

BIOLOGICAL



The Nature of the Threat: A Security Imperative and a Health Imperative

“**The threats arising from natural or deliberately induced disease outbreaks are as dangerous as those arising from nuclear terrorism or accidents.**”

An infectious disease pandemic has significant implications for the security of individuals, nations and the world as a result of death, riots and economic collapse – all of which can destabilize, cripple or topple governments. It is estimated that between 14 and 17 million people die from infectious diseases each year, and this already huge burden will be increased enormously in the event of a pandemic or a major bioterrorism incident. The problem is both a health and a security issue; the security lies in the effect, not the cause.

The threats arising from natural or deliberately induced disease outbreaks are as dangerous as those arising from nuclear terrorism or accidents. In both cases, we are at the crossroads of cooperation or catastrophe. The threat posed by biological agents is complex in nature and requires a break from traditional ways of thinking about prevention, deterrence, non-proliferation and response.

Biological threats can come from various and uncertain origins, and it is important that the full spectrum of biological threats be taken into account. Pathogens can be easily concealed and transported; many are found in nature, as well as in government, university and industry laboratories. Information on the production of biological weapons is increasingly available on the internet and in open scientific literature. There is also the risk of inadvertent release of pathogens, such as through laboratory accidents or research mishaps. Addressing these complex realities requires new approaches to define and implement enduring solutions.

Fortunately, many of the most effective steps for fighting biological attacks are also the very measures needed to fight infectious diseases. Whether a disease is naturally occurring or intentionally caused, the essential elements of effective disease control are to detect, diagnose and take timely measures to contain the spread.

To find solutions to the extraordinarily complex biological threat, NTI is pioneering new approaches that cut across traditional boundaries and challenge conventional approaches toward health and security.

Strategies for Threat Reduction

NTI works to reduce global biological threats through its Global Health and Security Initiative (GHSI).

GHSI focuses on two priority areas for action:

- ▶ Improving the global capacity for the prevention of and preparedness for biological threats through enhanced disease surveillance, early detection and response.
- ▶ Promoting the safe and secure practice of the biomedical sciences by safeguarding access to dangerous pathogens and preventing the misuse of technology and information.

Highlights of NTI's Global Health and Security Initiative for 2008 include: maintaining and expanding regional disease surveillance networks in the Middle East, Southeast Asia and Southern Africa; collaboration with partners, including the World Health Organization (WHO) and the Rockefeller Foundation, to connect operational and nascent disease surveillance networks around the globe in order to sustain and enhance their capabilities; and continued support for the International Council for the Life Sciences, an independent organization whose focus is promoting best practices worldwide in the biological sciences.

As part of its direct-action mission, GHSI has been working with its partners to build core capacities for the WHO's International Health Regulations (IHR), which provide a new global framework for coordination and communication during health emergencies of international concern, and require countries strengthen their existing capacities to detect, assess, notify and respond to disease threats. Establishing effective channels of communication and cooperation prior to an outbreak of disease or a bioterrorist attack is key to mitigation.



Laboratory technician examines specimens.

MIDDLE EAST CONSORTIUM ON INFECTIOUS DISEASE SURVEILLANCE (MECIDS)

The Middle East Consortium on Infectious Disease Surveillance (MECIDS), despite armed conflict and political tension, has continued to bring together public health leaders, academic institutions and private health care facilities in Jordan, Israel and the Palestinian Authority. NTI, initially working with Search for Common Ground, an organization that promotes conflict resolution, helped launch MECIDS in 2003. In January 2007, MECIDS became an independent consortium when an Executive Board was formed with Standard Operating Procedures, a business plan and a rotating Chairmanship. The Chairman of the Executive Board for 2008 was Dr. Adel Belbesi of Jordan. Dr. Assad Ramlawi of the Palestinian Authority is the 2009 Chairman.

Fortunately, MECIDS was functioning effectively when the first outbreak of avian flu was detected in the region, and the MECIDS partnership enabled rapid communication and coordination of efforts to help contain the impact and spread of the disease.

In addition to responding to emerging threats, MECIDS brings together officials from the ministries of health, doctors and scientists for regular cross-border information exchanges, laboratory and risk communications training, and regional scientific conferences.

In August 2008, MECIDS conducted a regional tabletop exercise in Istanbul, Turkey. This regional exercise was the culmination of a set of national exercises to test procedures and cross-border cooperation in response to the challenge of a human influenza pandemic. Key officials from the World Health Organization's headquarters and its European and Eastern Mediterranean offices participated. Observers from the Turkish Ministry of Health also attended.

Through GHSI, MECIDS has received financial support from the World Bank, the Bill & Melinda Gates Foundation and the UK Government, as well as in-kind support from IBM, which has contributed software, hardware and training, and Becton, Dickinson and Company, which has contributed laboratory and medical supplies. Key technical support has been provided by the World Health Organization, including training on the implementation of the International Health Regulations.

MEKONG BASIN DISEASE SURVEILLANCE NETWORK (MBDS)

The Mekong Basin Disease Surveillance Network (MBDS) brings together public health experts and academicians from Cambodia, Thailand, China (Yunnan and Guangxi Provinces), Vietnam, Myanmar and Laos to enhance cooperation in detecting and controlling infectious disease. NTI's Global Health and Security Initiative joined the effort in 2005 after initial support from the Rockefeller Foundation established MBDS in 1999.

MECIDS-IBM TECHNOLOGY WINS COMPUTERWORLD AWARD

In 2008, NTI's Global Health and Security Initiative, in collaboration with IBM and MECIDS, launched a unique technology to enhance data-sharing and minimize the impact of diseases throughout the region. The secure, Web-based portal system, the Public Health Information Affinity Domain (PHIAD), is currently being deployed in the Middle East through the MECIDS network.

This technology provides public health organizations with the right decision-making tools to implement timely, appropriate responses to infectious disease outbreaks – even across geographic and political boundaries. PHIAD uses near-real time information to facilitate fast response and enables the secure exchange of data on both national and international levels with appropriate protection of privacy at all levels.

By having a standards-based model of secure electronic information exchange that integrates public health reporting with the creation of clinical records, members can easily share and exchange key data to monitor and respond to potential outbreaks.

The PHIAD system will enhance the existing regional collaboration at several levels and allow health professionals to stay a step ahead of potentially dangerous disease outbreaks. The technology was recognized by the Computerworld Foundation's honors program in June 2008.

MEKONG BASIN NETWORK FACILITATES POST CYCLONE DISASTER EFFORT

The Mekong Basin Disease Surveillance Network (MBDS) facilitated a post-disaster relief effort in the aftermath of Cyclone Nargis in hard hit Myanmar in May 2008. A Rapid Response team made up of MBDS Thailand representatives participated in a 32-member medical team that assisted refugees in the Myuangmya region, approximately 46 miles from the hardest hit area of Laputta. The team was concerned about outbreaks of infectious respiratory diseases that, without immediate intervention, could spread to neighboring regions. This post-disaster relief effort may not have been mobilized or succeeded in its mission without the existing relationships and collaborative procedures formed through this trusted network.

The Google Foundation awarded a grant to NTI's Global Health and Security Initiative to improve laboratory diagnostic capabilities and train public health frontline workers in South-east Asia, with a focus on the Mekong Basin. GHSI also supports the strengthening of the governance of the network to enable MBDS member countries to work together as a regional network to reduce the burden of infectious disease for their populations. GHSI has created strong relationships with other partners working in the region, including Fondation Merieux.

In 2008, NTI joined with Fondation Merieux to award scholarships to veterinary and epidemiology professionals in Cambodia and Laos that will allow them to earn graduate degrees online while continuing to provide critical health care in their home countries. The two organizations partnered with the University of Edinburgh, United Kingdom to offer Master of Science degrees to improve the health security of the citizens of Laos and Cambodia. Developing in-country health security skills across medicine, veterinary medicine and environmental health and allied professions is a keystone in building capacity to combat the threat of disease outbreaks.

CONNECTING REGIONAL INFECTIOUS DISEASE SURVEILLANCE NETWORKS

In 2008, NTI's Global Health and Security Initiative, with support from The Rockefeller Foundation, began the implementation of a new effort to strengthen and connect regional disease surveillance networks, created at a meeting held in Bellagio, Italy in December 2007, with a plan to continue the activities of a global community of infectious disease surveillance practitioners.

The "Call for Action", a product of the Bellagio 2007 meeting, was launched in January 2008 at the Prince Mahidol Award Conference, a gathering of global leaders in public health held in Bangkok, Thailand. The Bellagio participants called on governments, international inter-governmental organizations and private foundations to provide financial and technical support to enhance and sustain the regional networks, and committed themselves to implement and carry forward a plan for action, in particular:

- ▶▶ To further strengthen national capacity and regional networks based on effective communication through electronic means, by regular meetings and joint projects;
- ▶▶ To promote and enhance the overall global capacity for infectious disease surveillance by connecting the regional networks into a global cooperative activity, including making the December 2007 Bellagio meeting an annual event;
- ▶▶ To develop and encourage collaboration between the human, animal and agricultural sectors to achieve a holistic approach to infectious disease surveillance; and,

- ▶▶ To promote the development of national capacities and new regional networks, particularly in Africa and South Asia.

Their efforts comprise a special focus on supporting nascent networks through shared best practices. With a select group of international experts to oversee the process, GHSI will be establishing working groups to develop strategies and materials for an international conference to be held in early 2010.

INTERNATIONAL COUNCIL FOR THE LIFE SCIENCES (ICLS)

NTI's Global Health and Security Initiative provides continued support for the work of the International Council on the Life Sciences (ICLS). The main purpose of ICLS is to enhance biological security and reduce biological weapons proliferation risks. To do that, ICLS is bringing together experts from around the world in the life sciences to identify critical biological risks to public safety and security, and to make sure that the extraordinary advances in biotechnology of recent decades benefit rather than harm society. ICLS is a membership organization. Among its key tasks are developing and promoting guidelines, best practices, codes of conduct and regulations to manage and reduce the risk that biological science, accidentally or intentionally, might cause harm to human beings, the environment or the economy.

ICLS has taken a regional approach in establishing sustainable groups of experts from governments, academia and private industry. In partnership with the I.M. Sechenov Moscow Medical Academy and NP-TEMPO (a grouping of 17 Russian life science laboratories), ICLS has established a standing International Advisory Group to promote best practices and standards in Russia and Central Asia. Similarly in the Middle East and North Africa region, following a regional conference in Abu Dhabi in November 2007, a core group was set up that has developed a framework for a regional biosafety and biosecurity strategy. This framework will be carried further at the Biosafety and Biosecurity International Conference 2009 (BBIC-09) in Morocco in April.

In the global arena, ICLS has brought private sector CEOs into inter-governmental discussions on the Biological and Toxin Weapons Convention and supported the UN Secretary General's biotechnology initiative.

In addition to NTI's support, ICLS has received support from the Alfred P. Sloan Foundation, the Canadian and U.K. Governments, the John D. and Catherine T. MacArthur Foundation, and the Robert and Ardis James Foundation.



**Dr. Moe Ko Do,
MBDS Regional
Coordinator, Thailand
and Dr. Louise
Gresham, GHSI.**

STRENGTHENING GLOBAL DISEASE SURVEILLANCE

Middle East Consortium on Infectious Disease Surveillance

To improve regional capacity for infectious disease surveillance in the Middle East by developing a food-borne and water-borne disease surveillance system uniting Israel, the Palestinian Authority and Jordan, and by designing an infectious disease epidemiology course to build regional rapid response capabilities in the event of disease outbreaks. Financial support is provided by the World Bank, Gates Foundation and the United Kingdom Foreign and Commonwealth Office.
NTI and others
\$2,204,000
2002-2009

Rapid Outbreak Response Revolving Fund

To create within the World Health Organization an account dedicated to supporting rapid emergency response to infectious disease outbreaks.
World Health Organization
Geneva, Switzerland
\$500,000
2003-2008

Strengthening National Health Preparedness

To assess preparedness for biological and chemical attacks in several nations by establishing and testing a set of international guidelines for preparedness, comparing them against existing public health capabilities that states have in place and making recommendations for improving those capabilities.
World Health Organization
Geneva, Switzerland
\$400,000
2004-2009

Biological Weapons Threat Reduction: Expanding Outbreak Reporting and Education in the New Independent States

To reduce the threat of biological weapons and other emerging infectious diseases in the New Independent States, the International Society for Infectious Diseases will expand the scope of a Russian language-based electronic network (PROMED) that rapidly disseminates information about outbreaks of infectious diseases, including potential biological weapons attacks, to include more physicians, scientists and public health officials throughout the New Independent States.
International Society for Infectious Diseases
Brookline, MA, USA
\$320,475
2005-2008

Developing Diagnostic Kits for Select Biological Agents

To develop rapid diagnostic tests for select biological agents of most significance to Russia, to introduce them to health-care practices and to organize manufacturing of such tests. Once developed, these tests could help fill a critical global need for better diagnostic tests for the detection of infectious diseases.
Moscow State Central Research Institute for Epidemiology of the Health
Ministry of Russia
Moscow, Russia
\$300,000
2005-2008

Creating a Regional Disease Surveillance System in South Asia

To develop a regional disease surveillance network that would initially bring together India, Pakistan and Bangladesh.
Up to \$275,000
2005-2008

Improving Biological Threat Detection and Surveillance in Russia

To convene Russian and international disease control experts in arriving at a consensus on a direct action project to improve the early detection and surveillance of biological threats in Russia.
\$75,000
2006-2008

Joint Training on Laboratory Biosecurity and Biosafety in Egypt

To support a workshop to raise awareness of the threat of bioterrorism and the need for safe and secure handling of dangerous biological materials in bioscience facilities.
Academy of Scientific Research and Technology
Cairo, Egypt
\$70,000
2006-2008

Enhancing the Mekong Basin Disease Surveillance Network (MBDS)

To strengthen national and sub-regional disease surveillance capacity in the Mekong Basin area (Cambodia, China, Laos, Myanmar, Thailand, and Vietnam) by developing human resource and laboratory capacity that operates across borders, responds quickly to regional disease threats, and works to create equity in the national capacities to detect and respond to local outbreaks, and, hence, prevent regional or even global emergencies. Financial support is provided by Google.org.
\$2,500,000
2008-2009

Pandemic Influenza Simulation Exercises in Southeast Asia

To strengthen national and sub-regional disease surveillance capacity in the Mekong Basin area (Thailand, Vietnam, Cambodia, Laos, Myanmar, and China-Yunnan province), and develop a system that operates across borders, responds quickly to regional disease threats, and works to create equity in the national capacities to detect and respond to local outbreaks, and, hence, prevent regional or even global emergencies.
NTI and others
\$610,000
2006-2008

Connecting Regional Infectious Disease Surveillance Networks, Bellagio

To strengthen and create new regional disease surveillance networks by bringing together representatives from infectious disease surveillance networks in Africa, the Americas, Europe and the Middle East in Bellagio, Italy, to share best practices and lessons learned. Financial support is provided by the Rockefeller Foundation.
Up to \$120,000
2007-2008

Connecting Health Organizations for Regional Disease Surveillance (CHORDS)

To implement the Bellagio Call for Action and continue the activities of a global community of infectious disease surveillance practice created by the December 2007 Bellagio meeting. With a select group of international experts to oversee the process, GHSI will establish working groups to develop strategies and materials for an international conference to be held in early 2010. Financial support is provided by the Rockefeller Foundation.
\$250,000
2008-2010

Control of Drug Resistant Tuberculosis in North Korea

To develop a professional exchange with health specialists in North Korea and build capacity for control of drug resistant tuberculosis.
NTI and others
\$300,000
2007-2010

Rapid Response Teams to Myanmar for Post-Cyclone Relief

To provide financial support to the Mekong Basin Disease Surveillance Network (MBDS) to assist in the deployment of Rapid Response Teams to Myanmar in the aftermath of Cyclone Nargis by covering the costs for transportation to/from Myanmar, communication, and translators.
\$30,000
2008

Southern African Centre for Infectious Disease Surveillance

To assist in the development of a consortium that enhances the Southern Africa region's capacity for the detection, identification and monitoring of infectious diseases and thereby contribute to enhancing national capacities of countries in the region for the surveillance of infectious diseases, including emerging and previously unknown diseases. Develop a Secretariat and governance structure for the Southern African Centre for Infectious Disease Surveillance (SACIDS). Initially, the consortium members include academic and research medical and veterinary institutions of the Democratic Republic of Congo, Mozambique, Tanzania, South Africa and Zambia. Financial support is provided by Google.org.
NTI and others
\$500,000
2008-2009

PROMOTING SAFE AND SECURE SCIENCE

AAAS-NTI Fellowship in Global Security

To strengthen scientific expertise in national security policymaking and encourage scientists to pursue careers in this arena, by supporting biomedical/public health experts to work on national security issues in the U.S. government through a one-year fellowship.
American Association for the Advancement of Science
Washington, DC, USA
\$1,261,763
2001-2008

Brucellosis Vaccine Research

To develop a new vaccine, employing former Soviet bioweapons scientists, to contribute to the management of this disease that threatens domestic and wild animal populations around the world.
All-Russian Research Veterinary Institute
Kazan, Russia;
International Science and Technology Center
Moscow, Russia (in conjunction with the U.S. Department of State)
\$600,000
2003-2008

Educating and Training the International Life Sciences Community on Dual-Use Dangers

To assess the best methods for educating and training life scientists about the risks of dual-use technologies and research and to cultivate a project for curriculum development in this area.
Up to \$50,000
2005-2008

Employing Former Bioweapons Scientists in Russia to Manufacture Diagnostic Enzymes for Endemic Infectious Disease Threats

To redirect former bioweapons scientists who were at risk of unemployment due to ongoing bankruptcy procedures at the State Research Center for Applied Microbiology and Biotechnology (SRCAM) Obolensk, by providing them with alternative, long-term employment relevant to their scientific expertise.
SRCAM
Obolensk, Moscow Region, Russia
\$400,000
2005-2008

International Council for the Life Sciences

To support and sustain an organization to promote best practices and standards for biosafety and biosecurity among the Life Sciences Community to reduce potential proliferation of dangerous pathogens and the misuse of technical information.
International Council for the Life Sciences
Washington, DC, USA
\$547,150
2005-2009

Regional Training Centers for Biological Safety and Security Threats

To develop a comprehensive strategy for establishing regional training centers for biological safety and security in the Middle East/Gulf/North Africa region and eventually in South and South East Asia. The centers will offer life scientists and laboratory staff on-site technical training in the highest biosafety and biosecurity standards and practices, tailored specifically to their work and regional concerns.
NTI and others
\$120,000
2007-2009

Regional Reference Laboratory for Viral Hepatitis

To set up a reference laboratory at the facilities of the State Research Center of Virology and Biotechnology (VECTOR) that will meet all national and international requirements and regulations for diagnostic work involving the use of molecular biological methods.
VECTOR
Koltsovo, Novosibirsk Oblast, Russia
\$325,500
2007-2009