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Title:	Global Biosurveillance: Enabling Science and Technology Workshop Background and Motivation: International Scientific Engagement for Global Security
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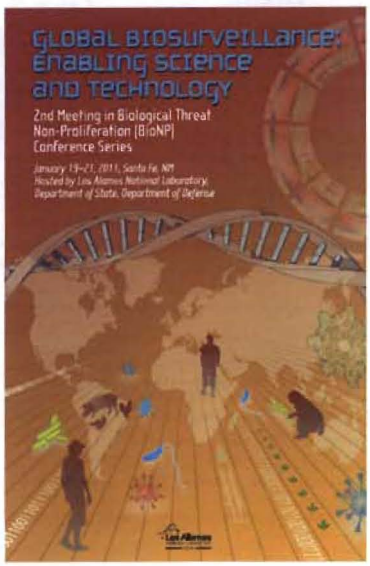


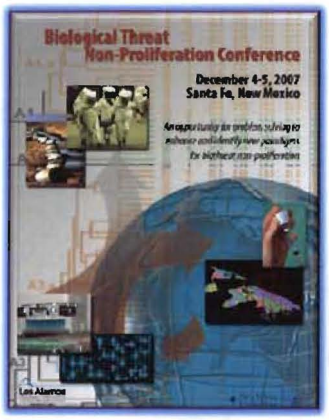
Global Biosurveillance: Enabling Science and Technology

Workshop Background and Motivation

International Scientific Engagement for Global Security

Helen Cui
Los Alamos National Laboratory
Jan 18-21, 2011, Santa Fe

First Biothreat Nonproliferation Conference December 2007



An opportunity for problem solving to enhance and identify new paradigms for biothreat nonproliferation

Moving Towards Integrated Comprehensive Global Biosurveillance

Biological Threat Defense Challenges

-- A 2007 view point

- Biological Weapons Convention
  - Confidence Building Measures, codes of conduct
  - No effective compliance verification
- Poorly Understood Threats:
  - Hostile States, terrorist groups, Individuals
  - Traditional, nontraditional; current, future
  - Malevolent intent, economically driven
  - Consequences on: human health, economy, political stability
  - Lack of knowledge and operational experience with the biothreat
- Sources of pathogens
  - Legal or illegal acquisition from existing facilities
  - Environmental isolation
  - Synthetic biology
- Knowledge and technologies
  - Mostly open, readily available, dual use
  - Modification of pathogen features and delivery routes
  - Information sharing, and information science
- Global Forces
  - Asymmetric threat environment
  - Information science/technology advances and information sharing
  - Intense pressure for technology development for societal needs could result in abrupt threat surprise
- Potential abrupt threat surprises resulting from Intense pressure for technology development for societal needs

What can we expect from counterproliferation and consequence management?

1st BioNP Conference Basics

- Three Day Meeting:
  - December 4-5, 2007, La Fonda Hotel, Santa Fe, 88 participants
  - December 6th, 2007, Los Alamos, 45 participants
- Sponsors:
  - LANL, Institute for Advanced Studies, New Mexico Consortium
- Participants:
  - Government: DOE, DOD (DARPA, DTRA), DOS, DHS (HHS, FEMA), DNI, FBI, etc
  - Academia, Institutes, National Labs, Industry, law firm, UK, Israel
  - Diverse disciplines, researchers and service providers
- Format:
  - Keynotes to frame the major challenges
  - Panel discussion format, introduced by topical speeches
  - By invitation, non-attribution forum, without press
  - A candid atmosphere emerged with energetic engagement

Key Topics for Conference Discussion

- Can the proliferation of biothreat agents be controlled at the source?
- How can efforts for nonproliferation and public health be leveraged?
- Can the international community construct an effective biothreat nonproliferation system?
- What is the research agenda needed to make that possible?

Conference Format

- Keynotes to frame the challenges
- Topical speeches to lead into panel discussions
- Panel Discussions:
  - Panel 1: Cross-walk of WMD Nonproliferation
  - Panel 2: Public Health and Biothreat Nonproliferation
  - Panel 3: Global Biosurveillance
  - Panel 4: Biosecurity and Information Transparency vs. Restriction
  - Panel 5: Science and Technology, Knowledge and Technology Gaps
  - Panel 6: Panel Discussion Synthesis
- Classified session for another level of detail and perspective

Topical Speeches

- How Open Source Information Enhances Terrorists' Motivation and Capability to Embark on Biological Warfare
- Infrastructure Simulation at Global Level (NISAC)
- Syndromic Surveillance for Early Detection of Bioterrorist Events - the Right Answer to the Wrong Question?
- High Throughput Laboratory Network
- 6 Case Studies in International Biological Threat Collaborations
- Synthetic Genomics – Options for Governance
- The Russian Biological Weapons Threat Today
- Exploring New Medical Biodefense Countermeasures from Host-Pathogen Relationships
- The tale of three recently emerged pathogens: anthrax, plague and tularemia

Panel 1 - Cross-walk of WMD Nonproliferation

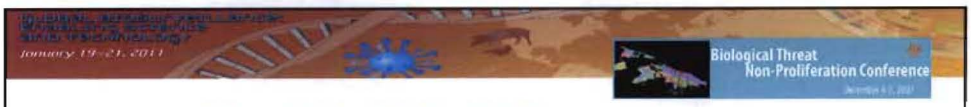
Potential Discussion Points:

- Understanding and characterizing threat space
- Nuclear NP and Biothreat NP: Commonalities and differences
- Dual use technologies, applications and restrictions
- Persistent surveillance, possibilities and obstacles
- What is verification and what is achievable
- Path forward for BWC and related international agreements

Panel 2 - Public Health and Biothreat Nonproliferation

Potential Discussion Topics:

- Strategic considerations to include policy and education for enhancing global public health and concomitant national security posture and stability of the US and US allies;
- Unusual and anomalous outbreak investigation, forensics and mitigation/containment through public health methodologies and technology insertion;
- The history of the FSU biological warfare program and what we have learned that is relevant to the future of global public health
- Leveraging nonproliferation and public health infrastructure and initiatives to include human capital.



Panel 3 – Global Biosurveillance

Potential Discussion Points:

- Current status and future of global biosurveillance capabilities
- As real time global biosurveillance develops, what are the ramifications for biothreat non-proliferation?
- Global biosurveillance in support of public health and biothreat reduction
- Specific signatures and indirect markers for global surveillance
- Monitoring facility, personnel, vaccination, etc

Panel 4 – Biosecurity and Information Transparency vs. Restriction

Potential Discussion Points:

- Information dissemination/publication, freedom vs. protection
- Education, material and information access in universities
- Code of conduct
- Biosecurity, physical protection
- Public and private sector collaboration

Panel 5 – Science and Technology, Knowledge and Technology Gaps

Potential Discussion Points:

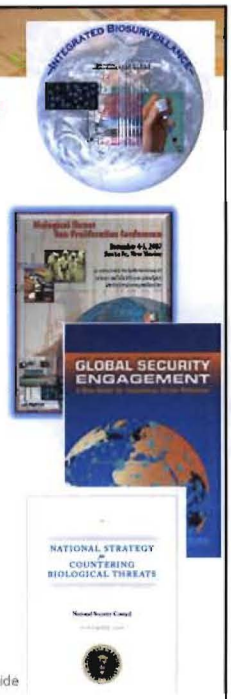
- What science and technology advances might change the detection game, making it more or less possible to detect biological weapon activities?
- Are we fooling ourselves regarding our capability for biothreat detection? What R&D is needed to quantity and verify the performance of detection systems?
- Can we anticipate techniques that make it possible to detect the phenotype, e.g. virulence, rather than library signatures based on genotype?
- What research is necessary to understand the practical possibilities, and threats posed, by bioengineering?
- How well do we understand disease dispersion and spread? Is the current modeling capability sufficient to draw operational conclusions? What R&D is needed to understand dispersion and spread better?
- How well do we understand the evolution of biological threats? What R&D is needed to understand it better?
- What anticipated S&T advances could make it possible to rapidly assess disease outbreaks, and assess whether they are unusual and/or intentional?

Panel 6 – Panel Discussion Synthesis

Potential Discussion Points:

- Lessons learned from WMD non-proliferation.
- What opportunities exist for leveraging public health and non-proliferation activities?
- Emerging global biosurveillance capabilities and potential impacts on non-proliferation.
- Information sharing and transparency – protect or proliferate
- What advances in science and technology are on the horizon and their effect on non-proliferation?
- What is the future of biothreat non-proliferation?

Summary of Key Messages from the 2007 Conference



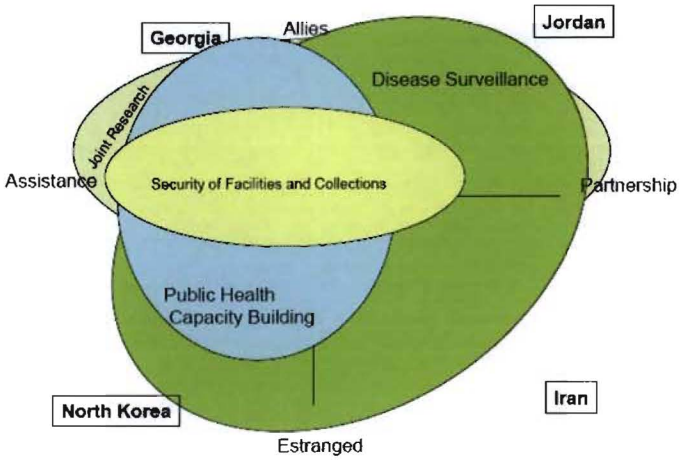
- Biological threat nonproliferation is a significant challenge, but must be pursued as part of an overall effective threat reduction strategy.
- Now is the time to rethink the challenges and seek sustainable, multi-purpose solutions to address the growing infectious disease threat. Host nations must see the value. Unusual disease outbreak investigation, vaccine design and early warning/response are common requirements for all nations.
- Global public health, medical, agricultural and environmental challenges provide unique leveraging points for BioNP.
- Global biosurveillance is an important approach for BioNP, but requires collaboration and information sharing at all levels, as well as significant investment in basic R&D and integration.
- Shift to global focus and enhanced Cooperative Threat Reduction and collaboration will provide important access and transparency.

Slide

PROTECT
National Strategies for Countering Biothreats

1. **Promote global health security**
   - Build global capacity for disease surveillance, detection, diagnosis, and reporting
   - Improve international capacity to fight infectious diseases
2. **Reinforce norms of safe and responsible conduct**
3. **Obtain timely and accurate insight on current and emerging risks**
4. **Take reasonable steps to reduce the potential for exploitation**
5. **Expand our capability to prevent, attribute, and apprehend**
6. **Communicate effectively with all stakeholders**
7. **Transform the international dialogue on biological threats**

Partnership Continuum in Biology (NAS Study)



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Why Global Biosurveillance?

- Rapid assessment of unusual disease outbreak
- Early warning of emerging, re-emerging and engineered biothreat enabling reduced morbidity and mortality
- Enhanced crop and livestock management
- Increase understanding of host-pathogen interactions and epidemiology
- Enhanced international transparency for infectious disease research supporting BWC goals
- Greater sharing of technology and knowledge to improve global health

International Collaboration

- International Engagement: Responsible Science for a Safe and Secure Society
- October 2010, Amman, Jordan
- AAAS & Jordan University of Science and Technology (Dr. Saied Jaradat)

International Collaboration

– Observations of Saied Jaradat

Engaging regional scientists in competitive research through teaming up with international research groups is essential for the following reasons:

- ... a great and fluid mechanism to force development of the regional scientific infrastructure to meet the international standards of biosafety practice.
- ... an opportunity for international committees to gain access to the available regional culture collection resources, including strains of pathogenic viruses and bacteria.
- Joint research projects should focus on biological samples with BioWeapons potential; their DNA and/or RNA sequence variation should be documented and available in the public domain...
- ... to publish their works in Peer-reviewed journals where scientists all over the world could see their research interests and work quality.
- ... regional scientists earned their degrees from highly reputable institutions in this country, their views towards science seems to change dramatically upon their returns home...

International Collaboration

– Observations Draft

- Significant energy exists for taking aggressive actions to enhance research and development and follow-on applications
- The global scientific enterprise is extremely energetic and competitive.
- Successful strategic training has provided a solid human resource base for the region.
- External consultations and investments have great potential for accelerating regional growth of technical infrastructure, scientific productivity and downstream regional societal impacts.
- Western universities and non-governmental organizations partnership is growing.
- Recent efforts to enhance biosafety/biosecurity in the region have made significant gains but continued focus is expand coverage.
- Communication between technical participants was very effective overall, which is foundational to overcoming many of the identified challenges and barriers .
- Future investment priorities should be guided by mutually established goals.
- Communications targeted at he public and officials could be a productive focus area for next workshop.

Moving Towards
Integrated Comprehensive Global Biosurveillance