

BIOLOGICAL

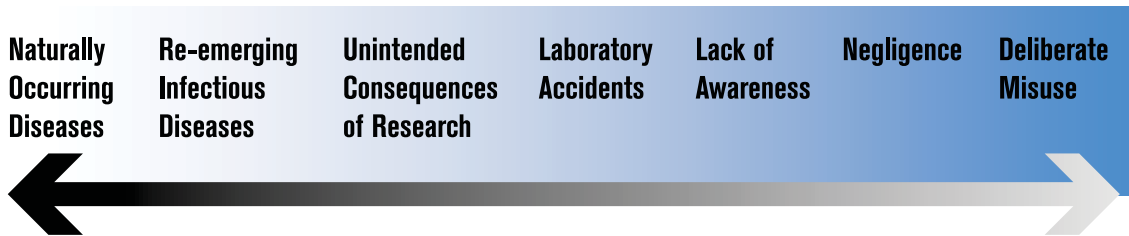
THE NATURE OF THE THREAT

Understanding and combating biological risks pose challenges that are encountered with no other conventional or unconventional threat to health and security.

For example, the fact that a biological attack has occurred may be far from obvious. An attack with a biological weapon may produce an infectious disease epidemic that would sicken and kill large numbers of people over a period of several days. Yet on the first day of the outbreak, there would be no way to know whether the outbreak was caused by a deliberate attack or a naturally occurring disease.

In the absence of an announcement by the attacker or a fortuitous discovery, authorities might well be unaware for days or weeks that an attack has occurred, until patients started to appear in emergency rooms with an unusual or inexplicable illness.

That's why NTI's Global Health and Security Initiative emphasizes that both health and security leaders around the world must be prepared, in an integrated way, to respond to the full spectrum of biological threats.



That spectrum includes:

- 8 naturally occurring diseases—these too can be destabilizing if an epidemic is severe enough;
- 8 inadvertent release of pathogens, such as through laboratory accidents or research oversights;
- 8 deliberate misuse of a biological agent to inflict harm—that is, a biological attack.

Test tubes with plague samples.

Fortunately, many of the measures needed to respond to natural infectious disease outbreaks are also a major part of the response to a biological attack. The essential elements

PROMOTING BEST PRACTICES: THE INTERNATIONAL COUNCIL ON THE LIFE SCIENCES

As part of its mission to safeguard access to pathogens and prevent the misuse of biomedical technology and information, NTI's Global Health and Security Initiative played a major role in launching the International Council for the Life Sciences (ICLS) in late 2005.

ICLS is working to enhance biological security and reduce biological weapons proliferation risks by bringing together experts from around the world in the public and private sectors of the life science community to identify critical biological risks to public safety and security, and to help ensure that the extraordinary advances in biotechnology over the past decade that are bringing great benefits to society are not misused to cause harm. 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 held a number of international meetings, such as seminars for experts from the G8 countries in Moscow in 2006 and 2007 cosponsored by the I.M. Sechenov Moscow Medical Academy and NP-TEMPO to cooperatively enhance biological security and safety; a conference in Abu Dhabi, UAE in November 2007 for the Gulf, Middle East and North African region to develop a sustainable network to deal with the critical issues of biosafety and biosecurity, and plans to hold a biological risk assessment seminar in London in June 2008.

In addition to NTI's support, ICLS has been supported by the Alfred P. Sloan Foundation, the Bioindustry Initiative (U.S. Department of State), the Global Opportunities Fund (UK Government), the Global Partnership Fund (Foreign Affairs Canada), the John D. and Catherine T. MacArthur Foundation and the Robert and Ardis James Foundation.

of an effective response are early detection and identification of the disease to enable a rapid response to contain the disease and treat the victims.

Biological weapons pose a number of additional challenges that distinguish them from other security threats. They can be relatively easy to produce and less expensive than other weapons that can cause large-scale casualties such as chemical or nuclear weapons. Potentially they can inflict large numbers of casualties with a small quantity of material. Pathogens can be easily concealed and transported; many are found in nature, as well as in government, university and industry laboratories. And information on techniques for the manufacture and delivery of the simpler biological weapons is increasingly available on the internet and in the open scientific literature.

Beyond that lies the vexing question of misuse. That is, the same laboratories, technologies and materials that are used for medical research or to produce pharmaceuticals can also be misused by terrorists or governments to make biological weapons. It is difficult to distinguish biological weapons activities from legitimate work. The essence of the problem lies in people and knowledge and, to a lesser extent, in equipment and facilities.

The Biological and Toxin Weapons Convention of 1972, which has been ratified by 155 states, prohibits the production or acqui-

sition of biological weapons. It has not proved possible to develop an effective verification mechanism and, in any case, the Convention is unlikely to constrain a terrorist group.

To find solutions to the extraordinarily complex biological threat, NTI has engaged in new kinds of thinking and organizing that cut across traditional bureaucratic and political boundaries.

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:

- 8 Improving the global capacity for enhanced disease surveillance, in particular on early detection and identification that will enable effective responses to disease outbreaks, whatever their origin.
- 8 Promoting the safe and secure practice of the biomedical sciences.

Highlights of NTI's biological program for 2007 include: advancing the development of the International Council for the Life Sciences, an independent organization whose focus is promoting best practices worldwide in the biological sciences and significant progress toward advancing regional disease surveillance networks in the Middle East and Southeast Asia. Effective global disease surveillance, early detection and response capabilities are the fundamental building blocks of preparedness against infectious disease threats—whether those occur naturally or result from bioterrorism or illegal state weapons. For word of an outbreak to spread effectively among affected countries and regions, channels of communication and cooperation must be established before the outbreak occurs.

That's why NTI and the Global Health and Security Initiative have devoted considerable energy to developing regional networks that strengthen rapid detection, investigation and communication and enable an early and effective response. In two critical regions—the Middle East and Southeast Asia—NTI projects are serving as models for regional cooperation that can be replicated in other areas of the world.



Laboratory technician handling hazardous material.



[top and center] **Photos by GHSI staff during trips to assess laboratory capacity and public health infrastructure in Southeast Asia.**

[bottom] **Leaders from the Thailand Ministry of Health participated in a meeting to discuss ways to enhance the quality of disease surveillance networks around the world.**

The **Middle East Consortium on Infectious Disease Surveillance (MECIDS)** brings together key people from the public health sector in Israel, Jordan and the Palestinian Authority. (see opposite page).

Similarly, the **Mekong Basin Disease Surveillance Network (MBDS)** brings together public health experts from Cambodia, China, Vietnam, Laos, Myanmar and Thailand to enhance cooperation in dealing with infectious diseases. MBDS was established in 1999 with support from the Rockefeller Foundation, and NTI's Global Health and Security Initiative joined this effort in 2005.

In March 2007, the Global Health and Security Initiative, together with the Rockefeller Foundation, brought together MBDS members to participate in a regional table-top exercise to test responses to a hypothetical pandemic influenza emergency. Officials from the six countries—including the ministries of health, foreign affairs, agriculture, tourism and security—as well as U.N. agency officials and specialists participated in the two-day exercise. A team of RAND Corporation public health specialists helped plan and support the exercise. The event was the first time that MBDS countries joined forces in a regional exercise that highlighted the need for a rapid and coordinated regional response. This regional effort drew on the experience of national exercises conducted by each of the six partners. These exercises were also conducted with support from the Global Health and Security Initiative.

Another significant step in the effort to strengthen and create new regional disease surveillance networks came in December 2007. With support from the Rockefeller Foundation, the Global Health and Security Initiative brought 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. Leading experts in infectious disease surveillance from the World Health Organization, the business sector and private foundations also participated. This resulted in a “Call to Action” by policy makers and public health communities around the world to take action to enhance the quality of infectious disease surveillance around the world, particularly in developing countries. The Global Health and Security Initiative is undertaking a project to promote the recommendations in the “Call for Action” that will have the effect of strengthening the effort to counter biological risks.

STRENGTHENING GLOBAL DISEASE SURVEILLANCE, EARLY DETECTION AND RAPID RESPONSE: ARABS AND ISRAELIS COOPERATE TO FIGHT DISEASE

When bird flu broke out in the Middle East, Israeli, Palestinian and Jordanian health officials worked together to share information and prevent its spread. This was possible because of a remarkable cooperative effort called the Middle East Consortium on Infectious Disease Surveillance (MECIDS). MECIDS brings together Israeli, Jordanian and Palestinian public health professionals in a successful, cooperative effort to detect, identify and mitigate infectious disease threats.



MECIDS participants and GHSI staff in Amman, Jordan. From left: Dr. Adel Belbesi (Jordan), 2008 MECIDS Chairman; Dr. Alex Leventhal (Israel), 2007 MECIDS Chairman; Terence Taylor, Director, GHSI; Jennifer Runyon, Senior Program Officer, GHSI; and Major-General Mohammad K. Shiyyab (Jordan) Director, Cooperative Monitoring Centre, Amman.

With the support of a locally-based NGO, Search for Common Ground, NTI helped launch MECIDS in 2003. A major step forward was achieved in January 2007 when the partners assumed full control through an Executive Board.

MECIDS already has proven its worth by responding effectively to outbreaks of avian influenza. A key protocol of MECIDS is that any party must immediately warn the others of a disease occurrence. A 2006 article in *The British Medical Journal* (written by the leading health officials in the consortium) describes how the consortium facilitated the sharing of information about the outbreak of avian flu as well as the effectiveness of coordinated actions to prevent further spread: “We believe that the cooperation, mutual reporting,

and assistance described here had an important effect during these outbreaks of avian flu.” Since 2006, avian influenza outbreaks in birds have been successfully contained and there have been no cases in the human populations of the partners.

MECIDS also brings together officials from the ministries of health and doctors and scientists for regular cross-border information exchanges, provides laboratory and risk communications training, hosts regional

scientific conferences and supports building advanced IT and communications networks.

The network has received major support from the World Health Organization, the World Bank, IBM (which has contributed software, hardware and training) and Becton, Dickinson and Company (which has contributed laboratory and medical supplies). In 2007, with the support of a World Bank grant, MECIDS progressed further as an independent, self-managed organization. It developed a business plan, drafted standing operating procedures and held regular board meetings and training workshops. Although regional conflicts have at times hampered planned meetings and other events, all partners are fully committed to the project.

PROJECTS APPROVED OR ONGOING IN 2007 **BIOLOGICAL**

PROMOTING SCIENCE SECURITY

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.

NTI

Washington, DC, USA

Up to \$50,000

2005-2007

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

\$397,150

2005-2009

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

Regional Reference Laboratory for Viral Hepatitis

To set up a reference laboratory at the facilities of the Federal State Research Initiation-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

Regional Training Centers for Biological Safety and Security

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

Washington, DC

\$120,000

2007-2008

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

2003-2007

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

STRENGTHENING GLOBAL DISEASE SURVEILLANCE, EARLY DETECTION AND RAPID RESPONSE

Building Capacity for Regional Bioterrorism Preparedness in Asia

To support an online symposium on bioterrorism preparedness for interested Asia Pacific Economic Cooperation (APEC) member countries.

University of Washington

Seattle, WA, USA

\$49,771

2006-2007

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

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

2004-2008

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 among 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.

NTI and others

Washington, DC, USA

\$1,437,000

2002-2008

Model Disease Surveillance System in Iran

To support the policy collaborations between American specialists at the Policy and Global Affairs Division of the National Research Council (NRC), acting on behalf of the National Academy of Sciences, and Iranian specialists at the Iranian Academy of Sciences, in their work to develop a model program of disease surveillance in Iran.

National Academy of Sciences

Washington, DC, USA

\$50,000

2005-2007

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
2006-2007*

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*

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.

*NTI
Washington, DC, USA
Up to \$275,000
2005-2008*

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
2003-2007*

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
Washington, DC, USA
\$610,000
2006-2007*