

Improving Global Health, Strengthening Global Security

CONFERENCE REPORT

Prepared by the Staff of the Center for Biosecurity of UPMC

INTRODUCTION

Improving Global Health, Strengthening Global Security was held in Washington, DC, on November 22, 2010. With the support of the Alfred P. Sloan Foundation, the Center for Biosecurity of UPMC hosted this invitational meeting to bring together nearly 200 leaders from the federal government, the policy community, top think tanks, academia, and major media outlets.

The meeting focused on policies and programs important to improving global public health and to strengthening global security—efforts that collectively comprise global health security. Such efforts include international cooperation in support of the Biological Weapons

Convention (BWC) and the International Health Regulations (IHR); disease surveillance for outbreaks of international importance and

urgency; exchange of technical information and new pathogens for vaccine, medicine, and diagnostic development; and prevention, early warning, and control of serious animal disease outbreaks.

There is momentum on global health security both internationally and nationally, with many distinct programmatic activities across the U.S. government. However, there are comparatively few opportunities for leaders in the field to meet, share accomplishments, identify common challenges, and consider new approaches. This meeting provided one such opportunity.

This summary report provides a brief synopsis of panel discussions and individual presentations. We invite you to explore the conference website, where you will find videos of the day's discussions as well as the conference agenda, speaker bios, attendee list, and background readings.

— Gigi Kwik Gronvall, PhD, Senior Associate,
Center for Biosecurity of UPMC



Moderator

Gigi Gronvall
Senior Associate,
Center for Biosecurity
of UPMC

Conference Speakers

Donald S. Burke, Dean, UPitt Graduate School of Public Health; Director, Center for Vaccine Research

Ilaria Capua, Director, OIE/FAO International Reference Laboratory for Newcastle Disease and Avian Influenza and OIE Collaborating Center for Diseases at the Human-Animal Interface

Dennis Carroll, Director, Avian Influenza and Other Emerging Threats Programs, USAID

Scott F. Dowell, Director, Division of Global Disease Detection and Emergency Response, CDC

Keiji Fukuda, Assistant Director-General for Health Security and Environment, WHO

Marlo Libel, Control of Communicable Diseases Program, PAHO (former)

Piers Millett, Deputy Head, BWC Implementation Support Unit, UN Office of Disarmament Affairs, UN Office at Geneva

Christopher J. Park, Director, Biological Policy Staff, Bureau of International Security and Nonproliferation, U.S. State Dept.

Julie Pavlin, Director, Division of Epidemiology and Biostatistics, Uniformed Services University

James B. Petro, Director for Biological Threat Reduction and Counterterrorism Policy, White House WMD Coordinator's Office, National Security Council

Guénaél Rodier, Director, Communicable Diseases, Health Security and Environment, WHO, Regional Office for Europe

Mark Smolinski, Director, Global Health Threats, Skoll Global Threats Fund

Andrew Weber, Assistant to the Secretary of Defense for NCB Defense Programs

Center for Biosecurity Speakers & Moderators

Thomas V. Inglesby
Chief Executive Officer
and Director

Anita Cicero
Chief Operating Officer
and Deputy Director

Gigi Gronvall
Senior Associate

Jennifer Nuzzo
Senior Associate

D.A. Henderson
Distinguished Scholar

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Speaker: Thomas V. Inglesby Opening Remarks

Introductory Remarks by Thomas Inglesby, Director, Center for Biosecurity

Thomas Inglesby established the purpose of the conference: “to examine and exchange views on improving global health security.” He noted that this was a clear priority of the Obama Administration, calling attention to the National Strategy for Countering Biological Threats (December 2009), which identifies promoting global health security as the first objective of the strategy. Dr. Inglesby offered 3 points of reference to frame the day’s conversation.

First, the U.S. government has committed significant resources to improving global health. The primary effort

is through the \$63 billion Global Health Initiative, but the government is also funding biosurveillance programs and NIH and DoD projects to develop drugs, vaccines, and diagnostic tests for many global disease threats.

Second, Dr. Inglesby observed that building global health security depends on the cooperation and partnerships among governments, NGOs, and professionals around the world.

Third, there are great opportunities and difficult challenges for improving global health security planning and practices. Participants were encouraged to consider: How do we fulfill the extensive treaty commitments related to the IHR and the BWC? How do we strengthen international disease networks for surveillance and response in the long term? How do we determine which new technologies to use for disease surveillance? How can animal and human surveillance be brought together in ways that improve both? How can we address tensions between global health and national security? Discussion of these questions should drive policy and actions forward for building global health security.

Presentation by James B. Petro: Advancing Issues at the Health-Security Interface: A Policy Perspective

Note: At the request of the speaker, Dr. Petro’s talk was off the record.

modern convergence of health and security. Gigi Gronvall introduced both treaties as well as some of the more recent developments in the implementation of these agreements. She noted that although the 2 treaties are distinct, they have over time adopted complementary purposes and goals. The panelists addressed some of the accomplishments to date as well as the challenges facing effective implementation of these treaties.

Piers Millett noted that although the BWC has near-global coverage, with 163 members and 13 other politically bound countries, the treaty is an anomaly among regimes that seek weapons of mass destruction. The BWC, unlike other arms control treaties, lacks a verification regime, and verification of compliance with the BWC is especially difficult, according to Mr. Millett, because of the dual-use nature of the life sciences. To address these challenges, Mr. Millett called for a network-based approach involving multiple agencies and partners within governments. He noted that disease, whether deliberate, natural, or accidental, is still disease and that security resources can and should be used to improve global health. Nevertheless, biological weapons pose some unique challenges, such as response to an allegation of deliberate use of disease, which will be one of the topics of



Panel Discussion

Biological Weapons Convention and the International Health Regulations: Successes, Priorities, and Biggest Challenges Ahead

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Implementation of 2 historic international agreements, the Biological Weapons Convention (BWC) and the International Health Regulations (IHR), illustrates the

the 2011 BWC review conference. Mr. Millett encouraged building on common understandings and progress to date and establishing continuity of work in improving global biosurveillance and investing in global health between and within governments and international stakeholders.

Christopher J. Park signified that U.S. policy has embraced the relationship between the BWC and global health, noting that the BWC fits into the national strategy for promoting global health security, particularly for building other nations' capacity for disease surveillance and public health response to outbreaks. According to Mr. Park, bridges must continue to be built between the health and security communities, because in the event of a disease outbreak, it may not be clear whether the cause was deliberate, natural, or accidental. Experts on global health and on global security are recognizing the complementary goals of these 2 treaties. Mr. Park identified the growing dialogue and sharing of ideas between experts from the security and health sectors as one of the most important components of the links between the IHR and BWC communities.

The coming together of global public health with a range of other sectors, including economics, development, and foreign policy, is the result of necessity, according to Keiji Fukuda, who pointed to the Millennium Development Goals as an example of multiple sectors coming together for health and security goals. Dr. Fukuda put health in a broader context, observing that to address the most pressing issues of our time—climate change, emerging infectious disease, and health development—as well as issues driven by globalization, demographic shifts, and urbanization, will require that we look at health not simply as “health.” He warned, however, that in this group of complex issues, fragmentation of efforts could impede progress and raise distrust between security and public health sectors.

In a discussion of the merger of health and security issues, personnel, and resources, the panelists agreed that work remained to fully develop the health security concept. Mr. Park explained that while the issue has been intellectually developed, a great deal of effort will be required to bring about actual integration and coordination. The panelists discussed managing concerns about and sensitivities to mixing security with health issues, but Mr. Millett concluded that it is neither a new problem nor an intractable one.

Mr. Park and Dr. Fukuda agreed that there is a tension but that it can be managed and that health and security can benefit from working collaboratively. The relationships, however, must be based on trust and equity, and there must be value to the countries who participate in international agreements.



Speaker
Andrew Weber
 Assistant to the
 Secretary of Defense
 for NCB Defense
 Programs

Presentation by Andrew Weber: Building Global Health Capacity and Strengthening U.S. National Security

While the formal merger of health and security is a new and continually adjusting relationship, Andrew Weber noted that the Department of Defense (DoD) has had a long-standing interest in infectious disease. Its interest has traditionally been limited to a finite list of pathogens, but, in the wake of outbreaks of SARS, H5N1, and H1N1, DoD has broadened its scope to identify and treat all emerging diseases.

Mr. Weber emphasized that the threat of a biological attack from foreign entities is real, citing Al-Qaeda and Aum Shinrikyo's attempts to develop and use biological weapons.

To address both intentional and naturally occurring health threats, Mr. Weber described 4 main ways that DoD is working to advance health security: developing new diagnostics and medical countermeasures, expanding the Nunn-Lugar Cooperative Threat Reduction to sub-Saharan Africa and South Asia, operating overseas DoD laboratories, and supporting global biosurveillance. As an example, he spoke about his recent visit to East African biological laboratories and the dangers of poor security and biosafety in regions with known terrorist organizations, such as al-Shabab in East Africa. Because of the challenges associated with maintaining security in remote areas, Mr. Weber said that DoD is particularly interested in point of care diagnostic tests that can provide timely disease information for patient management and biosurveillance, but which do not require building large numbers of high-containment (BSL-3 or

BSL-4) biological laboratories, where stocks of disease-causing agents would be kept. He supported the development of an integrated international disease surveillance system and specifically called for the integration of veterinary disease surveillance and response capacity, endorsing a collaborative approach between global health and global security entities. The goals of health and security are not mutually exclusive, and a cooperative effort to secure biological risks and enhance biosurveillance has benefits for both sectors.



Presentation by Ilaria Capua: Managing the Influenza Matrix in Line with the “One Health Vision”

Ilaria Capua detailed the emergence of the H5N1 virus—a “game-changer”—which brought renewed public health and political interest to an animal disease that continues to be a severe threat to human health. H5N1 catalyzed increased animal surveillance, expanded basic research, and forged lasting partnerships between public health and veterinary agencies, most notably the Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), and the World Health Organization (WHO). Dr. Capua emphasized that understanding disease dynamics at the interface between humans and animals is of critical importance, as all influenza viruses, including every pandemic virus, have included an animal component.

In the spring of 2009, while the world’s attention was focused on H5N1 influenza viruses circulating in poultry in Southeast Asia, a virus that apparently originated in swine, subtype H1N1, emerged in Mexico. The 2009 H1N1 influenza virus was the first influenza virus on record to contain genetic material from both the eastern and western hemispheres.

The 2009 pandemic was instructive on multiple levels. First, given the surveillance tools available, the scientific community

was unable to predict where, when, or which viral subtype would cause the next pandemic. The virus’s preferred host range (age, ethnicity, etc) was also unknown. Although vaccine was produced as rapidly as possible, it became available only after the pandemic had peaked.

Dr. Capua’s “One Flu” initiative aims to improve our ability to predict which influenza viruses could potentially cause future pandemics. To this end, she proposed the following actions:

- Capitalize on the networks formed during the response to H5N1 and expand them to include a broader range of influenza viruses that could become medically relevant.
- Perform targeted surveillance in human and animal populations to better describe the range of circulating viruses.
- Create and maintain an influenza “observatory” that would house the genetic sequences of all known influenza viruses in circulation in a publicly accessible forum.



Panel Discussion: Multinational Disease Surveillance Networks: What Is Working and What Is Needed?

The panelists examined the value, accomplishments, and needs of multicountry disease surveillance networks and how they are helping to improve global health security. As background, Anita Cicero observed that disease surveillance has become an increasingly important component in global health security, and multinational disease surveillance networks have emerged to respond to disease outbreaks, which almost always affect more than one country. Ms. Cicero discussed the importance of these networks in sharing information and collaborating in response to disease outbreaks. As an example, she noted the Middle Eastern Consortium on Infectious Disease Surveillance, which, in spite of political tensions in the region, brings together health authorities from Israel, Jordan, and Palestine to share case reports, sponsor joint training exercises, and develop

common protocols for responding to disease outbreaks. The panelists highlighted their experiences with multicountry disease networks and the successes and challenges in cross-country collaborations.

Dennis Carroll discussed the transformational events that have altered public health over the past 10 years, refocusing efforts toward a “One Health” approach. Specifically, he highlighted serial outbreaks of zoonotic diseases, such as H5N1 and SARS, which underscore the importance of the relationship between human and animal health. Early detection of disease in animals and humans will help prevent human illness and death and will minimize economic losses. The threat of H5N1 in particular catalyzed a dynamic alliance between the animal and human health communities, as the long-term pressure of a possible outbreak pushed governments to attempt to prevent outbreaks of the disease. Surveillance of animal diseases is one way that public health is attempting to improve early warning of disease outbreaks, before they result in serious human health consequences.

Guénaél Rodier highlighted the importance of trust and communication in building effective disease surveillance networks. He emphasized the great diversity among disease surveillance networks with regard to the formality of relationships, diseases of interest, laboratory or field focus, and funding sources. The most important aspect of these disease surveillance networks, however, is that they work well for the countries they are in and facilitate relationships between technical experts. By building relationships at a technical level and gaining trust through shared experience, individuals are able to communicate in a time of crisis and all parties benefit. Dr. Rodier pointed to the 193 national focal points linked to the IHR as an example of a formal network that facilitates communication between countries and works well for collaborative investigation of disease. He concluded by encouraging support of emerging and diverse surveillance initiatives, involving the security sector, and investing in trained personnel.

Marlo Libel discussed the development of strong, multinational disease surveillance networks in the Americas for monitoring and responding to emerging diseases. As the surveillance networks grew, specialists gained an understanding of how other countries were performing disease surveillance and running laboratories. The networks in the Americas established

common protocols and strengthened the overall regional capacity, which was shared among partner countries. Dr. Libel explained that the sharing of information and collaborative response to diseases in South America prepared them well to work together for the requirements of the 2005 revisions to the IHR. To build sustainable networks over time, he highlighted the importance of integrating multinational disease surveillance networks into regional political, economic, and social structures such as MERCOSUR, UNASUR, and CARICOM.

In the Q&A session, D. A. Henderson explained the history of the transformation of weekly disease reports from all health units in American countries from smallpox to polio, measles, and other diseases of interest. A key component of sustainability and effectiveness of this surveillance effort was the connection between reporting disease information to an active response of outbreak containment teams.



Presentation by Scott F. Dowell: IHR Capacity Building—Simple Goals Can Drive Progress

Scott Dowell observed that common thinking alone between the security and public health sectors will not drive progress. The newly developed IHRs have a “revolutionary focus on transparency and on the definition of global public health concern,” but the IHRs have not made enough progress due to insufficient and inconsistent leadership. Dr. Dowell noted that member states must be the ones to take leadership roles to help serve the needs of less-developed countries.

Earlier in 2010, the White House convened a meeting to bring relevant federal agencies together to define their common goals and create a unified U.S. approach to build global IHR capacity. Four goals were identified from this meeting; they are in the process of being finalized and cleared and are expected to be released in early 2011.

Dr. Dowell described the 4 goals that the administration has developed, along with measurable targets for each:

Human Resources:

- Partner countries should have a work force plan with a broad range of expertise to combat epidemics.
- Countries should have at least 1 epidemiologist per 200,000 people.

Surveillance:

- Each member state should have 3 or more functioning surveillance systems that adhere to international surveillance standards (eg, Severe Acute Respiratory Illness surveillance, acute flaccid paralysis for polio, acute hemorrhagic fever surveillance).

Laboratory:

- Each member state should be able to do 10 core diagnostic tests in their labs to analyze samples from patients in any part of the country. Six will be standardized for all countries for diseases of international importance, and 4 will be chosen by individual country. The 6 tests of international importance are: PCR for influenza, HIV serology, poliovirus culture, TB microscopy, salmonella bacterial culture, and malaria rapid diagnostic testing. These tests cover a range of diagnostic capacity that could be applied to other diseases and in-country needs.

Response:

- Member states should have well-established response teams in each major administrative unit in the country. For example, rapid response teams were started in Thailand in 2004 to investigate and respond to the H5N1 outbreak. Many countries followed this model and trained to respond to routine outbreaks.

These goals are intended solely to encourage more coordinated efforts on the part of the U.S. government. They are not intended to discourage actions in other fields or to direct activities of WHO.



Panel Discussion: New Innovations for Surveillance: What Is Most Promising? What Can We Expect?

This panel discussed the technological advances for surveillance in the near future. Jennifer Nuzzo opened with 2 observations. First, the foundation of any surveillance system—the people involved in its operation—need better tools to help them recognize and respond to disease outbreaks. Second, the term *surveillance* actually describes a number of discrete processes, including the collection of disease data, the analysis of that data, follow-on investigation, and the initiation of a public health intervention. Ms. Nuzzo noted that separate tools are needed for each of these processes. The panelists discussed what existing and emerging technologies can potentially be used to support public health, laboratory, and clinical personnel in the investigation of and response to disease outbreaks.

Julie Pavlin discussed the utility of syndromic surveillance systems, or those that aim to detect disease transmission prior to definitive laboratory diagnosis. These systems work well in providing early warning in closed populations like the U.S. military, which has the data and resources to monitor symptoms of disease in patients and samples from across the world. Regarding new technologies, Dr. Pavlin expects the use of nano-microarrays, or diagnostic tests that can rapidly identify a range of pathogens, to increase dramatically in the near future, especially as the cost and technical barriers fall. A number of these microarray test kits are currently being used to detect pathogens such as malaria, West Nile virus, and brucellosis. Ideally, these systems would be used to provide surveillance information to both the clinical and public health sectors in near real time. Finally, Dr. Pavlin emphasized that, regardless of which surveillance technologies are employed in the future, they must have relevance to local health concerns in order to be sustainable.

Donald Burke focused on the state of serology as a diagnostic methodology. Serology, or the identification of either disease-specific antibodies or viral particles in blood, has played an important role in the diagnosis of a number of novel diseases, including HIV/AIDS, SARS, influenza, and other emerging zoonotic diseases. Despite its importance, Dr. Burke noted that investments and approaches to serology are still in the “dark ages”—the predominant technology is the hemagglutinin inhibition assay that was developed in the 1940s. Dr. Burke described an article he authored in 1997 about emerging infectious diseases, when he called for better understanding of coronaviruses. He wondered how the response to SARS would have changed with better knowledge about animals that are infected by coronaviruses and where the virus exists in nature. At the beginning of an outbreak, leaders will need information about a disease very quickly. Investments in serology can strengthen our understanding of the impact of different viruses and bacteria and aid in the response to outbreaks of emerging diseases.

Mark Smolinski discussed his work at Google.org to leverage the massive amounts of search engine data to improve influenza surveillance by examining internet search engine terms. Dr. Smolinski’s team found they could identify disease activity 2 weeks earlier than traditional community surveillance systems. This effort, called Google Flu Trends, is not a stand-alone surveillance system but complements traditional surveillance systems, and its applicability to other diseases is currently being examined. In the future, Dr. Smolinski envisioned using internet-based social networks to track disease progression at both the individual and community levels. There are also great opportunities to take advantage of the diffusion of cellular telephones in traditionally resource-poor settings. One telecommunications company they engaged provided free, bidirectional short message service (SMS) to health officials for reporting disease status and receiving treatment options. Dr. Smolinski noted this work is especially important because accurate accounting of the burden of disease is a prerequisite to improving treatments or diagnostic options.



Presentation by D. A. Henderson: Destruction of the Smallpox Virus?

D. A. Henderson offered his unique perspective as the leader of the smallpox eradication program, which successfully eradicated smallpox as a naturally occurring disease in 1977. Dr. Henderson reviewed the decisions, official actions, and controversy surrounding the proposed destruction of the remaining smallpox virus stocks in the State Research Centre of Virology and Biotechnology (Vector) in Russia and the Centers for Disease Control and Prevention (CDC) in the United States.

Laboratory accidents in the 1970s spurred a 1976 World Health Assembly recommendation for the destruction of smallpox virus stocks in laboratories around the world. Eventually, only 2 known laboratories remained with stocks of the virus. In 1980, WHO established an advisory committee to determine the need for and nature of any research to be conducted with the virus. Preservation of the genetic information of the virus had begun, and the Secretary of Health and Human Services announced in 1990 that the U.S. would destroy its stocks of the virus after the completion of the sequencing work, which occurred in January 1994. Support for the destruction of the virus was provided by a wide array of scientific groups, and the WHO advisory group recommended a witnessed destruction of the virus on June 30, 1995.

However, the United States and Russia blocked a vote on destruction of the virus, and in 1996 the World Health Assembly postponed the decision to a later date. Major discussions in 1999, 2002, 2005, and 2006 failed to yield a decision. Developing countries that bore the burden of the disease and contributed significant financial and human resources to the eradication of smallpox strongly support the destruction of the virus. A final vote is expected to occur at the World Health Assembly in 2011.

In 2010, an Institute of Medicine report was published documenting the research that would be lost if live variola virus

was destroyed. The report concluded that research on live smallpox virus could lead to development of new therapeutics with novel targets and a vaccine that produces no side effects. But Dr. Henderson emphasized that new developments in these areas would be difficult and costly. Furthermore, they may have little practical utility, particularly because the U.S. lacks a national strategic plan to respond to a biological attack of smallpox and distribute and dispense countermeasures.

Concluding Remarks by Thomas Inglesby

Thomas Inglesby closed by echoing the words of Secretary Hillary Clinton from August 2010 on why and how the U.S. government invests in global health: to strengthen fragile and failing states, promote social and economic progress, protect the nation's security, facilitate public diplomacy, and demonstrate our compassion. Dr. Inglesby noted that the policies and programs pertaining to global health security that were a part of the day's discussions reflect the broader goals described by Secretary Clinton.