



The Challenge of Biological Terrorism:

When to "Cry Wolf", What to Cry, and
How to Cry It.

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I. When To “Cry Wolf”: The problem of risk assessment.





Post 9-11 “Events”

- *Oct. 2001 – Afghanistan:* U.S. forces destroyed cyanide, Botulinum and salmonella toxins, and possible Al Qa’ida anthrax production centers.
- *January 2003 – U.K.:* British arrest 13 in London, Bournemouth and Manchester, and find castor beans, traces of ricin, and equipment for making toxins.
- *Feb. 2003 – Washington, D.C.:* Ricin found in Senate Buildings
- *April 2004 – U.S.* reveals manuals on making and using ricin found in raids on terrorist groups in U.K., France, Spain, Russia, Georgia, and Northern Iraq



CIA Analysis of the Al Qa'ida and Terrorist Threat

- Al-Qa'ida and associated extremist groups have a wide variety of potential agents and delivery means to choose from for chemical, biological, radiological, or nuclear (CBRN) attacks.
- Al-Qa'ida's end goal is the use of CBRN to cause mass casualties; however, most attacks by the group—and especially by associated extremists—probably will be small scale, incorporating relatively crude delivery means and easily produced or obtained chemicals, toxins, or radiological substances.
- The success of any al-Qa'ida attack and the number of ensuing casualties would depend on many factors, including the technical expertise of those involved, but most scenarios could cause panic and disruption.
- The threat of terrorists using chemical, biological, radiological, and nuclear (CBRN) materials remains high.



- Many of the 33 designated foreign terrorist organizations and other nonstate actors worldwide have expressed interest in using CBRN;
- Although terrorist groups probably will continue to favor long-proven conventional tactics, such as bombings and shootings, the arrest of ricin plotters in London in January 2003 indicated that international Mujahideen terrorists were actively plotting to conduct chemical and biological attacks.
- Increased publicity surrounding the anthrax incidents since the September 11 attacks has highlighted the vulnerability of civilian and government targets to CBRN attacks.



Comparison of US Intelligence Estimates of Al-Qa'ida's Biological Weapons Capabilities

Before the War in Afghanistan:

- indicated that al-Qa'ida's members had trained in crude methods for producing biological agents such as botulinum toxin and toxins obtained from venomous animals.
- uncertain whether al-Qa'ida had managed to acquire a far more dangerous strain of agent
- judged that al-Qa'ida operatives had "probably" acquired at least a small quantity of this virulent strain and had plans to assemble devices to disperse the agent.
- believed that a facility to which the group had access provided the potential capability and expertise to produce biological agents, but had no evidence that the facility was being so used.
- assessed that al-Qa'ida was "highly unlikely" to have acquired two other dangerous biological agents, and had no credible reporting indicating it was attempting to do so.



After the War in Afghanistan:

- In fact, al-Qa'ida's biological program was further along, particularly with regard to Agent X, than pre-war intelligence indicated. The program was extensive, well-organized, and operated for two years before September 11, but intelligence insights into the program were limited. The program involved several sites in Afghanistan.
- Two of these sites contained commercial equipment and were operated by individuals with special training. Documents found indicated that while al-Qa'ida's primary interest was Agent X, the group had information obtained through the war in Afghanistan and in its aftermath indicated that al-Qa'ida's biological weapons program was further along than analysts had previously assessed.



After the War in Afghanistan:

- Reporting supports the hypothesis that al-Qa'ida had acquired several biological agents possibly as early as 1999, and had the necessary equipment to enable limited, basic production of Agent X. It considered acquiring a variety of other biological agents.
- Other reporting indicates that al-Qa'ida had succeeded in isolating cultures of Agent X. Nevertheless, outstanding questions remain about the extent of biological research and development in pre-war Afghanistan, including about the reliability of the reporting described above.



Capability-Based Threat Analysis

- The threat posed by bioterrorism cannot be analyzed simply in terms of what terrorists and states have already done.
- The potential capability of terrorists -- and states conducting covert, false flag, or proxy operations -- is also a key factor in assessing the terrorist threat.
- Dealing with a world where terrorists and extremist movements may exist in their original or mutated form for a matter of decades and in which ethnic, sectarian, and tribal conflicts are equally endemic, enduring, and prone to extremism.
- The past history of guerrilla wars is one that warns that terrorist groups, extremists, and no state actors may be able to establish considerable continuity and expertise.



Technical Challenges

- Technology and equipment is available to carry out far more lethal bioterrorist attacks than have been conducted to date -- particularly if a state should conduct covert terrorist attacks or use a terrorist group as a proxy.
- Attribution still has very serious limitations and attacks are all too possible where there could be no attribution, great ambiguity, a serious risk of deception or "false flags," or insufficient evidence to act with international support.
- Much still needs to be done in detection, particularly to create effective and reliable systems capable of any form of characterization without significant false alarms and mistakes..
- Even without state support, individuals and terrorist groups will have steadily better access to the equipment and facilities they need at steadily lower cost.



Key Challenges for Action: Improving the Quality of Incident and Scenario Analysis, Tracking Terrorists and Terrorist Activities

- End compartmentation of national analysis that artificially distinguishes between domestic and international terrorism, and attempts and successful incidents. Focus on high risk forms of terrorism and combine warning and analytic functions.
- Create hierarchies of intelligence to allow maximum sharing of data at the national and international level, and in a standardized and near real time form.
- Establish an international center(s) for tracking, characterizing, and analyzing terrorist incidents, terrorists, and terrorist activities.



- Create secure regional centers that can operate at high levels of classification and security for tracking, characterizing, and analyzing terrorist incidents, terrorists, and terrorist activities:
- Create a specialized element in such a center(s) for tracking and analyzing covert, and proxy biological and other forms of WMD attacks.
- Set international standards for incident reporting for both attempts and actual attacks.
- Provide maximum transparency for defender/responder use, media use, and public policy analysis.
- Examine Delphi and complexity theory methodologies.
- Do not concentrate rigidly on "bioterrorism," and analyze the risk of state action in the form of asymmetric warfare, covert attack, and proxy use of biological weapons.



II. What To Cry: The Problem of Intelligence





The Problem of Intelligence

- Tracking any form of biological warfare activity is extremely difficult, and these challenges are growing as nations and terrorists have more access to technology and dual use facilities and equipment.
- This is both an area where international cooperation could have great potential value and where it presents massive risks because intelligence collection is heavily-oriented towards human intelligence and sensitive sources and methods, and because it can be so useful to any state or group that can and desires to use such intelligence as a “cook book” for proliferating.



- At the same time, there has been little unclassified analysis of just how serious the problems in intelligence on biological weapons and bioterrorism are even for a power with all of the resources of the United States.
- This situation has changed. The report of the Presidential Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, issued on 31 March 2005 showed just how difficult a bioterrorist target like Al Qa'ida can be. At the same time, it provides equally important insights into many other types of problems and failures in the US effort to trace biological weapons developments in Iraq, Libya, and other proliferators.



New Transparency on the Problem

- Report of Commission of Intelligence Capabilities of the US Regarding Weapons of Mass Destruction (March 31, 2005) exposed massive problems in biological threat intelligence on Iraq, Libya, Al Qa'ida, and other Terrorist.
- Found could not characterize Iraqi and Libyan efforts.
- Failed to detect sophistication of the Al Qa'ida effort and its primary focus: "Agent X".
- Exposed basic limitations in indicators, collection capability, and vital need for coordinated efforts mixed with wide ranging mix of analysis and conclusions.
- Shows can only get major improvements through better HUMINT and MASINT. (*Measurement and signature intelligence*)
- Showed need for comprehensive and explicit reporting of uncertainty.



Commission Assessment of Intelligence

- Biological weapons collection woes result from both the technological limits of traditional collection methods and poorly focused collection process that is ill-equipped to gather and sort through information that could help alert the Community to crucial indicators of biological weapons activity.
- Gap in collection on the biological threat is largely attributable to the fact that the Community is simply not well configured to monitor the large stream of information.
- Intelligence must focus on doing a better job of collecting and connecting similar indicators of biological weapons personnel and activity in the future.
- Essential that the Community improves its access to and use of open source intelligence
- Must develop a basic understanding of the threat landscape. 17



Three Key Commission Recommendations

- “Tighter Intelligence Community coordination with the biological science community both inside government and out;
- Far more emphasis on integrated and aggressive intelligence targeting; and
- Stronger regulatory efforts to control potential biological weapons technologies, which would enable more intelligence collection than any go-it-alone effort by the Intelligence Community”



Key Challenges for Action: Improving Intelligence

- Create a “new kind of Counter Proliferation Center”
- Strengthen HUMINT and MASINT.
- Work with the Biological Science (and Delivery/ Weaponization) Community.
- DNI should use the Joint Intelligence Community Council to form a Biological Weapons Working Group.
- Intelligence Community needs a targeted, managed, and directed strategy for biological weapons intelligence.
- National Security Council should form a Joint Interagency Task Force to develop a counter-biological weapons plan that draws upon all elements of national power.



- Aggressively support foreign criminalization of biological weapons development and the establishment of biosafety and biosecurity regulations under the framework of the United Nations Security Council Resolution 1540
- Develop close relationships with foreign governments on the biological weapons issue will be imperative to better achieve its goals of monitoring and containing biological threats.
- The United States should remain actively engaged in designing and implementing both international and regulatory inspection regimes.



III. What To Cry: The Problem of Low Level Attack





The Problem of Low Level Attack

- Capability analysis has long shown that biological terrorism *can be* one of the four types of terrorism whose lethality justifies the term “weapons of mass destruction.”
- While massive uncertainties continue to affect estimates of lethality, and how easily given bioweapons can be produced and disseminated, every government that has seriously examined bioterrorism in terms of technical capability has concluded that it can produce high casualties, high levels of lethality, mass damage to food supplies, and/or massive economic costs.
- Like chemical and radiological terrorism, however, the previous chronology indicates that most real world biological terrorism may take the form of attacks where there is little real damage in terms of lethality and the main impact may be a mix of panic and expensive overreaction.



Key Challenges for Action: Improving the Response to Low-Level Attack

- Warning, intelligence, detection, defense, and response must be capable of dealing with low-level attempts and attacks, including a series of attacks that may not use the same agent.
- The modeling and analysis of bioterrorism and bioweapons must be parametric and explicitly model uncertainty.
- Governments must have clear plans to deal with public information and warning to counter panic, inform the media, and minimize economic impacts.
- National and international efforts are needed to establish suitable controls on equipment and supply sales and access to key facilities.
- Create suitable national and international legislation and law enforcement procedures to deal with low and high level threats.



- An international system for tracking individuals with special forms of expertise should at least be examined, as well as procedures for vetting and clearing workers and researchers.
- Education must take place in the real world capabilities and limits of bioterrorism before attacks occur.
- Create specialized elements to track and analyze the risk and effects of low-level attacks.
- Reexamine the risk of agricultural/food attacks.
- Reexamine local decontamination capabilities.



IV. What To Cry: Uncertainties in High-Level Attack





Uncertainties in High-Level Attack

- Fashionable to hold war games or simulations based on worst cases to dramatize the risks of covert, terrorist, or proxy attacks, and to model attacks at the scare level.
- In far too many cases, the lethality of given form of bioattack is based on uncertain criteria, and the modeling is weak, there is inadequate parametric analysis, and the analysis or simulation is based on mathematics and assumptions that are dubious.
- Need valid attack models on to base public policy. They need real-world capability studies, and not horror shows, and explicit models of uncertainty to prepare them for attacks that may be extremely difficult to characterize.
- At the broadest level, far more peer review and red teaming is needed of virtually every aspect of the analysis of high level attacks and of the ways such analysis is translated into guidance for planning.



Lethality

- In many cases, historical data are adapted with little real analysis, and no effort is made towards parametric modeling.
- Key agents all present major uncertainty problems:
 - *Anthrax*
 - *Smallpox*
 - *Plague*
 - *Other Lethality Issues: tularemia, glanders, melioidosis, and brucellosis. At least one country is known to have preferred to weaponize Dengue Fever over the previous agents.*
- Two other issues also merit attention.
 - *“Biological cocktails”*
 - *Character and “lethality” of available ways of attacking livestock and agriculture.*



Manufacture, Weaponization and Dissemination

- The lethality of a disease or toxin cannot be separated from the way in which it is manufactured, processed, weaponized, and disseminated.
- Every step in this chain can radically alter the real-world lethality and effect of such weapons.
- In the past, conventional wisdom indicated that manufacture, weaponization, and dissemination were technically difficult and required major resources.
- An examination of the unclassified literature on bioterrorism raises serious questions about just how much empirical research has actually been done on what terrorists can or cannot do in these areas, and what the kinds of states that might carry out covert or proxy attacks might do as well.



- The proliferation of bioweapons may be uncertain, but the proliferation of biotechnology is not. character.
- It seems possible that a comprehensive net technical assessment might show that the problems of manufacture, weaponization, and dissemination are being steadily reduced by the spread of biological facilities, dual-use equipment, and technical skills.



Technological Change and the “12 Monkey” Problem

- The National Intelligence Council notes in its study, **Mapping the Global Future: 2020**, that:

“Major advances in the biological sciences and information technology probably will accelerate the pace of BW agent development, increasing the potential for agents that are more difficult to detect or defend against. Through 2020, some countries will continue to try to develop chemical agents designed to circumvent the chemical weapons regime.”



The Impact of Genetic Engineering

- *Safer handling and deployment*, including the elimination of risks from accidents or misuse – the "boomerang effect".
- *Easier propagation and/or distribution* eliminating the need for a normally-hydrated bioagent or any use of aerosols. Microorganisms with enhanced aerosol and environmental stability.
- *Improved ability to target the host*, including the possible targeting of specific races or ethnic groups with given genetic characteristics.
- *Greater transmissivity and infectivity*: Engineering a disease like Ebola to be as communicable as measles. Microorganisms resistant to antibiotics, standard vaccines, and therapeutics.
- *New weapons*: Benign microorganisms, genetically altered to produce a toxin, venom, or bioregulator.



- *Increased problems in detection:* Immunologically altered microorganisms able to defeat standard identification, detection, and diagnostic methods. Problems in diagnosis, false diagnosis, lack of detection by existing detectors, long latency, binary initiation.
- *Greater toxicity, more difficult to treat:* Very high morbidity or mortality, resistant to known antibacterial or antiviral agents; defeats existing vaccines; produces symptoms designed to saturate available specialized medical treatment facilities.
- *Combinations of some or all of the above.*



New Types of Biological Weapons

- *Binary biological weapons* that use two safe to handle elements that can be assembled before use. This could be a virus and helper virus like Hepatitis D or a bacterial virulence plasmid like E. coli, plague, Anthrax, and dysentery.
- *Designer genes and life forms*, which could include synthetic genes and gene networks, synthetic viruses, and synthetic organisms. These weapons include DNA shuffling, synthetic forms of the flu – which killed more people in 1918 than died in all of World War I and which still kills about 30,000 Americans a year – and synthetic microorganisms.
- *"Gene therapy" weapons* that use transforming viruses or similar DNA vectors carrying Trojan horse genes (retrovirus, adenovirus, poxvirus, HSV-1). Such weapons can produce single individual (somatic cell) or inheritable (germline) changes. It can also remove immunities and wound healing capabilities.



- *Stealth viruses* can be transforming or conditionally inducible. They exploit the fact that humans normally carry a substantial viral load, and examples are the herpes virus, cytomegalovirus, Epstein-Barr, and SV40 contamination which are normally dormant or limited in infect but can be transformed into far more lethal diseases. They can be introduced over years and then used to blackmail a population.
- *Host-swapping diseases*: Viral parasites normally have narrow host ranges and develop an evolutionary equilibrium with their hosts. Disruption of this equilibrium normally produces no results, but it can be extremely lethal. Natural examples include AIDS, Hantavirus, Marburg, and Ebola. Tailoring the disruption for attack purposes can produce weapons that are extremely lethal and for which there is no treatment. A tailored disease like AIDS could combine serious initial lethality with crippling long-term effects lasting decades.



- *Designer diseases* involve using molecular biology to create the disease first and then constructing a pathogen to produce it. It could eliminate immunity, target normally dormant genes, or instruct cells to commit suicide. Apoptosis is programmed cell death, and specific apoptosis can be used to kill any mix of cells.



Key Challenges for Action: Improving the Response to High Level Attack

- Create reliable parametric models of lethality tied to different methods of manufacture, weaponization, dissemination and attack.
- National and international efforts are needed to create standardized and rigorous large-scale attack models for public policy and planning purposes.
- Net technical assessment is needed of the trends in the biological sciences, and in the dissemination of equipment and usable facilities.
- Better indicators and analysis is needed to aid national intelligence, warning, characterization tracking, and response systems.
- Options for international cooperation at the “fusion level needs serious examination.
- Modeling, simulation, and gaming of high level attacks, and defense and response needs to be extended to the international level.



V. How to Cry It: The Problem of Resources and Levels of Effort





The Problem of Resources and Levels of Effort

- Many countries have begun to respond to the threat of biological terrorism, as have international organization like the United Nations, the World Health Organization, and Interpol.
- Every country has taken a somewhat different approach, depending on part on its own approach to government, perceptions of the threat, and resources and capabilities.
- The practical problem is one of very different levels of resources, a lack of national expertise, and very different perceptions of the threat.
- The developed world is just beginning to develop national defense and response capabilities. In many cases in the developing world, there are both negligible surplus resources and negligible expertise, although such countries can and are be used by potential bioterrorist's.



The Practical Minimum

- Preparedness and Prevention
- Detection and Surveillance
- Diagnosis and Characterization of Biological and Chemical Agents
- Response



“Prudent Minimalism” or “Inglorious Excess:” The US as a Case Study

- US FY2006 budget request for homeland defense – including \$9.5 billion in spending by the Department of Defense but excluding state and locally funded expenditures – is \$49.9 billion.
- This is a \$3.9 billion increase over FY2005, and is higher than the total defense expenditures of Britain, France, or Germany. The Department of Homeland Security alone has a budget of \$27.3 billion.
- There is no precise way to distinguish US spending on the response and defense against bioterrorism



- CBACI estimates all federal programs relating to defense and response with some impact on biodefense rose from \$1.52 billion in FY2001, to \$6.4 billion in FY2002, to \$11.0 billion in FY2003, and \$11.9 billion in FY2004.
- A review of the US FY2005 and FY2006 budgets, including the annual impact of the \$5.6 billion the Congress appropriated for Project BioShield, creates a rough estimate that the current total -- using the same methodology as the CBACI -- might approach some \$14 billion.

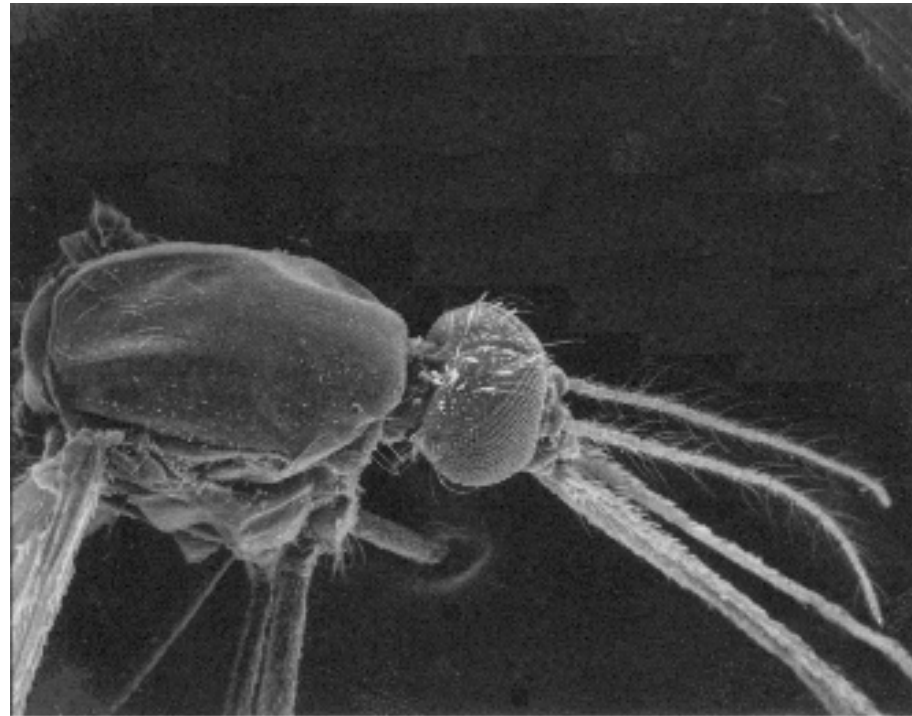


Finding the “Golden Mean:” Key Challenges for Action

- Move towards international cooperation in the areas listed earlier.
- Provide maximum transparency on national programs, including research and development, defense, and response efforts, and budgets.
- Create international and regional centers to coordinate key activities.
- Create international and regional centers to exchange data on methods of defense and response.
- Exchange data on methods of program management and measures of effectiveness.
- Create transparency in actual progress in creating international cooperation.
- Develop independent sources of comparative analysis of national and international programs, levels of effort, and strategies



VI. How to Cry It: The Threat from Man Versus the Threat from Nature





The Threat from Man versus the Threat From Nature

- *NIC: New and reemerging infectious diseases will pose a rising global health threat and will complicate US and global security over the next 20 years:* These diseases will endanger US citizens at home and abroad, threaten US armed forces deployed overseas, and exacerbate social and political instability in key countries and regions in which the United States has significant interests.
 - Infectious diseases are a leading cause of death, accounting for a quarter to a third of the estimated 54 million deaths worldwide in 1998. The spread of infectious diseases results as much from changes in human behavior--including lifestyles and land use patterns, increased trade and travel, and inappropriate use of antibiotic drugs--as from mutations in pathogens.



- Twenty well-known diseases--including tuberculosis (TB), malaria, and cholera--have reemerged or spread geographically since 1973, often in more virulent and drug-resistant forms.
- At least 30 previously unknown disease agents have been identified since 1973, including HIV, Ebola, hepatitis C, and Nipah virus, for which no cures are available.
- Of the seven biggest killers worldwide, TB, malaria, hepatitis, and, in particular, HIV/AIDS continue to surge, with HIV/AIDS and TB likely to account for the overwhelming majority of deaths from infectious diseases in developing countries by 2020. Acute lower respiratory infections--including pneumonia and influenza--as well as diarrheal diseases and measles, appear to have peaked at high incidence levels.
- WHO's analysis of major public health risks includes *Pneumonia, Diarrhoeal Diseases: AIDS: Tuberculosis: Malaria: Viral Hepatitis: Hospital-Acquired Infections: Leishmaniasis: Gonorrhoea: and Common Worms:*

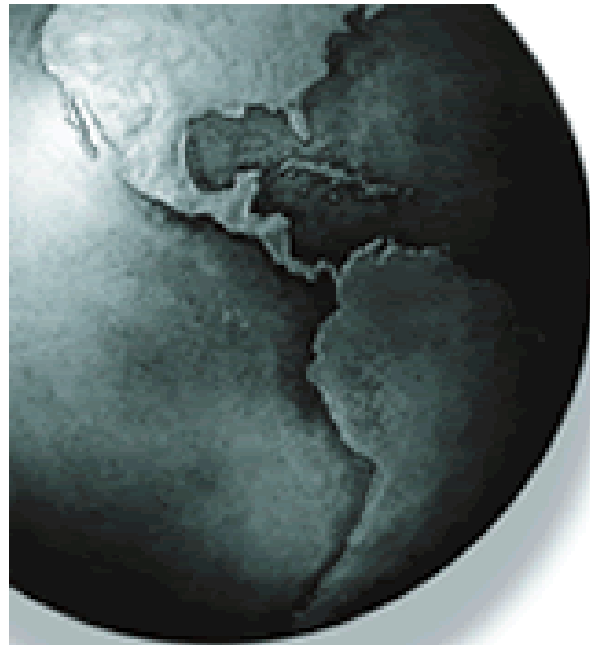


Key Challenges for Action: Integrating Bioterrorism and Public Health Activity

- Directly integrate planning for bioterrorism and natural disease (outbreak) warning RDT&E, defense and response.
- Create similar programs to deal with threats to agricultural and livestock.
- Provide as much transparency on national efforts as possible.
- Task the WHO with seeking international cooperation and creating a coordinated plan.
- Task the FAO with a similar role in dealing with threats to agriculture and livestock.
- Create international stockpiles of vaccines and medicines designed to deal with both bioterrorism and natural outbreaks and medical needs.



VII. When to “Cry Wolf,” What to Cry, and How to Cry It: The Challenge of International Cooperation





The Challenge of International Cooperation

- Serious real-world limits to the level of transparency that nations and international organizations can and should provide.
- Wrong kind of detail can provide both warning and aid to terrorists.
- Security difficult, and some nations are part of the problem and not the solution:
 - Iran, North Korea, Syria
 - Taiwan, China, South Korea, Pakistan, India, Israel?
 - Nth country?
 - Wild card?
- How do you regulate?
- How do you regulate without a cookbook?



Key Challenges for Action: Strengthening International Cooperation

- End the compartmentation of national analysis, planning, and programs that artificially distinguishes between domestic and international terrorism, and attempts and successful incidents. Focus on high risk forms of terrorism and combine warning and analytic functions.
- Create hierarchies of intelligence to allow maximum sharing of data at the national and international level, and in a standardized and near real time form.
- Establish an international center(s) for tracking, characterizing, and analyzing terrorist incidents, terrorists, and terrorist activities.
- Create secure regional centers that can operate at high levels of classification and security for tracking, characterizing, and analyzing terrorist incidents, terrorists, and terrorist activities:⁴⁹



- Create a specialized element in such a center(s) for tracking and analyzing covert, and proxy biological and other forms of WMD attacks.
- Set international standards for incident reporting for both attempts and actual attacks.
- International efforts are needed to establish suitable controls on equipment and supply sales and access to key facilities..
- Create suitable international legislation and law enforcement procedures to deal with low and high level threats.
- An international system for tracking individuals with special forms of expertise should at least be examined, as well as procedures for vetting and clearing workers and researchers.
- International efforts are needed to create standardized and rigorous large-scale attack models for public policy and planning purposes.



- Options for international cooperation at the “fusion level need serious examination; The WHO, FAO, and Interpol all have significant potential capabilities in these areas, and some progress is already being made in creating analytic and tracking capabilities in these organizations. More repaired and structured progress is needed, however, and some form of “fusion” or near-real time integration of their efforts may be required.
- Create international and regional centers to coordinate key activities.
- Create international and regional centers to exchange data on methods of defense and response:
- Task the WHO with seeking international cooperation and creating a coordinated plan for dealing with both bioterrorism and natural outbreaks/immunity problems.



- Task the FAO with a similar role in dealing with threats to agriculture and livestock.
- Create international stockpiles of vaccines and medicines designed to deal with both bioterrorism and natural outbreaks and medical needs.
- Create transparency in actual progress in creating international cooperation.
- Exchange data on methods of program management and measures of effectiveness.
- Develop independent sources of comparative analysis of national and international programs, levels of effort, and strategies:



Longer-Term Possibilities

- Biological Weapons Convention; Create an IAEA-like Body.
- Strengthen World Health Organization to Deal with both Bioterrorism and Outbreaks.
- Strengthen FAO to Deal with both Bioterrorism and Outbreaks.
- Create international and regional centers for cooperation; consider expanding Interpol or creating a new Interpol-like body.
- Add secure, near real time intelligence functions.



Thank You