convention. Consultation and Cooperation pursuant to this article may also be undertaken through appropriate international procedures within the framework of the United Nations and in accordance with its Charter.

“Experiments of Concern”

NAS, “Biotechnology Research in an Age of Terrorism”, 2004

- demonstrating how to render a vaccine ineffective
- conferring resistance to therapeutically useful antibiotics
- ***enhancing the virulence of a pathogen or rendering a non-pathogen virulent***
- ***increasing the transmissibility of a pathogen***
- ***altering the host range of a pathogen***
- enabling the evasion of diagnosis and/or detection by established methods
- synthesizing the genome of a pathogen

- GOF appears to fall under the heading of several of these “experiments of concern”
- BTWC requires strong justification for pathogen development using any means
- As a prima facie matter, intent of the NAS and of the BTWC states parties appears to include GOF