Contagion and Conflict

Health as a Global Security Challenge

A Report of the
Chemical and Biological Arms Control Institute
and the CSIS International Security Program

Project Members
Glenn Baek
Jonathan Ban
Chaarles Fogelgren
Colonel Scott Lloyd (USA)
John Swann
Yun Chung

Project Codirectors
Michael Moodie
William J. Taylor Jr.

January 2000

About CSIS

The Center for Strategic and International Studies (CSIS), established in 1962, is a private, tax-exempt institution focusing on international public policy issues. Its research is nonpartisan and nonproprietary.

CSIS is dedicated to policy impact. It seeks to inform and shape selected policy decisions in government and the private sector to meet the increasingly complex and difficult global challenges that leaders will confront in the next century. It achieves this mission in four ways: by generating strategic analysis that is anticipatory and interdisciplinary; by convening policymakers and other influential parties to assess key issues; by building structures for policy action; and by developing leaders.

CSIS does not take specific public policy positions. Accordingly, all views, positions, and conclusions expressed in this publication should be understood to be solely those of the authors.

About CBACI

The Chemical and Biological Arms Control Institute (CBACI) is a nonprofit policy research organization focusing on national and international security and threat reduction issues. CBACI was established in 1994 to promote the goals of arms control and nonproliferation, with a special, but not exclusive, focus on the elimination of chemical and biological weapons. It fosters this goal through an innovative program of research, analysis, publication, technical support, and education. Institute publications focus on products that are readily usable for policymakers, including a biweekly newsletter, the *Dispatch;* an occasional paper, the *Arena;* and a number of monographs and books. CBACI also promotes a variety of outreach activities to government, industry, academe, and the media, including an ongoing seminar series, "Responding to the Biological Weapons Challenge."

Contents

Project Team

CBACI

Michael Moodie
Project Codirector

Jonathan Ban
Chaarles Fogelgren*

CSIS

William J. Taylor Jr.
Project Codirector

Glenn Baek
Colonel Scott Lloyd (USA)
John Swann
Yun Chung

*Participated in the initial stages of the project.

Foreword

Health has rarely, if ever, been defined as a national security issue. Yet today's world, in which globalization and the information revolution bring people and problems together in surprising ways, finds health and security intersecting with greater frequency. Does this growing number of intersections between health and security issues create a national security challenge for the United States? We did not know the answer to this question when we began the project that resulted in this report. Eighteen months after we began, we still cannot provide a definitive answer, but that does not detract from the value of the effort.

We and those who worked with us are certain that seeking answers to the question has made a significant contribution. The project findings presented in this report define a unique set of intellectually exciting and politically challenging issues. The people we brought together had rarely thought they had much to discuss with those they found across the table from them. They will acknowledge freely that they all learned from one another and thought our labors underline the centrality of the human condition that can be lost all too often in arcane scientific, sociological, or even political explorations.

In bringing this project to completion, we realized that the lack of definitive answers to questions about the relationship between health and security should not be a cause for disappointment; that the report is not the end of the inquiry, but an important beginning. Our work opened doors to a whole series of questions important to policymakers, relief workers, the medical community, the military, and many others. Those questions need more analysis, evaluation, and understanding, and we hope to build on the foundation provided by this initial report to facilitate a continuing search for answers. Wise people understand that solutions to complex problems can be found only by framing the right questions. This project accomplished that.

On behalf of the Chemical and Biological Arms Control Institute (CBACI) and the Center for Strategic and International Studies (CSIS), we have many to thank. First, the Richard Lounsbery Foundation for providing the support that made the project possible; second, Dr. David Abshire for bringing our two organizations together to conduct this thought-provoking and ground-breaking assessment; third, all of those respected experts who generously contributed their time, experience, and

insights as members of the working groups brought together by the project or as participants in our electronic Delphi process; finally, the members of the project team for their commitment, dedication, and skill in bringing the project to a successful outcome.

Michael Moodie, CBACI
William J. Taylor Jr., CSIS
Project Codirectors

Introduction

Disease accounts for the greatest proportion of human morbidity and mortality in history, far surpassing war as a threat to human life. Smallpox alone is estimated to have killed 300 million people in the twentieth century, about three times as many people as died in wars during the same period of time. Today, infectious diseases are the world's leading cause of death, killing millions of people each year—most of whom are children—and the numbers only continue to increase.

In wars themselves, disease is responsible for more casualties than the firepower of the opposing sides. According to one expert, for example, during the U.S. Civil War, twice as many soldiers died of disease as were killed and mortally wounded in combat.[1]

In some cases, diseases have had a strategically decisive impact on the outcome of a conflict. On the very evening that the Aztecs drove the conquistadors out of what is now Mexico City, a smallpox epidemic began, one to which the Spanish were immune. The disease not only ravaged the native population, but it also had a marked psychological impact, demoralizing the Aztecs who watched their warriors fall to the infection while their opponents went untouched. The Aztecs interpreted the result as a sign that the Christian god of the conquistadors dominated their native deities.[2]

During the American Revolutionary War, the colonial government sent an army of invasion to Canada, which successfully captured Montreal. In approaching Quebec City, however, smallpox decimated the colonial ranks. The disease forced the invaders to retreat in disarray, and set Canadian history on a course distinct from that of its neighbor to the south.

When black slaves revolted in Haiti, Napoleon Bonaparte sent more than 25,000 French troops to quell the rebellion. Many were killed, however, by yellow fever. The huge losses influenced Napoleon's decision not to protect other French territories in the New World and was one of the considerations that led to the negotiation of the sale of the Louisiana Territory to the United States.[3]

Does history tell us that disease can be a security issue? Do more recent developments—in central Africa, Bosnia and Kosovo, or Iraq—make health issues part of the contemporary security agenda? Do the intersections of health and security

---

1. James McPherson, *Battle Cry of Freedom* (New York, N.Y.: Oxford University Press, 1988), p. 485.

2. William H. McNeill, *Plagues and People* (New York, N.Y.: Doubleday, 1976), p. 2.

3. Dumas Malone, *Jefferson the President: First Term, 1801–1805* (Boston, Mass.: Little, Brown, 1971).

developments in today's world need attention from national security as well as health professionals?

Historically, the concept of national security has focused on the use of military power to protect national borders and interests abroad. Over time, however, the concept of national security evolved to encompass a broader spectrum of concerns that included not only military power and protected borders, but also economic prosperity, access to natural resources and markets, and internal stability. Today, the international community, finding itself faced with challenges not readily amenable to military solutions, is beginning to embrace concepts of security that expand the notion of national security still further. Although some people argue that "security" in the post–Cold War era should continue to focus on challenges involving the use of military force, others contend that post–Cold War security also encompasses new challenges. Boutros Boutros-Ghali makes this point as United Nations (UN) Secretary General in his report, *Agenda for Peace,* in which he identified "new risks for stability: ecological damage, disruption of family and community life, greater intrusion into the lives and rights of the individual."[4] The secretary general pointed out that

> a porous ozone shield could pose a greater threat to an exposed population than a hostile army. Drought and disease can decimate no less mercilessly than the weapons of war.[5]

Some elements of this expanded concept of security are accepted without dispute—ethnic conflict, for example, or such transnational problems as the drug trade and organized crime. Debate arises, however, about whether other items should be incorporated into the "new security agenda." The first major debate in this regard relates to the relationship between environmental issues and conflict.

Some people might raise a similar question regarding health. Even if it is legitimate to expand the concept of security in the post–Cold War era, should health issues be a part of it? Defining health too broadly as a security problem would not be helpful. Not all anthrax outbreaks could or should be considered a possible attack with biological weapons (BW). Portraying all health issues as security problems that demand attention from the national security community would risk turning off that community and making it insensitive, precisely at a time in which the interaction between health and security really does matter.

Indeed, a look at a range of global developments since the end of the Cold War suggests that the intersections between health and security issues are worth examining. That was the purpose of the CBACI/CSIS project whose work is reflected in this report. The goals of the project were to

■ Elucidate critical trends in the global health arena and determine the ways in which they pose major security challenges in the post–Cold War environment;

4. Boutros Boutros-Ghali, *An Agenda for Peace: Preventive Diplomacy, Peacemaking, and Peacekeeping,* Report of the Secretary General to the Statement Adopted by the Summit Meeting of the Security Council on 31 January 1992, A/47/277/S/2411, June 17, 1992, p. 3.

5. *Ibid.,* pp. 3–4.

- Highlight the tough policy choices created by the interaction of health and security issues;

- Sensitize policymakers to the challenges inherent in this under-examined relationship; and

- Consider policy recommendations that could provide the basis for practical steps by each of the critical constituencies.

An underlying question in the project was whether a conceptual framework could be developed for tackling health and security issues that have come together in the post–Cold War environment in unique and challenging ways.

Global Change and the Spread of Infectious Disease

The world is besieged by disease; according to the World Health Organization (WHO) more than 2 billion people are seriously ill at any given time with diseases that account for more than 50 million deaths per year. (See Figure 1: Burden of Disease.)

Infectious diseases are the world's leading cause of premature death. (See Figure 2: Leading Causes of Death.) Nearly 50,000 children and adults die every day from infectious diseases worldwide. Of about 54 million deaths from all causes in 1995, more than one-quarter were the result of infectious diseases. Half the world's population of 5.8 billion people is threatened by endemic diseases, and millions are developing cancers as a direct result of preventable viral and bacterial infection.[6]

In the past 20 years, more than 30 new infectious agents that threaten human health have been discovered, including rotavirus, cryptosporidium parvum, legionalla pneumophila, hantavirus, and ebola. As the map demonstrates, no region of the world is immune from the onslaught of disease. (See Figure 3: Unexpected Outbreaks.) This onslaught can only be expected to continue in the face of a number of factors. Figure 4 suggests just how many factors will influence this process. Some of those critical factors are discussed below. (See Figure 4: Not Only a Health Problem.)

Globalization

The world is much more interconnected today than ever before. The forces of globalization have collapsed geographic space, leading to greater integration of a once segmented world. The proliferation and availability of air travel has fed the explosion in international travel. With commercial airlines servicing nearly all parts of the globe, people no longer are restricted to localized employment or leisure activities and regularly travel abroad on business and pleasure. Millions of people in developing countries use this mobility to migrate in search of better opportunities in the developed world. [7] At the same time, the less-developed world's cheap labor, resources, and operating

---

6. David Brandling-Bennett and Daniel Epstein, "Pandora's Petri Dish," *Forum for Applied Research and Public Policy,* Vol. 13, No. 4 (Winter 1998), p. 6.

7. According to the UN High Commissioner for Refugees, in 1994 at least 110 million people immigrated, another 30 million moved from rural to urban environments in their own countries, and another 23 million were displaced by war or social unrest. Cited in Laurie Garrett, "The Return of Infectious Disease," *Foreign Affairs* 75, No. 1 (January/February 1996), p. 70.

Figure 1

Burden of Disease

DALYs (Disability Adjusted Life Years) Lost in 1998 Due to Infectious
Diseases, Millions, All Ages
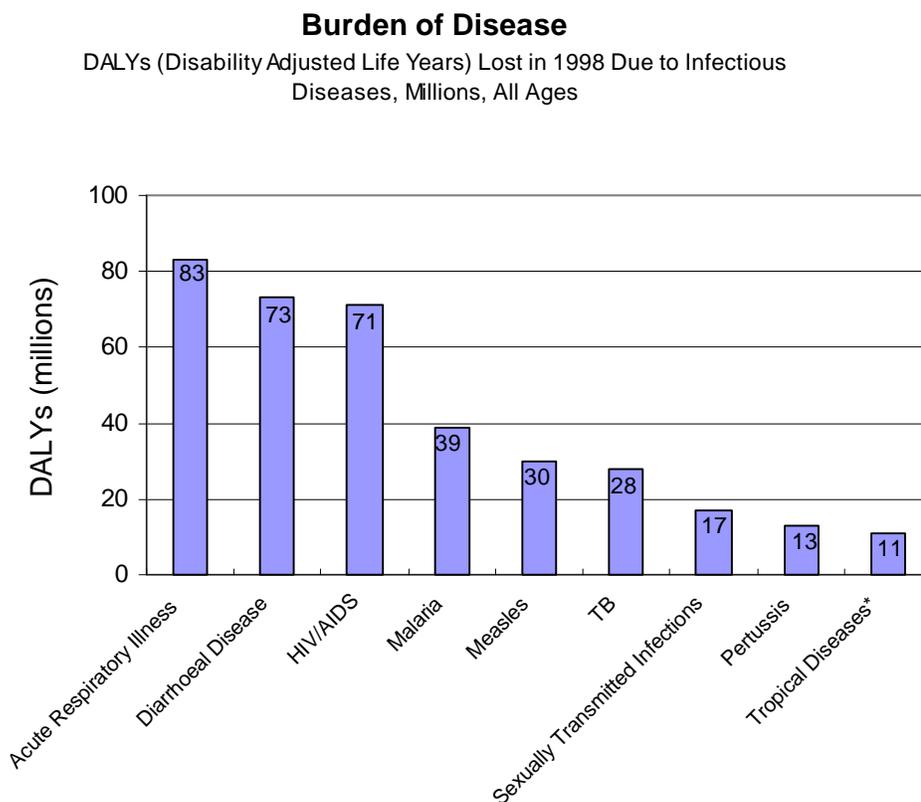
* *Tropical Diseases* include trypanosomiasis, Chagas disease, schistosomiasis, leishmaniasis,
  and lymphatic filariasis.

Note: One DALY is one lost year of healthy life.

Source: WHO.

costs have attracted much of the developed world's production and manufacturing base now that goods can be shipped all around the world with relative ease and at a significant savings to the consumer.

As a result of this burgeoning global activity, national borders have become increasingly porous. Traditional notions of national security based on defending national sovereignty from cross-border incursions now are only part of a much broader definition of "homeland defense." Today, international trade and travel threaten pandemics by transporting and spreading infectious disease globally. (See Figure 5: Burden of Disease.) An infectious disease in one country no longer can be considered a local or regional problem in an age in which Muslim pilgrims return home from the Haj with more than their spiritual resuscitation or when ebola is only a plane ride away from Washington, D.C.

The size of the international economy and the volume of goods imported and exported on a daily basis have reduced the significance of national borders as a defense against newly emerging exogenous threats. The global trade in agricultural products

Figure 2

Leading Causes of Death

53.9 Million From All Causes, Worldwide, 1998

Other
6%

Respiratory and
Digestive
9%

Maternal
5%

Infectious
Diseases
25%

13.3

Injuries
11%

Cancers
13%

Cardiovascular
Diseases
31%
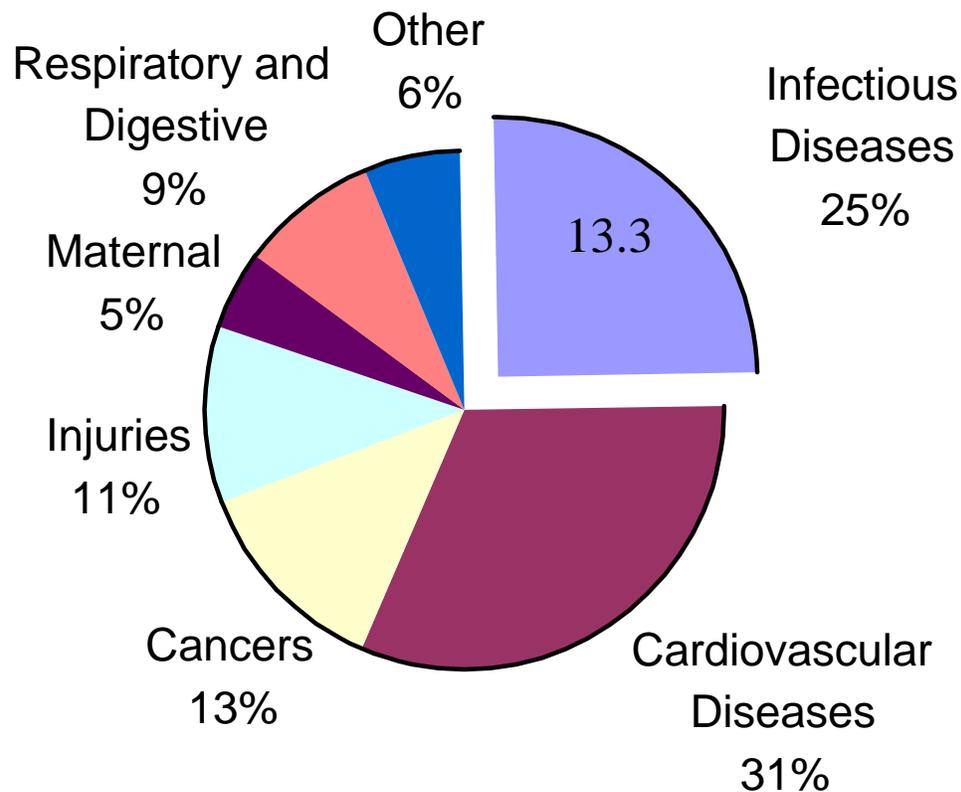
Note: Deaths from cancer and cardiovascular and respiratory causes also can stem from
infection and raise the percentage of deaths due to infectious diseases even higher.
Source: WHO.

inadvertently could introduce foreign plant or animal pathogens not encountered
before by native crop or livestock populations that may have a devastating effect on
food supplies and, ultimately, on the economy. Mad Cow Disease in Great Britain
devastated the beef industry, and the recent outbreak of foot-and-mouth disease in
Taiwan wrecked the hog industry as their beef and pork exports, respectively, were
rejected by the rest of the world. Similarly, the United States was forced to halt exports
and set up a quarantine when karnal bunt was found in Arizona wheat crops in 1997.

Figure 3

Unexpected outbreaks

Examples of emerging and re-emerging infectious diseases 1994-1999

Anthrax
Brucellosis
Cholera
Crimean-Congo haemorrhagic fever
Cryptosporidiosis
Dengue haemorrhagic fever
Diphtheria
Ebola haemorrhagic fever
E.coli O157
Echinococcosis
Enterovirus 71
Epidemic meningitis
Hendra
Human monkeypox

Influenza A (H5N1)
Influenza A (H9N2)
Lassa fever
Leptospirosis
Lyme borrellosis
Malaria
New variant CJD

Nipah
Omsk haemorrhagic fever
O'nyong-nyong fever
Plague
Poliomyelitis
Reston virus
Rift Valley fever

Ross River virus
Typhoid
Venezuelan equine encephalitis
West Nile fever
Yellow fever

SOURCE:WHO

Population Changes

Today, the world's population exceeds 5.8 billion people and is expected to reach 8.2 billion people by 2025. [8] Eighty-five percent of these people live in developing countries that do not possess the resources or institutions needed to provide basic human needs and the services essential for establishing social stability and sound public health. [9] As populations explode locally, regionally, and internationally, people are placed in competition for such essential resources as arable land, clean water, food, health services, and employment. People are forced to push into such new areas as river basins, coastal lowlands, and earthquake areas that are at risk from natural disasters. Trying to provide for increasing numbers of people produces problems with the carrying capacity of the physical environment that they occupy as growing populations increasingly exploit limited local natural resources to maintain a barely viable standard of living. Excessive mining of natural resources, overgrazing, over planting of arable

---

8. Dennis Pirages, "Demographic Change and Ecological Security," in Michael T. Klare and Daniel C. Thomas, eds., *World Security: Challenges for a New Century* (New York, N.Y.: St. Martin's Press, 1994), pp. 314–333.

9. *Ibid.*

Figure 4

Not Only a Health Problem

	Minor, Indirect, or No Factor		Important Factor		Very Important Factor

Row labels:

- Deforestation
- Climate Change
- Irrigation Project and Dams
- Poor Sanitation and Hygiene
- Hunger and Malnutrition
- Illiteracy
- Low Status of Women
- Lack of Adequate Housing
- Increased Travel and Migration
- Lack of Multisector Coordination
- Lack of Surveillance Systems
- Unavailability of Health Services
- Lack of Prevention Tools or Strategies
- Failure to Use Prevention Strategies
- Lack of Effective Treatment
- Failure to Use Treatment Strategies
- Lack of Effective Vaccines
- Failure to Use Vaccines
- Other Factors

Source: WHO. Based on available information.

land, and deforestation lead to environmental degradation and pollution that adversely affect the health and stability of local populations.

In many parts of the world, competition for access to the resources required to meet human needs inflames tensions between groups and threatens social stability. People who face unbearable conditions migrate in search of better opportunities, taking with them infectious diseases that they introduce into new populations as they move and intermingle. This is done largely through the introduction of enteric diseases into local water sources in areas with poor sewage and water treatment practices, but airborne and sexually transmitted diseases also are spread through migration. The epidemiological patterns of these diseases tend to mirror closely the migration patterns across state borders. (See Figure 4: Not Only a Health Problem.)

Urban populations also are growing as migrants move to cities in search of employment and other opportunities.[10] Population density exceeds 2,000 people per square mile in 7 countries, and at least 43 countries have densities of more than 500

Figure 5

Spread of meningococcal meningitis by pilgrims returning from the Haj, 1987

3 cases
Europe &
America

547 cases
Asia

6 cases
Africa

Source: WHO
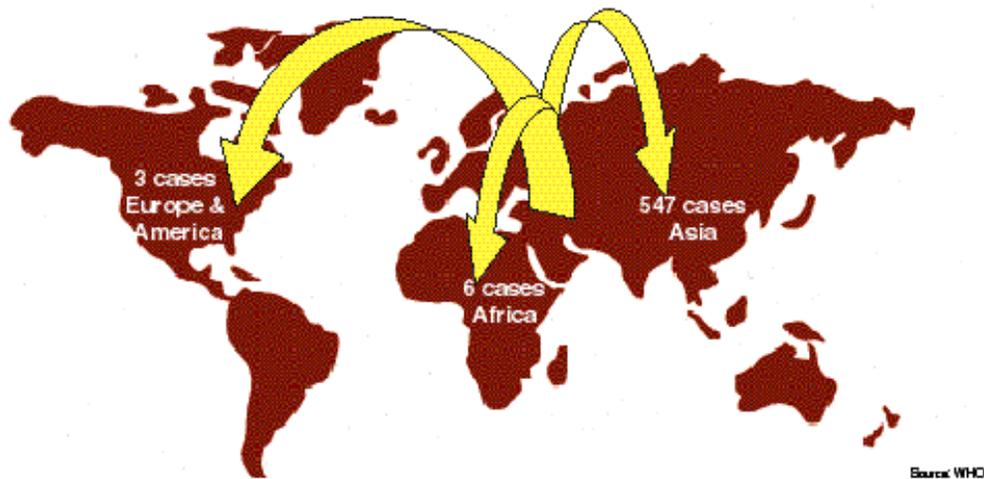
people per square mile.[11] Rapid urbanization is creating megacities that lack adequate housing, sanitation, employment, or transportation for the influx of poor migrants. Two million people live in the shanty towns of Calcutta, India, and more than 1 million people live in similar conditions in Istanbul, Turkey; Casablanca, Morocco; Lima, Peru; and Bogota, Colombia.[12] Such close physical proximity spurs major increases in infectious diseases that are airborne, waterborne, and transmitted by contact. Within dense urban populations, the growing numbers of both children and elderly people who require additional care place an increased burden on state services. Urbanization (and globalization) also propels significant alterations in social behavior. Changes in sexual practices, for example, become a major transmitter of disease. The absence of services and facilities in such overcrowded conditions threatens to spark violent rebellions and massive epidemics for which authorities are not prepared adequately.

Environmental Degradation

In many parts of the world, the physical environment cannot support the rapidly increasing number of people who inhabit it. As arable land is over planted to increase

---

10. As Kevin Kavanaugh points out, it is ironic indeed that a factor that draws rural people to cities is the expectation of better access to health care. Unfortunately, rapid urbanization is occurring at the same time that health care access is diminishing, which fuels popular discontent.

11. Rohit Burman, Kelly Kirsschner, and Elissa McCarter, "Infectious Disease as a Global Security Threat," Wilson Center Environmental Project, Washington, D.C., p. 68.

12. *World Resources, 1988–89* (New York, N.Y.: Basic Books, 1988) pp. 36–37.

crop yields, soil is depleted of nutrients; marginal lands are cultivated to support more people; overgrazing results in desertification; and the pace of deforestation increases with the demand for fuel for heating and cooking. Irresponsible agricultural practices may lead to short-term spikes in productivity, but they are unsustainable in the long term because tree and vegetation removal that makes way for farming results in rapid soil erosion, mud slides, and the silting of rivers. Soil depletion can hinder agricultural production; runoff damages infrastructure; and silting disrupts local marine eco-systems. These processes result in a reduced standard of living, an increased vulnerability to disease, and a greater potential for violent conflict.[13]

Rights to fresh water sources also can be a contentious environmental issue because this essential resource is unequally distributed regionally and globally. Shared water-sheds comprise about 47 percent of the global land area, and more than 60 percent of the area of the continents of Asia, Africa, and South America.[14] A dispute over the waters of the Jordan River Basin shared by Syria, Jordan, Israel, and Lebanon was responsible in part for the 1967 Arab–Israeli War, and Syria and Jordan are engaged in an ongoing dispute over water rights. A project intended to enhance the flow of the White Nile in Sudan by building a canal to bypass the Sudd, a large swamp in south-ern Sudan in which much of the White Nile's water is lost to evaporation, was one factor that sparked the ongoing civil war in Sudan.[15] Iraq and Turkey dispute the use of water from the Tigris and Euphrates Rivers; Turkey's Greater Anatolia Project is intended to construct a series of dams that restrict water flows to Iraq by approximately 10 percent of normal flows.[16] Meanwhile, Israel's use of groundwater from the Jordan River in occupied territories is a source of political tension that could complicate final status negotiations with the Palestinians. These types of issues are likely to become more intense as growing populations increase the demand for drinking water and for fresh water sources for agricultural production, the single largest water-consuming activity.

Economic and Political Transitions

The dissolution of the Soviet Union instigated rapid political and economic deterioration in Russia and the newly independent states (NIS). Democratization and the diffusion of political power from the center to the periphery, as well as the transition from command to market economies, also have resulted in political and economic instability—and increased health problems—for many of these countries. Unemployment skyrocketed as bloated and inefficient government subsidized industries were downsized and streamlined. To compound the situation, many of the goods these economies produce are not competitive on the international market. At the same time, inflation soared as governmental subsidies dried up and goods and services were opened to competition. People in these countries no longer could afford to buy basic commodities and became dependent on government rations. One consequence of the

13. See Pirages, p. 38.

14. Patrick Clawson, "Population, Resources, and Conflict," *Strategic Forum* 7 (September 1994), at *http://www. ndu.edu/ndu/inss/strforum/2704.html.*

15. *World Resources, 1994–95* (New York, N.Y.: Oxford University Press, 1994), p. 183.

16. *Ibid.*

Figure 6

Diphtheria in the Russian Federation and Newly Independent States

Number of cases reported annnually
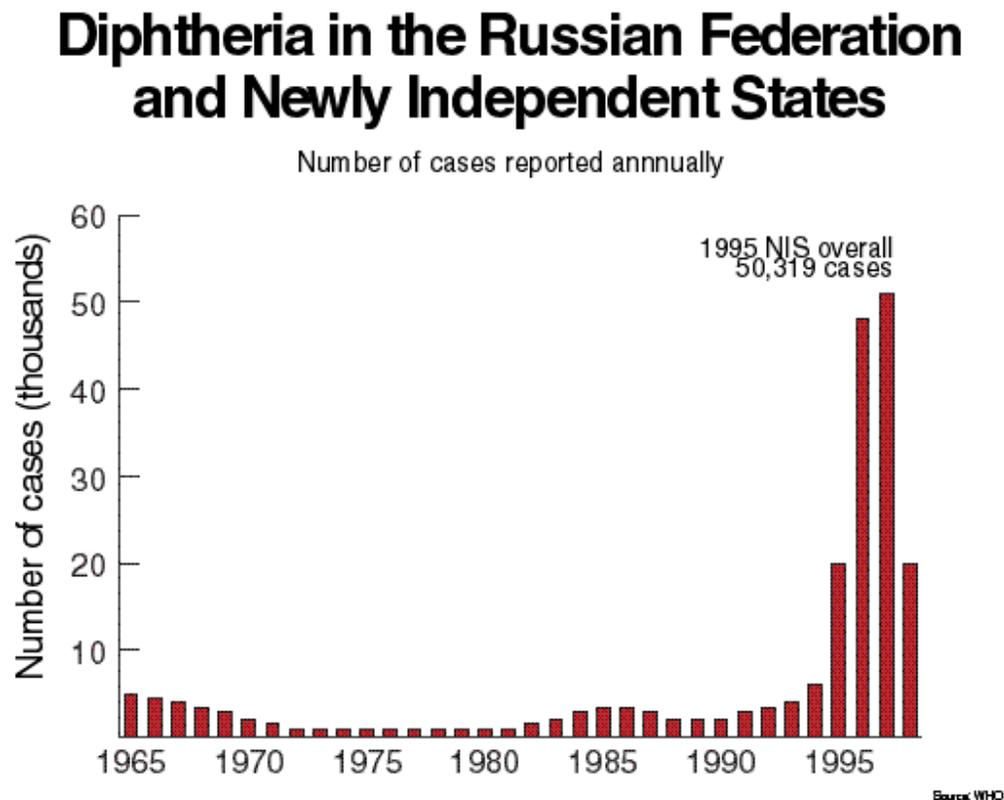
deterioration that has marked the post-Soviet environment is a markedly growing health burden. Only one measure is a diphtheria epidemic in the states of the former Soviet Union. (See Figure 6: Diphtheria in the Russian and Newly Independent States.)

The Outcome: Health and Security at Three Intersections

The pressures outlined above, particularly when viewed in combination, provide some preliminary indications of the ways in which the continuing burden of disease in the world of the twenty-first century will impact on global stability and security. This CBACI/CSIS project focused in particular on three emerging sets of issues at the intersection at which health and security come together.

Health, Failing States, and Stability

Faced with economies in ruins in conjunction with rapidly shrinking assistance from developed countries, many countries of the developing world have had to make diffi-cult budgetary decisions. These countries no longer are able to provide the same level of public services they once did. Basic public infrastructure—garbage removal, water

treatment, sewage disposal, pest control, health care facilities and services, environmental safety, education—have suffered, sometimes dramatically.

Considering these pressures, the world is witnessing the failure of some governments to provide fundamental services—including health care—to populations nominally under their control. This failure produces two important consequences: first, in some cases the government in question no longer is accepted as legitimate; second, when this happens, various components of society begin to compete to preserve and protect their own well-being. That competition often turns violent, with different entities taking up arms against the government and one another. In some parts of the developing world, the collapse of national health infrastructures must be anticipated. The consequence of such a collapse will contribute to the phenomenon of "failing states."

The impact of health issues on the stability of countries will be felt in a variety of ways. The 1994 plague outbreak in India, for example, produced reactions far out of proportion to the actual number of cases. Although far fewer than 100 cases were reported, the outbreak is estimated to have cost India $2 billion because of the deleterious affect on its aviation, export, and tourism industries. In the case of India, the impact was primarily economic. In other situations, the political stability of governments has been threatened. Poor government handling of the consequences—including medical—of the earthquakes in Nicaragua in 1972, Mexico City in 1985, and Kobe, Japan, in 1995 all fostered public discontent with the government. The result in some cases was the loss by those governments of political support. In others, however, such as Nicaragua, the poor government response promoted a political opposition that resorted to violence in an attempt to overthrow the government.

Humanitarian Warfare

A second aspect of the relationship between health and security is an increasing trend in civil conflicts for combatants to manipulate supplies of food and medicine in their search for an advantage against their adversaries. In some cases, such as the ethnic strife between Ethiopians and Eritreans or the conflict in Somalia, the struggle to control food and medicine defined the war strategies of some of the parties. The war in Bosnia was marked by frequent attempts to cut off food, water, medicine, and heat to enclaves of a competing ethnic faction. In such conflicts, the forced displacement or mass expulsion of groups creates new political factors that must be resolved if the conflict is to be brought to an end successfully. Moreover, the "safe havens" and refugee camps created for the humanitarian purpose of meeting basic needs of displaced populations can both overwhelm the capability of relief services and create an additional factor to be manipulated by warring factions.

Biological Weapons

A third element in the relationship between health and security is biological weapons, the use of which represents the deliberate spread of disease either against an adversary in a conflict situation or by non-state actors seeking to inflict high levels of casualties on an unsuspecting population. Since the end of the Cold War, the international

community has turned greater attention to the challenge of BW. This is the result of several developments, including

- the surprising discoveries of the size and scope of Iraq's BW program;

- the admission of Russian president Boris Yeltsin that the Soviet Union illicitly pursued an offensive BW program in violation of its obligations as a party to the 1972 Biological and Toxin Weapons Convention (BWC) that bans the development and production of such weapons;

- the realization that the cult responsible for the 1995 poison gas attack in the Tokyo subway also had tried to develop BW; and

- the general sense that more countries now are interested in acquiring BW.

Material and technology that can be used to make BW also have legitimate commercial or medical uses. The question of how to manage the global diffusion of "dual-use" material and equipment has become central in shaping the global response to the BW challenge. Developing countries demand more sharing of technology, in part to promote more and better medical research to combat endemic diseases. The issue has become the center of political controversy. Achieving a balance between the competing interests affected by the issue of technology transfer and technology diffusion in such areas as pharmaceuticals and biotechnology remains an elusive objective. The manner in which the issue is resolved will have implications far beyond the fight against BW.

Final Observations

With these considerations, it is clear that policymakers and analysts concerned with national security must focus on the intersections of health and international security. What is not clear is how they should think about these issues. Should their approach be one of dealing with a series of ad hoc questions, or should they focus on a conceptual integrity to these issues that facilitates more integrated assessment and decision-making processes? The solution could have important implications for the nature and quality of policy measures that may be developed; the success achieved in implementing them; and the effective allocation of resources to support them.

The following sections of this report address three key questions:

1. What are the key intersections of health and security at the state and international levels?

2. What are the critical dimensions of the health/security interface?

3. What policy challenges does the interaction of health and security create and what approaches most effectively address this relationship between health and security?

The analysis that follows emphasizes that the consideration of the relationship between health and security is only in its formative stages. There are many questions that will require additional careful attention and analysis in the period ahead. We hope that this report will stimulate further investigation of the challenges that emerge from this relationship that will confront governments and individuals alike for many years to come.

CHAPTER 1

At the Macro Level: Health, Instability, and Conflict

This report is concerned with the impact of health on security primarily as it relates to conflict both within and among states. The relationship between health and conflict in terms of war's ability to increase the likelihood of disease is well understood; historically, wars have created conditions ripe for the emergence of infectious diseases by disrupting the provision of medical services, breaking down civil authority, destroying health facilities and infrastructure, diverting health resources, and promoting the movements of populations that, when combined with the absence of sanitary conditions, create a rich breeding ground for disease.

The reverse relationship between health and security—health as a factor promoting instability and conflict—is less appreciated, however. Health and security exist in today's world in a complex, reciprocal relationship that is not straightforward. Examining that relationship at the macro level can best be done by breaking down the analysis into intra- and inter-state dimensions.

Health, Instability, and Conflict within States

It is the central function of the state to guarantee the physical safety of its citizens from "both internal and external forms of predation" (Thomas Hobbes, *Leviathan*).

The historian William McNeill describes the military and political upheavals in Europe and (to a lesser extent) China in the early Christian centuries that were "attendant" on massive disease epidemics. This pattern was to repeat itself in the thirteenth century with the Mongols and many other times throughout history.[17] McNeill's work puts into historical perspective a concern that has surfaced in the post–Cold War era about the relationship between health, stability, and conflict: that infectious diseases in states with fragile political systems place strains on social and other dynamics that can produce major political instability and ultimately erupt in violence and conflict.

The impact of disease on stability, however, usually is not direct; disease will not inevitably produce a negative political effect by itself. Instead, declining health, particularly in the form of the spread of infectious diseases, will work in combination with other factors to promote instability. First, emerging and re-emerging infectious diseases threaten economic stability. They do so in a number of ways, including reducing economic productivity by

---

17. McNeill, *Plagues and People*, p. 174.

13

- creating labor shortages and heightening absenteeism;

- redirecting resources from such critical national needs as education and infrastructure toward increased spending on health care;

- reducing individual resources by diminishing savings and imposing higher health care costs;[18]

- stimulating a negative balance of trade or causing a loss of income from tourism; and

- promoting capital flight and decreasing gross national product (GNP).

The Acquired Immuno-Deficiency Syndrome (AIDS) epidemic exemplifies the economic burden of disease. The WHO predicted that, by 2000, Thailand's total economic burden from AIDS would be over $9 billion.[19] In 1991, AIDS commanded more than 4 percent of Tanzania's health budget, and economists calculate that, by 2005, sub-Saharan Africa would lose 15 percent to 20 percent of its gross domestic product as a result of the disease.[20] Overall, according to the Global AIDS Policy Coalition, the estimated direct (medical) and indirect (loss of productive labor force and family impact) costs of the disease could exceed $500 billion by 2000.[21]

Second, disease can interact with population pressures and trends, particularly migration and urbanization, to create more volatile social and political situations. This combination can produce heightened competition for limited resources and foster more intense rivalries among groups in countries marked by ethnic, religious, or other diversity.[22] Under certain conditions, such rivalry can spill over into violence.

Third, if a government is perceived to be incapable of adequately addressing health problems created by the spread of disease, it can produce a heightened sense of marginalization among affected populations and a stronger sense of deprivation and resentment toward the government. This psychological impact can be particularly adverse when combined with chronic poverty, which has been described as the "faithful squire of pestilence."[23] All these attitudes can contribute to the eruption of

---

18. The reverse also appears to be true in terms of the effect of better health on capital formation. Expectations of a longer life appear to stimulate savings. World Health Organization, *The World Health Report 1999: Making a Difference* (Geneva, Switz.: World Health Organization, 1999), p. 11.

19. Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* (New York, N.Y.: Farrar, Straus and Giroux, 1994), p. 485.

20. K. P. Kavanaugh, "Invisible Invaders: Disease as a Threat to National Security," unpublished paper, p. 5.

21. Laurie Garrett, "The Return of Infectious Disease," *Foreign Affairs* 75, No. 1 (January/February 1996), p. 70.

22. The destabilizing impact of health and population pressures is intensified when they are combined with environmental degradation. Not only are environmental problems likely to spur an increase in such environmentally related diseases as tuberculosis, asthma, and chronic bronchitis, but environmental degradation also is likely to interact negatively with population pressures to increase instability and the prospect for conflict. See Colin H. Kahl, "Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991–1993," *International Security,* Vol. 23, No. 2 (Fall 1998), pp. 80–119.

23. David F. Fidler, "Return of the Fourth Horseman: Emerging Infectious Diseases and International Law," *Minnesota Law Review,* Vol. 81, No. 4 (April 1997), p. 809.

violence, not just spontaneously, but in some cases as the result of exploitation by ethnic, religious, or national elites to serve their narrow interests.

Finally, the spread of disease can intensify pressures on governmental structures. Disease can decimate the ranks of skilled administrators, diminish the reach or responsiveness of governmental institutions, or reduce their resilience. Such pressures inhibit the ability of governments to respond to the spread of disease and the problems that flow from it. Obviously, the less able to respond, the greater pressure on the government. If the governmental structures of a state already are fragile or weak, these pressures can cause them to collapse.

In many parts of the world, disease inhibits the ability of a state to maintain its armed forces, thereby limiting capabilities to impose social order and protect the country from external intervention, is especially notable. The presence of infectious diseases in military populations jeopardizes military readiness and reduces force strength through death and debilitation of military personnel. The U.S. Department of State has expressed particular concern that human immuno-deficiency Virus (HIV)/AIDS may begin to undermine the military capabilities of Africa, Asia, and Latin America by degrading manpower resources and military preparedness.[24]

The relationship between health and military expenditure is particularly complex and creates a policy conundrum for governments besieged by health problems. On the one hand, the burden of disease generates costs that limit military budgets, further diminishing readiness and capabilities. On the other hand, money spent on the military in a time in which a government confronts a grave medical crisis can lead to intensified questioning of the legitimacy of such government decisions.

A negative synergy exists, therefore, among health problems (particularly in the form of infectious diseases), population dynamics, environmental degradation, weak government structures, and long-standing grievances in segments of the population. This synergy creates a downward spiral dynamic between infectious diseases and state capacity such that diseases reduce the capacity of the state to respond—not only on the health front but more generally—and lowered state capacity results in increasing levels of disease.[25] The negative impact of this synergy between health and other social and economic dynamics is likely to become more intense in the face of a sudden onset of disease. Chronic health problems, however, or health challenges that are slower to play themselves out also can promote an insidious erosion of state capacity, confidence in government, and political and social stability. The long-term consequences of the incident at Chernobyl, including the inability of the Soviet government to deal with long-term health effects particularly in Ukraine, for example, is suggested to have contributed to growing doubt over the legitimacy of the Soviet regime among the general population.

This negative spiral is most intense in countries whose state capacity is severely limited already because they have fewer human, financial, and other resources from which to draw to break the cycle. Most of those countries are located in the developing

24. U.S. Department of State, "United States Strategy on HIV/AIDS," Publication No. 10296 (July 1995), at *http://dosfan.lib.uic.edu/ERC/environment/releases/9507.html.*

25. Andrew T. Price-Smith, "Pathogen-Induced Mortality and State Capacity: Statistical Evidence, 1951–1991," Paper presented to the CSIS/CBACI Working Group on Health and Security, May 26, 1999.

world. Some commentators have spoken of "Thirdworldization," a term that suggests a particularly pernicious pattern in which deteriorating levels of health care, immunization, sanitation, education, and the total burden of disease in a society interact with poverty and ecological disturbances to roll back the level of development and lose ground in the fight for improved quality of life.[26] It is little wonder that disease frequently is included on lists of factors that precipitate the collapse of governments in the developing world (together with crime, civil war, hunger, and drugs). The argument has been made, for example, that the growing destabilization of sub-Saharan Africa is due, at least in part, to the increased stresses on state capacity imposed by the burden of disease.

It also is no surprise that conflict—both within and between countries of the region—tends to accompany that instability. The collapse of the ability of central governments to provide such basic needs as the physical protection and the delivery of essential services leads to the rise of alternative actors and to intense competition among those actors for whatever resources might be available.

While the negative spiral dynamic is particularly characteristic of the world's poorest countries, a similar pattern has asserted itself in other places, including Russia. Russia is among a group of countries whose health profiles suggest they may confront that downward spiral dynamic among infectious diseases, economic disruption, and limited state responsiveness that can lead to instability and violence. Other countries that have been suggested as potential concerns in this regard include Ukraine, India, South Africa, Thailand, and possibly China.[27] Some of these countries are among the most important players on the global political and security scene, and instability in any of them could have profound implications for regional and global security dynamics.

Complex Humanitarian Emergencies

In some cases, the negative synergy among infectious diseases, disruptive population dynamics, environmental degradation, weak government structures, and long-standing grievances manifests itself in a specific place and time, giving rise to what increasingly have been called "complex emergencies." In a report to the Carnegie Commission on Preventing Deadly Conflict, Douglas Lute describes the multiple causes of these potential catastrophes as the "entanglement of 'four scourges': war, disease, hunger, and displacement."[28] Andrew Natsios, former director of the Office of Foreign Disaster Assistance (OFDA) of the U.S. Agency for International Development (USAID), cites OFDA figures to show that the number of such emergencies began to accelerate in the late 1980s. Between 1978 and 1985, there were an average of 5 ongoing complex emergencies each year; by 1989, there were 14; by 1992, there were 17; and 24 in 1996.[29] Natsios lists five characteristics for such emergencies:

---

26. The term is used particularly by Laurie Garret in *The Coming Plague,* including as a chapter heading.

27. Andrew T. Price-Smith, "Infectious Disease and Global Stability at the Turn of the Century," *International Journal,* Vol. 54, No. 3 (Summer 1999).

28. Douglas Lute, *Improving National Capacity to Respond to Complex Emergencies: The U.S. Experience,* Report to the Carnegie Commission on Preventing Deadly Conflict (New York, N.Y.: Carnegie Corporation of New York, 1998), p. 2.

- roots in traditional ethnic, tribal, or religious animosities that often produce widespread atrocities;

  the deterioration of the authority of the national government to the extent that public services disappear and policy control passes to regional centers of power;

- mass population movements that produce public health emergencies;

  massive dislocation of the economic system, generating hyperinflation, severe decline in the GNP, and deep unemployment; and

- a general decline in food security.[30]

Complex emergencies highlight the inability of a government to cope in situations in which already predominant conditions of scarcity are made even worse. A complex emergency rends the fabric of a society, making such a calamity enormously lethal and destructive. Sickness and disease play an important part in the process.

The interaction between disease, population movements, and inadequate food security is an especially destructive dynamic in complex emergencies. People moving to avoid the ravages of conflict often are massed in refugee or displaced persons camps in which the risk of starvation and epidemic is high. Food is almost certain to be in short supply in any case because the conflict has destroyed local food supplies (creating one of the major reasons that people move). The warring parties then manipulate food availability as a weapon in their contest. (See the following chapter.) The lack of sanitation and clean water combines with overcrowding to create ideal conditions to spawn epidemics, made even more likely as the lack of food and malnutrition erode the body's self-defense mechanisms against disease. According to Natsios, the "greater portion of civilian deaths in recent complex emergencies have been from starvation or disease, not violence."[31]

The exceptions to this general rule—including Chechnya, Angola, Bosnia, and Rwanda—have captured attention precisely because of the intensity of the interaction among violence, starvation, and disease. In central Africa, for example, the migration of throngs of Hutu refugees from the civil war in Rwanda to camps in Zaire provoked the eruptions of cholera, dysentery, and other highly communicable diseases. Unable to address the problem effectively, Zaire pushed for the repatriation of Hutu refugees, who were reluctant to return in the face of threats from Rwanda's new Tutsi rulers. While the political game played out, the squalor of the camps continued to breed disease and dissatisfaction.

The plight of the refugees also fostered dissatisfaction with the government of Zaire among its own populations living near the camps because of the central government's inability to ameliorate the horrible conditions. This dissatisfaction—both within and outside the camps—translated into a direct challenge to the central government by political elements in eastern Zaire. The opposition ultimately succeeded in ousting Zairian president Mobutu Sese Seko.

---

29. Andrew S. Natsios, *U.S. Foreign Policy and the Four Horsemen of the Apocalypse: Humanitarian Relief in Complex Emergencies* (Westport: Praeger/CSIS, 1997), p. 1.

30. *Ibid.,* p. 7.

31. *Ibid.,* p. 154.

Food Security

Food and health are closely related, particularly in complex emergencies. In such situations, people usually do not die of starvation itself, but of disease complicated by malnutrition. Hunger problems are a major contributor to mortality from infectious disease.

Considering this relationship between hunger and disease, the lack of food security in a conflict environment can be devastating. Reporting on the situation in Sudan in July 1998, the *Washington Post* disclosed that 1.2 million people were at risk because of inadequate food supplies, a fourfold increase in two months.[32] Those at risk included 100,000 refugees who had fled their homes after a flare-up in the 15-year-old civil war there.[33]

Civil conflict can jeopardize food security in several ways. First, the recruitment of soldiers for militias draws men away from productive employment in agriculture. Because such conflicts frequently occur in situations in which the farming system is precarious already,[34] such disruptions are amplified, exacerbating the risk of starvation.

Second, recruitment not only diminishes productivity, but it also reduces family income. This is important because famine often is not inevitably the result of drought or failed harvests but provoked by a rapid increase in the disparity between food prices and family incomes. With the major bread winners involved in the fighting, the decline in family incomes can combine with increased food prices generated by a lack of supply—also as a result of conflict—to promote widespread risk of famine. With renewed fighting in Angola following the collapse of a fragile peace accord that held from 1994 to 1998, food was available in the markets, but it was so expensive that many people were unable to afford it. The high cost was especially untenable for the civilians who had fled empty-handed from the countryside to avoid soldiers notorious for their brutality. As a result, more than 180,000 people who had fled their homes were placed at risk, and they overburdened communities whose food resources were stretched to the limit already.[35]

Third, combatants in such conflicts do not depend on well-developed supply lines for their support but usually live off what they can forage, raid, buy, or steal from noncombatants. Aid workers throughout Angola, for example, told stories of ill-trained, starving soldiers showing up at food distribution centers demanding that they receive food. Many had been pressed into service either through a draft or through nighttime roundups of young men in poor neighborhoods.[36]

---

32. Karl Vick, "Sudan's Famine Overwhelms Aid Effort," *Washington Post,* July 7, 1998.

33. James C. McKinley, Jr., "In Sudan, Deadly Epidemic Follows War's Devastation," *New York Times,* July 24, 1998, p. A1.

34. Sub-Saharan Africa, for example, is the only region in the world in which the expansion of arable land contributed nearly as much as yield increases to the growth of cereal production from 1961 to 1990. In contrast, in Latin America, expansion of arable land accounted for only one-third of the recorded production gains. Leif Roderick Rosenberg, "The Strategic Importance of the World Food Supply," *Parameters* (Spring 1997) at *http://www/carlisle-www.army.mil/usaswc/Parameters/97spring/.*

35. Suzanne Daley, "Hunger Ravages Angolans in Renewed Civil War," *New York Times,* July 26, 1999, p. A1.

36. *Ibid.*

Finally, conflict can destroy traditional coping mechanisms that are used in times of food shortage. In Sudan, for example, most families in the regions in which conflict re-emerged ate all their seed stores that they would have used for planting. Others lost most of their cattle in raids by one side or the other—or both.

Although conflicts clearly intensify the risks of famine and starvation, the dynamic sometimes can work in the other direction as well, with the lack of food security influencing political dynamics. Food riots following price hikes on basic commodities sometimes provoke domestic political crises. More dramatically, according to Natsios, "[f]amine has been the precipitating event in more revolutions and coups in the developing world than is commonly understood," and he explains the particularly strong dynamic:

> In many countries the term [famine] conjures up apocalyptic images that are rooted in real historical experience.... People who have watched relatives and friends die from starvation sometimes panic when a famine is predicted; their anger at the state's inability to deal with the emergency can have serious political consequences.

Natsios cites, in particular, the overthrow of Haile Selassie in Ethiopia and the unseating of Numiery in Sudan as both resulting from inadequate government responses to famine and drought.[37]

An example of the potentially strategic impact of health and food security is provided by North Korea. Starvation is prevalent, offset only by some limited, humanitarian food aid from the United States, South Korea, China, and the European Union. The situation is critical because starvation has resulted in increasing levels of illness and an ever more unhealthy population. With the totally closed nature of North Korea, however, it is impossible—from satellite imagery or virtually any other means—to know what is happening to the food and other humanitarian relief being provided. Experts suggest it probably is being funneled to the military, but no one is sure.

The growing food and health crisis in North Korea raises questions about the future of its Stalinist leadership. Estimates by the U.S. Central Intelligence Agency suggest the regime could collapse within three years. Others contend it could happen within one year, unless the United States and others provide additional humanitarian support.

This reality underlines one of the policy dilemmas at the intersection at which health and security issues collide: providing aid alleviates the humanitarian crisis, but it also props up the brutal North Korean regime that, according to some accounts, has the worst human rights record in the world. On the other hand, a failure to provide aid might precipitate a regime collapse that prompts leaders in North Korea to lash out against South Korea, sparking a war on the peninsula that eventually could involve the United States and Japan. North Korea's army is the fourth largest in the world. North Korea has almost 100 surface-to-surface missiles, some of which are likely to be armed with chemical and biological warheads. Seoul (including most of the 80,000 Americans in South Korea) presents an attractive and vulnerable target.

---

37. Natsios, *U.S. Foreign Policy and the Four Horsemen of the Apocalypse,* pp. 13–14.

Sidebar 1: North Korea

Background

Floods: In 1995, North Korea suffered the worst floods in its history. Throughout 145 of the 200 counties, 5.2 million people were affected while 500,000 were left homeless. Farmlands, agricultural machinery, irrigation systems, dams, and pumping stations all were destroyed, and the harvest of 1995 was seriously affected, exacerbating the famine situation. In summer 1996, the situation became exponentially worse when more floods arrived.

Economy: North Korea has recorded negative economic growth for the eight consecutive years since 1992. The loss of traditional trading partners and economic reforms in China have left the country virtually cut off from the outside world. Exports declined from $1 billion in 1992 to $500 million in 1995, a decline of 42 percent. Moreover, factories operate at less than 20 percent capacity and the GNP per capita is less than $1,000.

Famine: Since 1995, the estimated death toll in North Korea from famine is at least 1 million people. This death toll rivals that of Somalia in the 1990s, in which 1.5 million died; and of Ethiopia in the mid-1980s, in which 1 million died as a result of famine. Government rations were down to as low as 100 to 150 grams per person per day—scarcely enough for subsistence. Because of this shortage, people rely on "alternative food" (weeds, roots, and corn stalks) that could cause serious health risks.

Health Situation

Famine has left an estimated 800,000 children under 5 years old (more than one-third of the age group) malnourished (according to UNICEF figures). Checks revealed that children under 6 showed signs of a severe lack of food. Diarrhea, pneumonia, and other acute respiratory infections are increasing among children weakened by malnutrition. In addition, these children have skin infections and a visible lack of hygiene. Their parents are no better off. To compound matters, hospitals and clinics throughout North Korea are reported to be suffering from shortage of essential drugs, medical equipment, and vaccines. Patients often go into surgery without anesthesia. Medical resources purportedly are limited to traditional herbal remedies. Despite widespread use, these remedies are unable to address such acute health problems as widespread infectious disease outbreaks. As if this were not enough, water reservoirs are dry because of extended periods of drought. Food shortages and poor health could prove a lethal combination. Malnourished people are vulnerable to typically benign ailments that, with little or no treatment, rapidly can become life-threatening. Children run an especially

heightened risk from such treatable diseases as measles, polio, and debilitating disorders like diarrhea.

Security Implications

Stunted growth and the early death of children could have a long-term detrimental effect on North Korea's security. In addition, there could be a massive flood of refugees into Asia. South Korea's Ministry of Unification estimates the creation of 30,000 to 2 million refugees depending on the seriousness of the situation:

- **First Stage:** 30,000–50,000 refugees if the current trend in economic output continues;

- **Second Stage:** 100,000–200,000 in the case of national crisis; and

- **Third Stage:** 1 million–2 million in the case of the total collapse of North Korea's government and economy.

The potential collapse of North Korea poses major security challenges to regional actors. First, as a failing state under severe economic stress and famine, the implosion of North Korea could unleash a massive flow of refugees across the Russian and Chinese borders, the Sea of Japan, and the Demilitarized Zone; the migration of malnourished masses would increase the possibility of widespread infectious diseases among the unsuspecting population in Northeast Asia. Second, even if North Korea were to survive indefinitely, the deteriorating health conditions in the country could undermine the future of North Korea's military forces seriously.

Health as a Regional and Global Security Consideration

As the example of Korea suggests, the negative dynamic among declining health, political stability, and potential conflict are not likely to remain within a national boundary. (See Sidebar 1.) The resulting spillover can have serious implications for regional and, possibly, global stability and security. Like the situation within states, the process of interaction between health and security and the relation between cause and effect at the international level is not necessarily direct but assumes a number of manifestations.

First, disease can be a catalyst for conflict. As has been argued, disease can undermine military readiness and, by fostering economic problems, create volatile conditions not just within a country but across an entire region. It is this combination of eroding military capabilities and economic instability that HIV/AIDS in Africa has created. As a result, the U.S. Department of State has expressed concern about the disease as a potential "war starter" or "war outcome determinant."[38]

---

38. U.S. Department of State, "U.S. International Strategy on HIV/AIDS," p. 30.

Second, the combination of disease and violence can provide a rationale for intervention into intra-state conflicts by both military forces of neighboring states and peacekeepers from the international community. Both interventions run the risk of eroding security still further.

Adjacent states may seek to fill any power vacuum created by the eruption of a complex emergency or state failure in a neighbor in which health is a contributing factor in the onset of such conditions. In doing so, it may prompt a reaction that is more widespread throughout the region. The crisis in what was Zaire has become a regional conflict involving not only the Congo and Rwanda, but also Uganda, Angola, and other countries as well. Not only is each participant seeking to influence events in the Congo to suit its interests, but also to shape events so that it emerges as the master of regional dynamics.

Complex emergencies have spurred international interventions largely for humanitarian reasons, although members of the international community sometimes have been prompted by strategic concerns as well. Peace support operations, however, might become more complicated, depending on the impact of disease on military capabilities. On the one hand, policymakers from lower-incidence countries may be reluctant to deploy their forces to high-incidence areas, fearing that those troops not only might become infected, but also that they might spread the disease on their return home.[39] On the other hand, militaries from countries with high rates of infection may find it difficult to supply healthy contingents or that their troops are refused by the UN, a regional organization under whose auspices peacekeepers are deployed (such as the Organization of African Unity [OAU]), or the host country itself.

Clearly, refusing to use infected troops is a politically sensitive decision, particularly if the country concerned has a direct interest in restoring stability in a conflict situation. One analysis suggests that such a decision can lead to charges of racial bias or discrimination.[40] More generally, issues related to disease can exacerbate existing differences between developed and developing countries or, to oversimplify, between "North" and "South." For their part, the limited medical aid provided to developing countries, whether in general or in the context of specific emergencies, can fuel sentiments of frustration and resentment toward countries that do not confront potential health catastrophes regularly. For example, the local head of the World Food Program in Angola estimates that meeting food requirements for 1999 there would cost $120 million; only $31 million had been pledged by mid-year.

In some developed countries, the issue of minority, immigrant populations already has become a sensitive domestic political issue. To the extent that health challenges provoke pressures for further migration from the relatively biologically disadvantaged South to the more benign states of the North, those issues are likely to become more severe. As globalization makes closing borders increasingly impossible, racist politics

---

39. The military is a major means by which diseases are transmitted, considering that it is composed of large groups of young, sexually active men who are conditioned to feelings of invincibility and bravado, have money and time to spend on prostitutes and other forms of casual sex, and are removed from traditional mores and societal constraints on their behavior. Working Group discussions during the project suggested, for example, that the two groups most responsible for spreading HIV/AIDS in Africa were truck drivers and the military.

40. U.S. State Department, "U.S. International Strategy on HIV/AIDS," p. 30.

might become shriller and perhaps have an impact on the outcome of some elections. The potential dangers in this scenario should not be exaggerated. But to the extent that immigrants from developing countries are perceived to create further demands on state services—such as the public health system—newcomers will become unwelcome. In some circumstances—in regions in which there is high unemployment, for example —the environment is almost certain to become more volatile.

Another manifestation of the intersection of health and security in the interactions among states is the growing use of health as a tool in political disputes. To some extent, North Korea has manipulated its food needs to exert leverage on the international community to serve the regime's broader interest of securing global recognition. Perhaps the most egregious example of this utilization of health as a tool in a diplomatic/ security dispute, however, has been Iraq's, particularly in the fight over sanctions imposed following Saddam Hussein's invasion of Kuwait and its defeat in the Persian Gulf War.

Iraq's invasion of Kuwait on August 2, 1990, prompted the UN Security Council (UNSC) to pass Resolution 660 condemning the invasion and demanding an immediate withdrawal. When Iraq did not comply, Resolution 661 imposed a comprehensive trade embargo. Recognizing the humanitarian impact that such a policy could have on the Iraqi population, the trade embargo exempted "supplies intended strictly for medical purposes, and in humanitarian circumstances, foodstuffs,"[41] and the exchange of payment for these purposes. Saddam Hussein's refusal to withdraw Iraqi troops from Kuwait resulted in Resolution 678 of November 28 authorizing member states "to use all necessary means...to restore international peace and security in the area."[42] The resulting Operation Desert Storm forced Iraq to withdraw from Kuwait by February 1991; and, on April 3, 1991, Resolution 687 established a formal cease-fire and set the conditions for the lifting of sanctions.

From the start, the UNSC was sensitive to the effects that sanctions were likely to have on the Iraqi populous. In addition to providing Iraq with a way out from under the sanctions through full compliance with Resolution 687, the UNSC authorized the sale of $1.6 billion of Iraqi petroleum products for the purchase of food, medicine, and humanitarian supplies. This program, dubbed the Oil-for-Food-Program, was expanded in April 1995 through a resolution that provided "for the sale of $2 billion worth of Iraqi petroleum and petroleum products, of which $1.32 billion is available for the purchase of humanitarian goods."[43] Saddam Hussein initially refused to participate in the Oil-for-Food-Program, however, calling it an infringement on Iraqi sovereignty. It was not until May 1996 that he finally relented. The program was expanded in February 1998 when the UNSC allowed $5.21 billion in Iraqi oil sales, of which $3.55 billion is available for the purchase of humanitarian goods.[44]

Although the UNSC was sensitive to the impact that sanctions were likely to have on the Iraqi people, it did not anticipate Saddam Hussein's intransigence and disregard for the health and well-being of the Iraqi people. (See Sidebar 2.) As a result of Saddam

---

41. United Nations S/RES/661 (1990), August 6, 1990.
42. United Nations S/RES/678 (1990), November 29, 1990.
43. United Nations S/RES/687 (1991), April 8, 1991.
44. United Nations S/RES/986 (1995), April 14, 1995.

Hussein's intransigence, the economy of the country plunged, marked by a decline in per capita GNP from $3,500 before the war to $600 today. Four million Iraqis, 20 percent of the population, live in poverty.[45] Water treatment and safe sewage disposal have become nonexistent or inadequate as most of the related infrastructure was destroyed during the Gulf War,[46] which has left drinking water contaminated with enteric diseases that have increased significantly since the end of the Gulf War.

Sidebar 2: Iraq

There has been a significant decline in indicators of health in the Iraqi population since the onset of the Gulf War. These trends, along with Saddam Hussein's continual hold on power, raise questions about the UN sanctions policy on Iraq. Two indicators illustrate the severe decline in overall Iraqi health since the Gulf War. Infant mortality rose from 47 deaths per 1,000 live births in 1989 to 108 deaths per 1,000 live births in 1999. This is an increase of more than 125 percent in just 10 years. Like-wise, the percentage of newborns suffering from low birth weight rose from 9.2 percent to 22.8 percent in the seven years since UN sanctions went into place.[47]

UNICEF, in conjunction with Iraq's Ministry of Health, conducted a survey to determine trends in stunting (i.e., abnormally below-average height for particular age groups), underweight (i.e., abnormally below-average weights), and wasting, (i.e., abnormally low weight *vis-à-vis* a particular height) in Iraqi children. Among 1991, 1995, and August 1996, all three categories of indicators rose steadily and significantly in Iraqi children. Nearly one-third of Iraqi children in the study suffered from stunting in 1996, and 26 percent were underweight for their age.[48] The wasting indicator initially spiked in the five years following the Gulf War, with an increase from 3 percent to 11 percent,[49] but then began to decline and, by October 1997, was at 7.5 percent.[50] This initial increase in wasting followed by a slight decline could be attributed possibly to greater daily caloric intake as a result of the Oil-for-Food Program, which was approved by Saddam Hussein in May 1996 after five years of refusing to participate.

---

45. UN Children's Fund, *Situation Analysis of Children and Women in Iraq—1997,* April 1998, p. 9.
46. *Ibid.,* pp. 31–38.
47. UNICEF and Iraqi Ministry of Health, "Child and Maternal Mortality Survey 1999 Preliminary Report," July 1999, p. 11
48. UNICEF, "Situational Analysis of Children and Women in Iraq," 1997, p. 63, at *ftp://www2.unicef.org/pub/iraqsa.*
49. *Ibid.*
50. UNICEF and Iraqi Ministry of Health, "Nutritional Status Survey of Infants in Iraq," October 27–November 2, 1997, p. 12.

Skyrocketing rates of infectious disease in Iraq may illustrate best the deteriorating health situation in the country. According to the WHO and Iraq's Ministry of Health, many diseases drastically increased in the period between 1989 and 1994, including cholera, typhoid, malaria, measles, and meningitis.[51] These increases in particular were the result of the lack of access to health care facilities and attention since the Gulf War. Enteric diseases like cholera and typhoid proliferated due to a lack of operating water and sewage treatment facilities as well as sewer systems that were reduced to rubble during the war itself. Open sewage largely is responsible for a rampant mosquito population that threatens to spread malaria while the proliferation of rodents infested with sand fleas carrying leishmaniasis are spreading this disease.[52] Meanwhile, cross-border refugee flows and rodent and insect migration could spread these disease outside Iraq.

Aside from poor sanitation conditions, the severe shortage of medical supplies in Iraq allowed easily treatable diseases to spread. Government spending on medical supplies decreased by 90 percent to 95 percent from 1989 levels, and doctors and hospitals are left without basic medicines, anesthetics, and often the electricity needed for operating medical devices.[53] The shortage of food in Iraq is severe, too, and is exacerbating the health situation. Exorbitant food prices force most Iraqis to rely on insufficient government rations, which gives Saddam Hussein further leverage over the Iraqi people. In the last election, Saddam Hussein made voting a requirement for receiving a daily food ration.

In light of this record, a debate has emerged over the extent to which Saddam Hussein manipulates the health issue. Iraq consistently uses health statistics, particularly those related to children, to argue that UN sanctions should be lifted because of the deep distress they inflict on the Iraqi people. This argument appears to have had some resonance, particularly in other parts of the Arab world, which may not like Saddam Hussein but do not like the suffering of the "innocent." Supporters of the sanctions note that exceptions had been made from the very beginning to allow the provision of food, medicine, and other humanitarian assistance. In their view, declining health statistics reflect Saddam Hussein's callous decision not to take part in the Oil-for-Food Program initially and his continued denial of medical supplies to his own people.

This debate was intensified further by the publication of a report in late July 1999 that demonstrates that, in areas of the country controlled by Saddam Hussein, children under age 5 are dying at twice the rate they were before the conflict. The report also shows that in Kurdish areas in which UN officials run food and medical programs the health of the children appears to have improved somewhat.[54] The survey was published jointly by the UN Education, Scientific and Cultural Organization

---

51. World Health Organization and Iraqi Ministry of Health, "The Health Conditions of the Population in Iraq Since the Gulf Crisis," March 1996, pp. 9–14.

52. UNICEF, "Situational Analysis of Children and Women in Iraq," 1997, p. 63, at *ftp:// www2.unicef.org/pub/iraqsa*.

53. *Ibid.,* p. 40.

(UNESCO) and Iraq's Ministry of Health, but the Iraqis dissociated themselves from the findings about the northern part of the country.[54] According to U.S. Department of State spokesman James Rubin, the "bottom line" is that Iraq continues to block aid available through the Oil-for-Food Program and that

> in places where Saddam Hussein isn't manipulating the medicines and the supplies, this works.... We can't solve a problem that is the result of tyrannical behavior.[56]

This decline in the health and well-being of the Iraqi people illustrates the intersection of health and security and highlights the tough choices with which policymakers are faced.

In addition to providing an example of the ways in which the manipulation of food and medical supplies can become a tool in an international security dispute, the situation of Iraq also highlights the problems generated by the health-inspired migration and regional tensions such dynamics can foster.

Iraqis in search of food, employment, and medical attention have begun to migrate. Seasonal migration of labor to agricultural areas has spread enteric diseases into previously uncontaminated water sources. An estimated 80,000 refugees have migrated from Iraq to Turkey and an estimated 771,000 refugees have migrated from Iraq to Iran, taking with them these diseases.[57] An estimated 500,000 refugees are in camps along Iraq's border with Iran and an estimated 200,000 refugees are in camps along Iraq's border with Turkey.[58] The UN High Commission for Refugees (UNHCR) reports extreme strain on resources for providing food, shelter, and repatriation services.[59] Refugee camps have become covers and sources of food and medical supplies for groups opposing the governments of Iran and Turkey. In an effort to suppress opposition groups that use refugee camps as a base, Iran and Turkey have conducted cross-border military excursions into northern Iraq that are potentially destabilizing.

Final Observations

For most of the past decade, the World Bank has argued that unhealthy countries are condemned to slow growth. In a recent commentary on the World Bank's argument, the *Economist* notes that the "idea that ill health reinforces poverty is less familiar than the view that poverty reinforces ill health, but both are equally true."[60]

This discussion highlights that it is not just poverty that ill health reinforces: disease also can intensify a broader cluster of factors that, particularly when in

---

54. UN Children's Fund and Iraqi Ministry of Health, "Child and Maternal Mortality Survey 1999: Preliminary Report," July 1999, Appendix, Table 3.

55. Barbara Crosette, "Children's Death Rates Rising in Iraqi Lands, UNICEF Reports," *New York Times,* August 13, 1999, p. A6.

56. *Ibid.*

57. *Washington Post,* September 3, 1996.

58. *Ibid.*

59. UN High Commission for Refugees, *Iraq Country Profile,* at *http://www.unhcr.ch/world/mide/world.htm/.*

60. "Helping the Poorest," *Economist,* August 14, 1999, p. 11.

combination, can produce profoundly unsettling consequences for the stability and security of states, regions, and, potentially, the international community as a whole. Just as with the narrower relationship between ill health and poverty, however, this linkage between health and security and stability is not familiar. A recent survey of American attitudes about global infectious diseases, for example, reports that, despite awareness and concern about such diseases, most Americans have not yet made the connection between these diseases and U.S. national security.[61]

Perhaps the lack of familiarity with the interaction between health and security results from the fact that the most serious manifestations of those interactions have occurred in the poorest sections of the globe. Much of the foregoing discussion has focused on Africa, in which the United States—and many other countries—do not perceive it necessarily as a security interest of the first order.

This could be changing. On January 10, 2000, Vice President Gore briefed the UN Security Council (UNSC) on the African AIDS epidemic, representing the first time the UNSC has taken up a health issue as part of its agenda. This development and the examples of North Korea and Iraq suggest that health questions are becoming a part of the security mosaic in situations in which the United States identifies important national interests. Health questions may not be big pieces in those mosaics yet, but they contribute to defining the full challenge that the United States encounters in those situations. And they make them more difficult to resolve.

Perhaps most troubling is the fact that the pattern in which the increased burden of disease diminishes the capacity of a state to address not only health problems, but also broader political and social demands, might assert itself in some countries of genuine strategic importance. The ultimate collapse of state capacity is, by all accounts, a catalyst for the kinds of complex emergencies that have come to plague post–Cold War international affairs. If such emergencies erupted in such places of importance as Russia, India, or perhaps China, the impact on regional and global stability and security could be enormous.

---

61. "Americans' Awareness and Attitudes About Global Infectious Diseases: Executive Summary," Survey Conducted for the Global Health Council by Lake Snell Perry & Associates, June 16, 1999, p. 4.

CHAPTER 2

At the Micro Level: "Community Warfare"

Civilians always have been at risk in war, and the laws of war evolved, in large measure, to protect noncombatants. A characteristic of conflicts in the post–Cold War era, however, has been an increased willingness of adversaries in a conflict to inflict pain and suffering on civilian noncombatants as part of a deliberate strategy. The civilian community, which was to be protected, has become the epicenter of violence.

One term used to describe these activities is "humanitarian warfare," defined as "aggression through control and denial of vital humans needs" of a civilian population for the realization of political or military goals.[62] The term appears to be an oxymoron and is not entirely satisfactory in capturing the phenomena of concern, but it does suggest the manipulation of basic human needs that lies at the heart of such a strategy. Another term that has been suggested is "community warfare." This term could be useful, too, because it suggests the target of such a strategy is the civilian community, although it may be interpreted as focusing only on ethnic conflicts. For purposes of this report, both "humanitarian warfare" and "community warfare" are used to specify the practice that has emerged of deliberately inflicting impoverishment and deprivation on noncombatants.

Humanitarian warfare represents a key intersection of health and security because attack on and manipulation of medical resources and food supplies often is integral to the strategy. Starvation, forced migration, and the manipulation of relief operations also are elements of community warfare. This assault on basic human needs can no longer be considered collateral damage or unintended consequences of warfare; subversion of civic order aimed at weakening and destabilizing the adversary's civilian base has become a deliberate strategy of combatants.

Although the laws of war and international human rights law forbid humanitarian warfare, there are few normative frameworks or international mechanisms in place for measuring, ensuring accountability, and punishing the use of community warfare. Part of the difficulty in establishing normative guidelines for humanitarian warfare in international law lies in the fact that there is no clear distinction between the military and civilian populations in many of the low-intensity conflicts that dominate the post–Cold War era. In many low-intensity conflict situations, especially in cases of civil war or insurgencies, combatants are irregular forces raised from grassroots communities, and they generally are not under strict central command. Furthermore, military

---

62. Jack Chow, "Health and International Security," *The Washington Quarterly* 19, No. 2 (Spring 1996), pp. 63–77.

cultures are very different from region to region and some cultures may view humanitarian warfare tactics as legitimate, despite the existence of an international norm against such activities embodied in such instruments as the 1949 Geneva Convention.

The objective of humanitarian warfare is to gain advantage in a conflict through the destruction of civil society by manipulating basic resources for civilian populations, infrastructure, supplies, population demographics, social functioning, and attitudes.

The three most commonly employed tools of community warfare may best be categorized as *privation, forced displacement,* and *psychological campaigns.* Privation involves the denial of goods and services essential to human survival. Forced displacement is designed to disrupt normal social functioning, cleanse an ethnic or religious group from a piece of territory, instill fear, and turn the civilian population against those fighting the war on their behalf. Privation and forced displacement are partly psychological campaigns aimed at breaking the will of civilians while other tactics of intimidation are used to instill fear into a civilian population and drive them into desperation. Humanitarian warfare tactics can shred communities and destroy them physically, functionally, emotionally, and psychologically, leaving them weak, distraught, and compliant.

Privation

Privation attempts to weaken the enemy or support for the enemy by denying access to basic human needs and may be the most common tool of humanitarian warfare. Control of medical resources, civilian food supplies, electrical grids, gas pipelines, water systems, and access to other essential goods or services can give one belligerent significant leverage. One example of the use of privation is Sudan, in which a civil war has raged for 15 years after the government in Khartoum attempted to impose Islamic law on the largely Christian and animist population in the southern part of the country. Today, the conflict is a struggle for political power and control of territories, including the oil fields in central Sudan. Privation has been a notable aspect of the conflict. According to relief workers in Sudan, government forces routinely target feeding centers and hospitals, and the intensity of the attacks seem to increase as the prospects of defeating the insurgents recede. According to one official from Operation Lifeline, for example, the number of attacks in all of 1997 was 25, while in the first six months of 1998 alone there were 28 such attacks. Displaced people in Sudan tell of militias of both sides raiding their camps and villages, stealing cattle, burning huts, and abducting children to sell into slavery.[63]

Privation tactics were also employed in the civil war in the former Yugoslavia, when the Bosnian Serbs besieged Sarajevo, cutting off all supplies and shelling the city to destroy most of the essential infrastructure. Despite a desperate need for food, water, fuel, and electricity, they would not permit aid to enter the city. The Bosnian Serbs essentially attempted break the will of their Muslim adversaries by starving them into submission and making daily life unbearable in terms of even its most basic

63. Hilary McKenzie, "Enmeshed in Conflict and Drought, Southern Sudan Starves," *New York Times,* July 22, 1998.

aspects. Eventually, after intense international pressure, the Bosnian Serbs opened the airport at Sarajevo to allow an airlift of humanitarian supplies. The price for opening the airport, however, was UN agreement that the Bosnian Muslims in Sarajevo would not be able to leave, thereby ensuring their control by the Serbs.

The situation in Sarajevo also highlighted an issue that makes situations involving humanitarian warfare particularly difficult for decision makers in the United States and elsewhere. With few alternatives available, the Sarajevan Muslims used their dire situation to intensify international public attention to their plight. At one point, Muslim officials in Sarajevo even refused relief supplies to underscore their belief that insufficient aid was being provided to the Bosnian Muslims throughout the country.

Promoting a sense of victimization is a reverse tactic in humanitarian warfare. By fostering a sense of victimization, the side under stress can create pressures both for the continued delivery of relief supplies and for external intervention on "their side" to alleviate the humanitarian tragedy. Unfortunately, creating a sense of victimization requires victims. Allegations were made that the Muslims in Sarajevo shelled their own people and blamed it on the Serbs in an effort to turn international public opinion in the Muslims' favor. During the siege of Bihac, the Muslims also sequestered their women and children, ostensibly to prevent panic. Conveniently, such sequestration also created images of victims the international community was unable to ignore.

Assaulting Medical Resources

Under provisions of the 1949 Geneva Convention governing the conduct of war, doctors and other health care workers are to be exempt from deliberate hindrance or attack during a conflict. For their part, the ethics of the medical profession require doctors to provide equal treatment for all, regardless of their status. Post–Cold War conflicts, however, have witnessed the collapse of these standards on both counts.

Perhaps the most striking example of the growing trend of attacking the delivery of medical care was in Kosovo. Medical care in Kosovo initially came under siege in 1989–1990 when Yugoslav president Slobodan Milosevic ordered thousands of ethnic Albanian professionals fired and replaced with Serbs. This action led to the decline in the number of state-run medical institutions in Kosovo by 75 percent, leaving most Kosovar Albanians dependent on a rudimentary health care system manned by doctors in private clinics that lacked access to good equipment and modern medical texts. As a result, such diseases as neonatal tetanus, abdominal typhus, polio, and hepatitis began to appear, and the region suffered more than 170 epidemics between 1990 and 1998.[64]

During widespread fighting in Kosovo in 1998, at least 17 small hospitals and 28 out-patient clinics were destroyed. At public health institutions, Albanians were made to pay for medications while ethnic Serbs received theirs at the expense of the state. In some cases, Kosovar Albanian patients were expelled from hospitals, preventing them from receiving appropriate care.[65]

In the month following the commencement of the North Atlantic Treaty Organization's (NATO) bombing campaign, the assault on what was left of Kosovo's medical system became even more severe. Government troops and paramilitary units attacked

64. R. Jeffrey Smith, "Refugees Say Doctors Targeted in Kosovo," *Washington Post,* April 20, 1999.
65. *Ibid.*

and destroyed 90 community-based health care clinics run by the Mother Teresa Society that were providing assistance to 2,000 patients per day. Medical clinics in Pristina, Kosovo's capital, and elsewhere were not only looted but also booby-trapped to ensure that no one could return and try to restart operations. The Yugoslav army moved artillery, radars, tanks, and other armored vehicles onto hospital grounds, essentially daring NATO to attack them and their "hostages."[66]

Kosovo, of course, is not the only conflict in which medical facilities have been shut down. In Sudan, for example, the relief organization Doctors Without Borders (Médecins Sans Frontieres) had to close a center that had admitted almost 800 children due to continued fighting. Eventually, the compound was completely looted.

A second, particularly pernicious aspect of the assault on the delivery of health care in situations of community warfare is the direct targeting of doctors and other health care professionals. In Kosovo, for example, Physicians for Human Rights documents the

> murder, torture, interrogation, harassment, detention, imprisonment, and forced disappearance of ethnic Albanian physicians.[67]

Serb police apparently branded as an act of terrorism the rendering of medical assistance to members of the Kosovo Liberation Army (KLA), the leading antagonist in the conflict with Serbia. Doctors were harassed particularly if they provided assistance to people living in areas of conflict or previously under KLA control, or even if they worked with international medical organizations.[68]

The goal of such measures appears to be twofold. First, their use seeks to prevent the delivery of health care to an adversary, either directly or through the intimidation of doctors. Second, the assault on medical services appears to be a device to break down the social structure of the adversary. Denying health care in Kosovo, for example, prevented women from obtaining medical care on childbirth, one of life's fundamental transitions. Destroying the medical system is a way of demonstrating dominance, instilling fear and resignation, and dramatizing the hopelessness and futility that would accompany continued fighting.

Manipulating Food Supplies

Another key aspect of the privation dimension of humanitarian warfare is the manipulation or destruction of food supplies. In contemporary conflicts, food has tremendous value. This report highlights the problems of food security and the detrimental relationship among inadequate food security, the increased likelihood of disease, and conflict. Many current and likely future conflicts will be in regions in which food security is tenuous in any case. Controlling food supplies in such situations provides enormous leverage to the side that can achieve it. As Jack Chow points

---

66. *Ibid.*

67. See Physicians for Human Rights, *War Crimes in Kosovo: A Population-Based Assessment of Human Rights Violations of Kosovar Albanians by Serb Forces* (New York, N.Y.: Columbia University, 1999), p 104.

68. *Ibid.,* p. 107.

out, "In famine-racked sub-Saharan Africa, the struggle to control food defined war strategy."[69]

One goal of seeking control of the food supply is to ensure sustenance for one's own forces. In Sudan, the UN reported on "leakages" of food intended for famine victims to troops through looting and robbery after the food was distributed to hungry families. Another method of leakage was the *tayheem,* a traditional Sudanese taxation system through which civilians had to give food to officials of the Sudanese People's Liberation Army.[70]

A second objective of controlling food supplies is to deny it to the adversary's fighters or the population that supports them. Sudanese prime minister Sadiq al Mahdi commented to a UN Children's Fund (UNICEF) official, for example, "your food is killing my soldiers."[71] As a result, Sudanese officials diverted food from Dinka tribesmen in the south, whose loyalties were suspect. The policies of the Sudanese government regarding food supplies led Dick McColl, chief of staff to the then administrator of the USAID, to argue that "I think the [Sudanese] government has been fully prepared to let people starve" as a way to punish the southern rebels and their supporters. According to Sudan's government, however, the region was too insecure to allow food to be delivered, but most international aid organizations shared the view of U.S. officials.[72]

The strategic value of food, however, is more important than its nutritional value to the troops of either side. This value and its implications are well articulated by former OFDA director Natsios:

> Food aid has economic, military, and political usefulness based on its biological necessity in sustaining life. Food is a major target because persons cannot live without it; it can be sold and resold, hoarded until prices rise and profits are higher, used to pay troops or militia or to purchase loyalty of other population groups in conflict, or denied to an enemy. In many complex emergencies food aid replaces paper currency, which is either unavailable or so devalued that it is useless. The shear bulk of food makes it visible: it attracts the attention of anyone with a gun. Medicine is none of these, though it is sometimes stolen and resold. Because of these properties, the presence of food aid increases the level of insecurity in many emergencies.[73]

Forced Displacement

Forced displacement is an aspect of humanitarian warfare most recently used in Kosovo as part of Yugoslav president Milosevic's ethnic cleansing campaign aimed at reestablishing the Serbian presence in the historic region. In this case, the Serbs used their historic claims to the territory to justify the expulsion of ethnic Albanians.

---

69. Chow, "Health and International Security," p. 67.
70. "U.N. Finds Food Aid Goes to Sudan's Troops," *New York Times,* September 10, 1998.
71. Quoted in Chow, "Health and International Security," p. 67.
72. Philip Shenon, "US Urges Sudan to End Restrictions on Food Airlift to South," *New York Times,* May 3, 1998.
73. Natsios, *U.S. Foreign Policy and the Four Horsemen of the Apocalypse,* p. 155.

The distinction between military and civilian may have been blurred because the KLA is largely an irregular, non-uniformed force raised at the grassroots level. For Yugoslav security forces, this means that all Kosovar Albanians represent potential KLA insurgents.

In Kosovo, Rwanda, and elsewhere, the forced displacement of massive numbers of people created enormous refugee problems, with hundreds of thousands forced to flee to neighboring countries. The refugee camps that they then congregate in can become breeding grounds for disease that can spread rapidly through a refugee population living in extremely close quarters.[74] Improper sanitation often contaminates the only available drinking water; and nutritional deficiencies increase vulnerabilities to disease, particularly for people living in such close proximity.

The refugee camps themselves can become a tool in the conflict in several ways, and controlling them can assume considerable importance. First, refugee camps can be a secure base for cross-border guerrilla operations as well as a reservoir of new recruits.

Second, the camps can become a source of power. Refugee camps often are controlled by militants in the conflict who are not likely to have disarmed. One lever of control is to manipulate resources intended to relieve the humanitarian disasters that the camps pose. The almost 2 million refugees who fled to Zaire were located in camps controlled by 10,000 or more former Rwandan militia members. According to a representative of the UNHCR,

> The way the camp [near Goma] was organized, it was the militiamen who determined food distribution, access to hospitals. [Militia] police ran the camp. The refugees were more like hostages than refugees getting direct aid.[75]

Indeed, the abuse by those who controlled the camps was underlined by stories of returned refugees that the guerrillas used physical and psychological coercion to keep them in the camps.[76] Apparently, the controllers of the camps in Zaire proved so objectionable that two of the most prominent international relief organizations—Doctors Without Borders and the International Rescue Committee—pulled out.

Another objective in seeking control of the refugee camps is ensuring that international attention is focused on the humanitarian crisis. The notion of victimization comes into play in this situation as well. So long as refugees are forced to live in such difficult conditions, international relief is likely to flow, providing more resources to be controlled by those who hold sway in the camps.

---

74. An estimated 60,000 cases of cholera and 10,000 deaths occurred, for example, in a one-month massive epidemic among Rwandan refugees in Goma, in what is now the Congo. Susan Cookson, Ronald Waldman, Brian Gusulak et al., "Immigrant and Refugee Health," *Emergency Infectious Diseases,* Vol. 4, No. 3 (July–September 1998), at *http://www.cdc.gov/nci/eid/vol4no3/cookson.htm*.

75. Quoted in Ben Barber, "Feeding Refugees or What? The Dilemma of Humanitarian Aid," *Foreign Affairs* 76, no. 4 (July/August 1994), p. 11.

76. *Ibid.* Their techniques included withholding information that the government of Rwanda promised safety to returnees and spreading propaganda that Rwanda's leaders would slaughter them if they returned.

The Challenge to Aid

Efforts to control the refugee camps by the combatants, as well as the broader manipulation of food and medical resources, pose difficult policy problems for those who would provide aid to avert humanitarian disasters. The intention of aid donors is that such assistance should be free of politicization. Jack Chow bluntly identifies the problem with this desire in arguing that "Keeping people alive when others want them to starve politicizes assistance because help is perceived as a potential threat."[77] Aiding the besieged narrows the disparities in power between combatants. When one combatant sees that aid is strengthening his opponent—either physically or politically—that aid becomes, in his eyes, a legitimate target to control or destroy. Assistance routed through Eritrea bolstered the rebels there, for example, because it strengthened their political claims to be not only capable of governing but actually doing so. As a result, Ethiopian government forces began to attack that assistance.

A second challenge for aid donors is the fact that recipients can exert substantial leverage. In many cases, donors must depend on the consent of the recipients to provide assistance. In such situations, players that might seek to intensify the sense of victimization have a useful means for doing so. As mentioned, the leaders of Muslims in Sarajevo rejected UN shipments to protest the paucity of aid to other Muslim enclaves, apparently willing to allow the people of Sarajevo to suffer for the sake of securing their political objectives.

A third threat to aid donors is the increasing danger to the aid workers themselves. Just as with members of the medical community, relief workers increasingly are targeted by the combatants who see their efforts as bolstering the other side. In Kosovo, for example, between summer 1998 and spring 1999, 10 workers from the Mother Teresa Society were killed, 6 were permanently disabled by gunshot, and at least 1 other was missing.[78]

Psychological Campaigns

Humanitarian warfare measures are aimed at instilling fear into a population that otherwise might be inclined to support the other side in a conflict. Deliberate campaigns of rape are intended to destroy the familial, generational, and communal bond by tarnishing females. Sniper fire aimed at Bosnian children on their way to school or civilians collecting water or scraps for firewood is also designed to break the will of the adversary by instilling fear, by intimidating, creating a sense or loss of control and the feeling of hopelessness.

Torture, mutilation, and sexual assault are all part of the pattern. In Sierra Leone, the rebels implemented a campaign code-named "No Living Thing" that included such brutalities as singling out women and children for sexual abuse, severe mutilation, and other atrocities. According to a report from Human Rights Watch, although they had engaged in brutal tactics for years, the rebels appeared to become more desperate and their butchery more severe after the arrival of Nigerian forces, which

77. Chow, "Health and International Security," p. 68.
78. Smith, "Refugees Say Doctors Targeted in Kosovo."

constituted the bulk of the peacekeepers sent to the country under the auspices of the Economic Community of West African States (ECOWAS). The report author argues that the rebels' strategy was designed "to put themselves back on the chessboard."[79] Through these atrocities, they sought to make the civilian population subservient and make themselves a player with whom both the government and the peacekeepers had to deal.[80] In general, attacks on the physical and mental health leave long-term psychological scars that will affect the health of these societies well into the future.

Final Observations

In the face of human misery, the inclination for Americans and many others always will be to try to help. But a contending view suggests that assistance, at least in some cases, can prolong a conflict. The concern is that aid will be used as a substitute for political initiatives aimed at resolving the root causes of the conflict.

There is no question that long-term political solutions are preferable to short-term humanitarian measures. But long-term solutions are not always possible, and actors external to the conflict certainly are not often in a position to impose them. The dilemma of responding to conflicts marked by humanitarian warfare, therefore, will continue.

Some may argue that NATO's bombing campaign in the former Yugoslavia marked a watershed in the prospects for military interventions for humanitarian goals. Yet NATO's actions in the Balkans were driven by far more than humanitarian motives, although they were not unimportant. Whether a similar set of factors can be replicated elsewhere, particularly the further one moves from NATO's borders, is a question that cannot be answered definitively. No one is likely to be criticized, however, for voicing skepticism about the prospects.

Community warfare reduces the intersection of health and security to very human terms. It raises questions for policymakers, relief workers, the medical profession, and the military alike. Good answers to those questions are not likely to be developed by each of those groups alone; instead, humanitarian warfare poses a complex challenge that is likely to be solved only by a multifaceted, holistic response in which the various actors understand the stakes involved for themselves and for others and ensure that the critical tools of policy—to meet both security and humanitarian goals—work together instead of at cross-purposes.

---

79. Barbara Crosette, "In West Africa, a Grisly Extension of Rebel Terror," *New York Times*, July 30, 1998.

80. *Ibid.*

CHAPTER 3

Biological Weapons

Writing 50 years ago, Vannevar Bush observed,

> Without a shadow of a doubt, there is something in man's make-up that causes him to hesitate when at the point of bringing war to his enemy by poisoning him or his cattle and crops or spreading disease.[81]

Biological weapons (BW) are widely regarded as an absolute perversion of human knowledge, and medical science in particular. But man's perversity seems to be asserting itself at the end of the twentieth century. Doubts are being raised about the validity of Bush's observation that man will hesitate to disseminate disease among his adversaries. The threat of BW looms larger today than at any time in the past 50 years. Fears have emerged about the erosion of the international norm against such weapons. The BWC that bans such weapons is perceived as increasingly untenable. For example, Japanese terrorists attempted to use BW before they chose to resort to nerve gas in the Tokyo subway.

Biological weapons represent one of the most intricate intersections of health and security in the world today. Successfully managing the transit of that intersection will impose heavy demands not only on members of the national security community, but also on health professionals, scientists, lawyers, and many others.

Biological warfare is the deliberate spread of disease among an adversary's population, livestock, or plant life. BW involve the use of living organisms or the byproducts of living organisms as instruments for waging conflict.

The use of BW stretches far back into history. An early example can be dated to 1346 at Kaffa (now Fedossia, Ukraine) in which plague-ridden corpses of Tartar soldiers were catapulted over the walls of the besieged city. Another familiar historical incident is Sir Jeffrey Amherst's provision of smallpox-infested blankets to native Americans around Fort Pitt during the French and Indian Wars.[82] Development of "modern" BW dates to the early decades of the twentieth century. Some people contend that biological agents were used during World War I,[83] and every major combatant—including the United States, Canada, Britain, France, the Soviet Union,

---

81. Quoted in Joshua Lederberg, "Introduction," in Joshua Lederberg, ed., *Biological Weapons: Limiting the Threat* (Cambridge, Mass.: The MIT Press, 1999), p. 6.

82. For more information on the more dated history of biological weapons, see Mark Wheelis, "Biological Warfare Before 1914: The Prescientific Era," in Erhard Geissler and John van Courtland Moon, eds., *Biological and Toxin Weapons Research, Development, and Use for the Middle Ages to 1945: A Critical Comparative Analysis* (Oxford, U.K.: Oxford University Press, 1999).

83. Stockholm International Peace Research Institute, *The Problem of Chemical and Biological Warfare,* Vol. I, The Rise of CB Weapons (New York, N.Y.: Humanities Press, 1971), pp. 216–217.

Germany, and Japan—had a BW program during World War II. Japan, however, was the only country that actually used BW during that conflict.[84]

During the Cold War, BW were not considered particularly good battlefield weapons; instead, their role was seen more in strategic terms, as possible weapons against cities or economic infrastructure. The Soviet Union apparently took this latter view.[85] For the United States, however, such a role was redundant considering its growing nuclear capabilities. This is one reason President Richard Nixon made the decision to end the U.S. offensive BW program in 1969. Some people argue that President Nixon's decision reflected a determination that BW were useless. As British expert Gradon Carter argues,

> the abandonment of BW arose from political considerations.... The utility of BW had been demonstrated by all possible means, short of use in war, and the established feasibility could clearly not become disestablished with time.[86]

President Nixon determined that

> biological agents were marginal, if not irrelevant, to a United States equipped with other conventional and nuclear assets and not confronting an imminent military threat.[87]

Today, BW could become the weapon of mass destruction "of choice," particularly for actors looking for relatively cheap leverage in pursuit of ambitious goals. BW could be of interest, for example, to countries with regional security designs against neighbors with limited military capabilities. They also could be valuable to such states in confronting a country like the United States, whose military power cannot be contested directly but that might be countered with an "asymmetric" strategy. The emergence of terrorist groups or fanatical individuals with motivations and world views far different from those of traditional political terrorists makes BW use by non-state actors a contingency of increasing concern. Indeed, some people contend that bioterrorism is the "single most dangerous threat to [U.S.] national security in the foreseeable future."[88]

---

84. Japan's program is described in Peter Williams and David Wallace, *Unit 731: The Japanese Army's Secret of Secrets* (London, U.K.: Hodder and Stoughton, 1989), and Sheldon H. Harris, *Factories of Death: Japanese Biological Warfare, 1932–45, and the American Cover-Up* (London, U.K., and New York, N.Y.: Routledge, 1994). Since the publication of these works, more details about Japan's BW program have begun to emerge through research by the Simon Wiesenthal Center and the Global Alliance for Preserving the History of World War II in Asia. This evidence suggests that, in addition, Japan may have used BW in present-day Burma, China, Indonesia, Russia, Singapore, and Thailand. The number of fatalities caused by the program is disputed, but the higher levels put the number in the hundreds of thousands. *New York Times*, March 4, 1999.

85. Ken Alibek, former deputy director of the Soviet Union's major Biopreparat BW program, in a presentation to the Seminar Series on "Responding to the Biological Weapons Challenge," sponsored by the Chemical and Biological Arms Control Institute, May 19, 1998.

86. Quoted in British Medical Association, *Biotechnology, Weapons, and Humanity* (Amsterdam, Netherlands: Harwood Academic Publishers, 1999) p. 23.

87. Brad Roberts, "New Challenges and New Priorities for the 1990s," in Brad Roberts, ed., *Biological Weapons: Weapons of the Future?* (Washington, D.C.: CSIS, 1993), p. 69.

Figure 7

Infective Doses for Select Biological Agents	
Agent	**Infective Dose (aerosol)**
Anthrax	8,000 to 50,000 spores
Brucellosis	10-100 organisms
Plague	100-500 organisms
Q Fever	1-10 organisms
Tularemia	10-50 organisms
Smallpox	Assumed low (10-100 organisms)
Viral Encephalitis	10-100 organisms
Viral Hemorrhagic Fevers	1-10 organisms
Botulinum	0.0001 microns/kilogram (Type A)
Staphylococcal enterotoxin B	30 ng/person (incapacitating) 1.7 microns/person (lethal)

Source: David Franz, et. al., "Clinical Recognition and Mangement of Patients Exposed to Biological Warfare Agents," *Journal of the American Medical Association (JAMA)*, 8/6/1997.

Biological weapons are potentially attractive to both states and terrorists because of a number of characteristics. They are relatively simple to produce, and the agents and equipment needed to develop them are widely available because of their use in legitimate commercial enterprises from manufacturing pharmaceuticals to brewing beer. Compared with other capabilities, BW also are relatively inexpensive, and covert programs are relatively easy to conceal. Perhaps most important, BW can be strategic in impact, creating casualties potentially comparable to those of a small nuclear weapon.[89] (See Figure 7: Infective Doses for Select Biological Agents.)

Biological weapons generally fall into four categories: bacteria, viruses, rickettsia, and toxins. As lethal as chemical weapons can be, biological weapons are many times deadlier, pound-for-pound. Laboratory tests on animals, for example, indicate that, if disseminated and inhaled effectively, 10 grams of anthrax spores are capable of producing as many casualties as a ton of chemical nerve agent.[90] (See Figure 8: Casualty Estimates Produced by Hypothetical Biological Attack.)

There are many potential human biological pathogens. A NATO handbook, for example, lists 39 possible agents.[91] The pathogens involved present a wide spectrum, from those with little ability to cause disease or disability to some of the most deadly agents known to man. A "good" biological weapon, however, will exhibit a number of characteristics that promote its effective performance. (See Figure 9: Characteristics of

---

88. R. James Woolsey, former director of Central Intelligence in the Clinton administration, quoted in "Bioterror," *Boston Phoenix,* March 19–25,1999, p. 20.

89. Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks* (Washington, D.C.: U.S. Government Printing Office, 1993), p. 53.

90. *Ibid.,* p. 3.

91. Mark G. Kortepeter and Gerald W. Parker, "Potential Biological Weapons Threats," *Emerging Infectious Diseases,* Vol. 5, No. 4 (July–August 1999), at *http://www.cdc.gov/ncidod/eid/vol5no4/korteper.htm/.*

Figure 8

Casualty Estimates Produced by Hypothetical Biological Attack*			
Agent	*Downwind reach (km)*	*Number dead*	*Number incapacitated*
Rift Valley fever	1	400	35,000
Tick-borne encephalitis	1	9,500	35,000
Typhus	5	19,000	85,000
Brucellolis	10	500	125,000
Q fever	>20	150	125,000
Tularemia	>20	30,000	125,000
Anthrax	>20	95,000	125,000

*Assuming a release of 50 kg of agent by an aircraft along a 2 km line upwind of a population center of 500,000.
Source: George Christopher, et. al., "Biological Warfare: A Historical Perspective,"
Journal of the American Medical Association, 6 August 1997

Effective Biological Weapons.) Several of these characteristics relate to the medical difficulties created by such weapons. (See Sidebar 3.) Indeed, some classical biological agents—anthrax, plague, and tularemia, for example—represent potentially enormous burdens on the medical systems of the victim population, whether military or civilian.

Smallpox has emerged as a possible biological agent of particular concern, largely because of its impact on the medical system. Smallpox is considered a good biological weapon, particularly for terrorists, because it is highly contagious. During a terrorist scenario played out at a conference in Washington, D.C., in February 1999, public health officials were unable to stop the spread of the disease after a hypothetical attack. The outbreak in the scenario resulted in 15,000 cases within two months, and failure of containment turned the outbreak from a local to a global problem.[92] Smallpox virus is not widely available, however; indeed, the WHO declared in 1980 that smallpox had been eradicated as a disease worldwide. But as Sidebar 3 indicates, concerns remain about whether the only remaining stocks of smallpox are those held in the United States and Russia for scientific and medical purposes.

Sidebar 3: A Smallpox Threat?

Variola virus, the virus that causes smallpox, has been a scourge on mankind since it first infected humans some 7,000 to 10,000 years ago. Experts attribute approximately 300 million deaths in the twentieth century alone to this terrible plague. Smallpox is an "explosively contagious airborne virus."[93] It is easily transmitted via normal human communication. Coupled with its easy transmission is its 10- to 14-day incubation period during which infected individuals may show no signs or

---

92. Tara O'Toole, "Smallpox: An Attack Scenario," *Emerging Infectious Diseases,* Vol. 5, No. 4 (July–August 1999), at *http://www.cdc.gov/ncidod/eid/vol5no4/otoole.htm/.* See also Jason Bardi, "Aftermath of a Hypothetical Smallpox Disaster," *Emerging Infectious Diseases,* Vol. 5, No. 4 (July–August 1999), at *http://www.cdc.gov/ncidod/eid/vol5no4/bardi.htm/.*

93. Richard Preston, "The Demon in the Freezer," *New Yorker,* July 12, 1999, p. 44.

symptoms. Taken together, these two factors preclude most hopes of an early intervention focusing on quarantine to contain the disease before it spreads to thousands of individuals.

After a valiant decade-long effort that began in 1966 and ended with the last reported case of smallpox in 1977 in Somalia, the World Health Organization (WHO) officially announced that the disease had been eradicated in 1980.[94] Countries were told to curb vaccination programs.

The eradication of smallpox as a disease did not eliminate the virus, however. Live samples of the smallpox virus were maintained at the U.S. Centers for Disease Control and Prevention in Atlanta, Georgia, and Russia's State Research Center of Virology and Biotechnology in Kolts-ovo. The WHO decided in 1996 to destroy the remaining samples by June 30, 1999. As the date of the final eradication approached, however, doubts surfaced as to the appropriateness of destroying the only remaining samples of the virus believed to exist. On May 22, 1999, the WHO, acting on the strong urging of the Clinton administration, postponed the final eradication until 2002.[95] The decision has launched an intense debate.

Arguments for and Against the Final Eradication of Smallpox

D. A. Henderson, director of the Johns Hopkins Center for Civilian Bio-defense Studies and a leader in the WHO campaign to eradicate smallpox, offers several of the reasons the smallpox virus should be eliminated. One is cost. Henderson argues, "To get a new antiviral drug against smallpox will cost approximately $300 million and that kind of money simply isn't there."[96]

A second reason is the contention that the validity of retaining the samples to continue research on the virus is misconstrued. Supporters note that, worldwide, only one facility currently is conducting this type of research.[97] Henderson also argues that a new drug is impractical due to the difficulties inherent in developing it, the financial demands for such development, and the fact that human smallpox forms pustules that are practically impenetrable by vaccines and drug treatments.[98] Finally, he contends that, because the vaccine for smallpox was derived from cows, there is no need to retain human smallpox samples for vaccine development.[99] In addition, he explains that the eradication of smallpox samples

---

94. For detailed timeline of seminal events in the history of smallpox, see Leslie-Ann Levy, Mei-I Zien, and Alan Elias, "Controversy Surrounds Smallpox Decisions," *CBW Chronicle,* Henry L. Stimson Center, Washington, D.C., August 1999, p. 3.

95. See "Smallpox Virus Destruction: Why Change Direction?" *Biodefense Quarterly: A Publication of the Johns Hopkins Center for Civilian Biodefense Studies,* Vol. 1 No. 1 (June 1999), p. 1.

96. *Ibid.,* p. 55.

97. See "Smallpox Virus Destruction: Why Change Direction?," p. 2.

98. *Ibid.,* p. 2.

that now exist would establish an international norm against the acquisition of the smallpox virus: "The creation of a general moral climate against smallpox would effectively make the possession of the virus, anywhere, a crime against humanity."[100]

Although the arguments of Henderson and others in favor of elimination are powerful, strong arguments also exist to support the competing position against elimination. One of the primary motivations behind the postponement relates to the argument that the remaining samples are needed to continue research on drugs and treatments and to heighten the identification process should an outbreak occur. Several elements delineate this line of thinking. First, adequate stocks of the virus must be maintained if research is to continue and a large-scale vaccination program is be undertaken. In addition, adequate stores would be required for the development of new types of vaccines. Second, to enhance identification and diagnostic capabilities, more extensive knowledge of the genome variability of the smallpox virus is required. This entails the use of live specimens and assumes adequate supplies. Third, the use of animal models in developing new vaccines and treatments would be extremely valuable, and these types of models could be carried out only with live smallpox samples. Fourth, live samples of the smallpox virus would be needed to study the response mechanisms of the human immune system. Finally, smallpox virus proteins have potential as reagents in studies of human immunology. Live specimens would be needed at least until sufficient amounts of smallpox isolates could be cloned and sequenced.[101]

A second factor that influenced the decision to delay the eradication of the final samples of smallpox is the overwhelming lack of smallpox vaccine worldwide. From the viable stores of smallpox vaccine that exist in the United States today, approximately 7 million doses could be administered to U.S. citizens. It would take approximately 100 million doses of vaccine to contain a surging outbreak of smallpox in the United States alone.[102] Production of adequate levels of vaccine could take more than two years and cost untold millions of dollars. What would happen if an outbreak occurred today, when there is virtually no immunity whatsoever to smallpox and the capability for widespread vaccination is all but defunct?[103]

A third factor influencing the delay in the final eradication of the last remaining smallpox stores relates to security. Recent allegations have claimed that the former Soviet Union, while paying lip-service to existing

99. *Ibid.,* p. 2.
100. Preston, p. 51.
101. For further explanation, see the Institute of Medicine, Board of Global Health, *Committee on the Assessment of Future Scientific Needs for Live Variola Virus* (Washington, D.C.: National Academy Press, 1999), pp. 2–4.
102. *Ibid.,* p. 51.
103. *Ibid.,* p. 46.

arms control regimes, has worked extensively to develop smallpox as an offensive biological weapon and there are concerns that samples of smallpox may have left the country. Ken Alibek, the first deputy chief of Biopreparat, the Soviet bioweapons development program, who defected in 1992, details Soviet development of 20 tons of smallpox kept at Soviet military installations for quick loading onto intercontinental ballistic missiles targeting the United States.[104] In addition, Peter Jahrling, the principle scientific adviser at the Army Medical Research Institute of Infectious Diseases (USAMRIID), reports that Russian scientists admitted that

> they didn't account for every ampoule of the virus and there were plenty of opportunities for staff members to walk away with samples of the virus. Nor could the Russians account for the whereabouts of their former employees.[105]

With the availability of tons of smallpox virus and scores of workers with experience in working on smallpox, the concern that rogue states and/or terrorist organizations have acquired a viable smallpox weapon has grown tremendously. In addition to concerns that Russia may be continuing to work on smallpox development as a biological weapon, those countries that are suspected of either having clandestine stocks of smallpox or trying to buy or steal the virus include China, North Korea, Iraq, Iran, and Cuba.[106]

The Current Challenge

Countries suspected of pursuing BW programs are listed in a 1993 study by the Office of Technology Assessment (OTA). Specific countries were included by the OTA when they appeared in lists of suspected BW proliferators in more than two-thirds of the nongovernmental studies of BW proliferation the OTA assessed at that time. In the six years since the OTA study, the list of countries of greatest concern regarding BW proliferation has changed very little. More recent U.S. government studies have expressed the concern that more than a dozen countries may be interested in BW.[107] (See Figure 10: Biological Weapons: States of Concern.)

Three important points should be made about the BW programs of these countries. First, producing a chemical or biological agent is not the same as developing a weapon. Many additional steps must be taken successfully before a weapons capability

---

104. Alibek, presentation at "Responding to the Biological Weapons Challgenge," May 19, 1998.
105. *Ibid.*
106. Preston, p. 46.
107. See, for example, Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, D.C.: U.S. Government Printing Office, 1997). For individual assessments of the chemical and biological weapons programs in China, Iran, Iraq, Libya, North Korea, and Syria, see the Case Studies on each respective country published as part of *The Deterrence Series* (Alexandria, Va.: Chemical and Biological Arms Control Institute, 1998).

is achieved, including designing, testing, and building munitions; acquiring effective delivery systems on which the munitions must be integrated; and conducting appropriate logistics, defense planning, and training efforts. Some of these steps are not easy. The most difficult phase of a BW program is not acquiring the agent, but engineering an effective device that disseminates the agent in a form that accomplishes the goals of the attack.

Second, intelligence is not always sufficient to determine the precise status of a program. In the case of Iraq, many analysts were surprised by the scope of Saddam Hussein's BW

Figure 9

> Characteristics of Effective Biological Weapons
> ◆ High virulence;
> ◆ No widespread immunity;
> ◆ Insusceptibility to medical treatments;
> ◆ A short incubation period between infection and the onset of symptoms;
> ◆ Infection in reliably small doses;
> ◆ Stability for transmission as an aerosol;
> ◆ Easily produced in large quantities;
> ◆ Ease of transport and storage;
> ◆ Survival of environmental stresses;
> ◆ Penetration of unprotected ships, military equipment on the ground (e.g., tanks), or buildings
> ◆ Availability of either medical or physical protection for users.

program and the speed with which it had moved to weaponization. In many cases, the United States simply will not know enough to determine whether a country is only a dabbler conducting research on various agents without necessarily having made the decision to go to full-scale production or weaponization, or whether it is a committed proliferator.

Third, while there are similarities in various programs, they are not necessarily identical. As discussed below, the biotechnology revolution is capable of providing unique points of entry into a program that were not available when earlier efforts were under way. As the OTA points out, each pathway

> involves tradeoffs among simplicity, speed, agent shelf-life, and visibility. The choice of pathway would therefore be affected by the urgency of a country's military requirement, its desire to keep the program secret, its level of concern over worker safety and environmental protection, and the existence of embargoes on precursor materials and production equipment.[108]

Whatever pathway is chosen, however, it is wrong to assume that those of the future will be the same as those that led to the development of such capabilities in the past.

Ongoing Challenges

Coming to grips with chemical and biological weapons (CBW) proliferation is complicated by three factors.

First, as has been mentioned, much of the material and equipment in a CBW program is "dual-use." Many agents and much of the equipment involved in making BW also have legitimate commercial uses. The international community recognizes the problem inherent in the dual-use nature of biological material and equipment. It has

---

108. U.S. Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction* OTA–BP–ISC–115 (Washington, D.C.: U.S. Government Printing Office, 1993), p. 18.

Figure 10

> Biological Weapons:
> States of Concern
> China
> Iran
> Iraq
> Libya
> North Korea
> Syria
> Taiwan

attempted to impose some regulation through the activities of the Australia Group (AG), an informal mechanism for coordinating biological export controls. The 31-member AG is under attack currently from radical non-aligned countries for being discriminatory and violating the spirit of the Biological Weapons Convention (BWC), which, in addition to banning weapons, also commits parties to share technology and information for peaceful purposes. In response, members of the AG, frequently led by the United States, argue that the AG not only is consistent with the treaty but also provides a mechanism for implementing the commitment not to transfer equipment or material that could facilitate development of another country's BW program.

Second, proliferation of chemical weapons has been described as the

> unfortunate side effect of a process that is otherwise beneficial and anyway impossible to stop: the diffusion of competence in chemistry and chemical technology from the rich to the poor parts of the world.[109]

The same can be said of BW. This diffusion of capability increasingly creates a world of "virtual BW programs" in which the critical factors shaping the proliferation landscape are not technical but political choices.

Another dimension of the diffusion problem is expertise. One aspect of this problem is the leakage of experts from such places as the former Soviet Union that had or have major BW programs. A second is the training of foreign nationals in the United States and elsewhere in the West in scientific disciplines that might be exploited for BW purposes. Clearly, not all foreign students in the hard sciences or engineering are proliferation risks. But experience—such as that with Iraq—demonstrates that foreign-trained nationals often take lead roles in a proliferator's programs.

Finally, current thinking about BW was shaped primarily by the legacy of the Cold War and now is too narrow.[110] In major wars, BW could have a broader range of uses than has generally been appreciated. Their use may be threatened, for example, to dissuade military action or deter intervention by an outside state or coalition before actual military conflict begins. BW also may be employed to cripple an intervention in its early stages in order to prevent the conflict from progressing to a decisive encounter. Psychological intimidation or instilling panic in civilian populations are still other objectives. Regimes defeated on the battlefield also may resort to BW to prevent the elaboration of a post-conflict outcome that represents a strategic defeat and threatens the existence of the regime or severely limits its freedom of action.

---

109. Julian Perry Robinson, "Chemical Weapons Proliferation: The Problem in Perspective," in Trevor Findlay, ed., *Chemical Weapons and Missile Proliferation* (Boulder, Colo.: Lynne Rienner, 1991), p. 26.

110. This discussion is based in part on the work of Brad Roberts, who has done extensive analyses of unexpected uses of weapons of mass destruction.

Major theater wars, however, are not likely to be the most frequent conflict situations in which U.S. forces find themselves; instead, lower-scale conflicts, such as peace enforcement operations, humanitarian assistance missions, or noncombatant evacuations, are more likely scenarios. Threatening to use biological (or chemical) weapons to compel the departure of U.S. forces in such situations is one possible contingency. So, too, is BW use to target congregating civilians preparing for evacuation. Policymakers and defense planners have given almost no attention to confronting the use of biological (or chemical) weapons in such scenarios.

The Bioterrorism Threat

Over the past several years, a confluence of events—the World Trade Center bombing, the Tokyo subway sarin gas attack by the Aum Shinrikyo, and the bombing of the Murrah Federal Building in Oklahoma City—focused attention on the growing threat of terrorist use of nuclear, biological, or chemical (NBC) weapons. The threat of bioterrorism, in particular, has become the subject of intense concern.

Many of the characteristics of BW make them particularly attractive for terrorists. The science involved in making BW is not "cutting-edge" but at least 70 years old and well within the grasp of a trained microbiologist. Most of the equipment needed to produce BW is "dual-use" and can be obtained readily. In addition, the cost of producing such weapons is relatively low; and they can be produced in relatively small spaces, diminishing the chances for discovery by law enforcement or intelligence officials.

Considering that the impact of an attack may not be felt for several days, BW also are attractive if the attacker wishes to remain anonymous. This is particularly relevant in light of the "new" terrorists who appear less interested in claiming responsibility for an attack to draw attention to their political cause and more concerned about merely killing large numbers of people. For those with such a goal, BW have another attractive characteristic: lethality. According to the OTA, if BW were used under optimal conditions, a single attack in such a major metropolitan area as Washington, D.C., could kill as many as 3 million people.[111] Fortunately, such an attack would require sophisticated BW capabilities, which most would agree have yet to diffuse from state to non-state groups.

The singular nature of BW means that a bioterrorism incident would play out quite differently than an attack with chemical weapons, creating a unique set of response requirements. In particular, a bioterrorism attack would impose heavy demands on the public health system. That same public health system is the crucial factor in an effective response. A highly effective public health system should make an important contribution to deterring the threat by demonstrably diminishing the gains of a potential attack. It also constitutes the "first line of defense" in the event deterrence or prevention fails. Ultimately, it will be the public health system that will be called on to mitigate and ameliorate the consequences of a bioterrorism attack.

The bioterrorism threat is multifaceted. Terrorism experts argue that new actors have joined the more familiar ethnic/nationalist, separatist, and ideological groups, and that these new groups embrace far more amorphous religious and millenarian

---

111. Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction*.

aims than traditional groups do. They also employ less cohesive organizational structures and have more diffuse membership. Joining these new groups are a greater number of lone actors, such as Larry Wayne Harris, who was arrested for mail fraud for ordering plague samples, as well as ad hoc groups that come together only for a particular purpose, as was the case in the World Trade Center bombing.

Not all terrorists will be attracted to BW. There are reasons that such traditional political terrorist groups as the Irish Republican Army have limited themselves to classical terrorist weapons rather than NBC weapons. The new entrants on the terrorist scene, however, do not appear so constrained. The Aum Shinrikyo is a case in point. The Aum is a unique combination of millenarian cult, criminal organization, and terrorist group with an idiosyncratic motivation. It has a particular view of its relationship to society and the acceptability and utility, not just of violence, but also of inflicting mass casualties. Such groups as these may find the use of BW most attractive.

Another consideration is the sponsorship of terrorism by states with ongoing offensive BW programs. To date, there is no evidence that such countries as North Korea that are alleged to have BW and also are on the list of state sponsors of terrorism, have transferred any BW capability to non-state actors. But past is not always prologue, and a number of scenarios can be envisioned in which a state that views the United States as a major adversary might promote terrorist use of BW within the United States, especially as a last resort.

A number of challenges emerge in attempting to determine the biological agents that terrorists might employ. A terrorist might focus, for example, on traditional agents because the most information about them is available. He also might conclude that agents like anthrax historically have been the primary agents in BW programs for the good reason that they have characteristics that make them effective BW. But a terrorist might conclude, too, that the government would pay greatest attention to these "classical" agents. He then might opt to pursue capabilities that are not such likely candidates, both to ensure surprise and the absence of medical and other countermeasures.

Presumably, BW use is intended to promote mass casualties, but that may not always be the case. Terrorists, for example, may conduct a limited BW attack as a "demonstration" of their capability and exploit the inherent threat. Analytically, the potential range of scenarios for BW use is virtually unlimited, and conceptual boundaries to this aspect of the threat must be elaborated. One factor that may drive employment options, for example, is agent availability. Another factor that could shape BW use is the target. Several factors have been identified to suggest higher-risk targets, including critical infrastructure points, national symbols, special events drawing large crowds, and sensitive government or corporate activities.

As mentioned, bioterrorism imposes particularly heavy demands on public health systems. The public health sector, for example, must focus not just on what it must be capable of doing after a BW incident; it also must consider key actions that should be taken that can contribute to deterring or preventing an attack in the first place. Officials responsible for the public health response to the bioterrorism threat confront short-, medium-, and long-term needs.

Public health response requirements will be imposed on many more people than just professionals in the public health service. Those potentially involved include

residential physicians; nurses; emergency room personnel; epidemiologists at the local, state, and federal levels; and many more. Whether and how much students in medical and nursing schools and schools of public health should be exposed to this problem is another issue.

The bioterrorism challenge also creates a need for at least two sets of facilities: those for doing technical analyses, particularly analytical laboratory capability, and those for treatment of victims. With respect to treatment facilities, the issue of capacity will be crucial. Considering that isolation units to treat victims of a BW attack could be standby facilities that may not see a lot of use, the risk is that capacity for any given situation will be too small to prevent adequate treatment or so large that it represents an undue drain on resources.

The specification of medical treatment needs will be driven in part by the list of agents deemed most important. The kinds and amounts of drugs, including vaccines, that should be available is one obvious requirement. But so, too, is determining the ways in which these drugs should be used in the prevention, crisis management, and consequence management stages of a BW incident. Looking at the longer term, research and development priorities to provide appropriate medical treatment in the face of an evolving threat are important as well.

Public health officials also are likely to be involved in decisions on whether to provide other equipment needed to respond to the bioterrorism threat and, if so, in what amounts. This may include protective equipment for civilian populations, such as having simple masks on hand, that could be distributed prior to an attack (if sufficient warning were received). Public health professionals also could be involved in determining the necessary detection, identification, and warning systems for certain categories of potential targets (for example, subways or sports arenas).

Finally, communications among public health officials, others in the medical community, technical analysts, law enforcement officials, and policymakers will be critical in identifying and reacting effectively to a BW attack. Another dimension of communications is the development of public affairs strategies to ensure that civilian populations receive information that is critical to their well-being, reassuring, and sufficient to ensure that public health capabilities are not overwhelmed.

The challenge of bioterrorism poses one of the most difficult problems for policymakers: Considering the wide range of contingencies and outcomes (from low probability/catastrophic consequence to higher probability/lesser impact), what is a prudent investment of time, money, and effort to put into this problem? That is a central question with which policymakers must grapple continuously.

The Implications of Rapidly Advancing Biotechnology

As in other areas of knowledge and technology, innovations in biology and biotechnology can be used for good or ill. This dualism stands out dramatically in relation to BW. On the one hand, developments in the biological sciences and biotechnology—genetic modification, biomolecular engineering, metabolic engineering, bioproduction technologies, among others—may make it easier for states or terrorists interested in acquiring BW to do so. On the other hand, those same developments may hold the key to dramatic advances that can reduce the threat such weapons pose.

Studies have identified a number of profoundly disturbing potential applications of biotechnology to the development of BW. In the short term, the most significant concern is that advancing biotechnology will make it easier to do a number of things that, in the past, were deemed difficult or risky. Among the more specific concerns in this regard are

- **Enhanced utility on the battlefield.** One reason that BW were not considered terribly useful on the battlefield was that several days could pass before they had any impact because of the incubation periods for the diseases promoted by various BW agents. By that time, the battle could be over. In contrast, the impact of chemical weapons can be immediate. If the speed at which the disease caused by the agent could be made almost instantaneous, BW could become more attractive as a means to determine an outcome on a battlefield.

- **Genetic engineering to increase the ability of microorganisms and toxins to withstand stresses associated with storage and dissemination.** Many biological agents are fragile. They can be killed by sunlight or be destroyed in the explosive burst of the warhead carrying them. Some have relatively short shelf-lives and cannot be stored for long periods of time in large quantities. The insertion of alternative genes could alter these characteristics, making agents more robust and longer-lasting.

- **Development of strains with increased virulence of from 10 to 100 times more toxicity than natural strains.** The more severe the disease, the greater the impact on the target. Whether the goal is to influence a military outcome or pose a strategic threat, dramatic increases in the severity of risk posed by BW might make such weapons more attractive to some prospective BW proliferators.

- **Manufacture of antibiotic resistant agents.** Developing genetically engineered strains resistant to antibiotics was one of the goals of the illegal Soviet program of the 1970s and 1980s (and remnants of which might be continuing still). Apparently, they were successful with respect to the plague. More recently, Russian scientists claimed success in developing an antibiotic-resistant strain of anthrax. The prospect of this development is real, and the implications for planners who cannot count on any form of medical defense is potentially enormous.

- **Genetic engineering that would result in more controllable persistence of an agent.** The more controllable the persistence of an agent, the more predictable it is. Predictability is important from the point of view of the BW user; the less predictable, the less likely it is to be used because its ultimate impact is so uncertain.

Longer-term, the issues are equally if not more unsettling. The production of new agents that are either "superbugs" or new and unknown is one such contingency. Use of other materials, such as bioregulators, is beginning to receive attention, too.[112] A recent report from the British Medical Association (BMA) addresses in detail the impact of new technologies on such questions as enhancing BW production

---

112. Ken Alibek describes the work that his former colleagues in the Soviet Union conducted with regulatory peptides that, when produced in large quantities, can alter moods and trigger psychological changes.

capabilities, the new agents that might be used for BW, and the prospect of tailoring microorganisms for BW purposes. The report dedicates a complete chapter to the possibility of producing and using genetic or ethnic weapons that can exploit differences in gene frequency between populations to incapacitate or kill selectively. Such a weapon may be beyond current capabilities, but the rate of innovation in the biological and biotechnology arenas raises questions about whether and how far out of reach such an option may be by the middle of the next decade.[113]

The author of the BMA report, Malcolm Dando of Bradford University, also describes in some detail what is entailed in the "new biology" at the cellular and molecular levels in his book *Biological Warfare in the 21st Century: Biotechnology and the Proliferation of Biological Weapons*. He concludes that

> Maybe for the next decade the [new biotechnology] capabilities...will remain predominantly in the hands of western countries, but it seems unlikely to be true 20 years from now.... What today would require the ingenuity of a Nobel Prize–winner will in 50 years be commonplace.[114]

An even more detailed assessment of the impact of the latest developments in biotechnology is provided by Stephen Block of Princeton University.[115] Block presents the findings of a 1997 summer study by JASON, an organization of primarily academic scientists who address problems of national interest. He describes six broad classes of unconventional pathogens that the JASON scientists thought might emerge in the future:

- **Binary biological weapons,** in which a two-component system in which neither element is toxic on its own but, when combined with the other, produces a lethal mixture;

- **Designer genes** that exploit the growing knowledge of the complete genetic codes of hundreds of viruses and creates the real possibility of developing synthetic genes, viruses, and even entire synthetic organisms;

- **Gene therapy,** which, with the goal of effecting a change in the genetic makeup of an individual by introducing new information designed to replace or repair a faulty gene, has been described as the "Holy Grail" of modern medicine;

- **"Stealth" viruses** that are be designed to produce a tightly regulated viral infection that can lay "dormant" for a lengthy period of time without causing harm but that spurs disease once it is triggered by an appropriate external or internal signal;

- **Host-swapping diseases** that introduce mutations into a relatively benign animal virus, permitting it to escape from its normal hosts and infect humans instead, giving it the potential to become a virulent human disease; and

---

113. British Medical Association, *Biotechnology, Weapons, and Humanity* (London, U.K.: Harwood Academic Publishers, 1999).

114. Malcolm Dando, *Biological Warfare in the 21st Century: Biotechnology and the Proliferation of Biological Weapons* (London, U.K.: Brassey's, 1994), p. 157.

115. Stephen Block, "Living Nightmares: Biological Warfare Threats Enabled by Molecular Biology," in Sidney Drell and Abraham Sofaer, eds., *Dirty War: The Growing Threat of Chemical and Biological Weapons* (Stanford, Cal.: Hoover Institution Press, 1999).

- **Designer diseases** that are based on current and evolving understanding of cellular and molecular biology that is nearly at the point at which it may be possible to contemplate a disease and then make the pathogen necessary to produce it.

Block summarizes the conclusion of the study as follows:

> [P]rogress in biomedical science inevitably has a dark side, and potentiates the development of an entirely new class of weapon of mass destruction: genetically-engineered pathogens. The danger of such next-generation biological weapons in the 21st century is quite real, and they pose extraordinary challenges for detection, mitigation, and remediation.

Understanding the ways in which state proliferators or terrorists may exploit developments in biology and biotechnology is crucial. It is particularly important to appreciate that those interested in acquiring BW will have the benefit of the scientific and technological developments of the past decade. As a result of starting higher on the "learning curve," terrorists are not likely to design and implement their programs in the same way as countries did in the past. Iraq's BW program, for example, shows that a country's higher point of entry on the BW learning curve can produce a weapons program that is surprising in its scope and in the pace that it moves from research and development to weaponization.

The Other Side of the Coin

Looking only at the implications of biology and biotechnology on weapons development, however, is not the whole story. The same technologies that make advances in BW possible also may create opportunities for new ways to respond to such weapons more effectively. Indeed, biology and biotechnology are critical components of an effective response to the BW challenge. They are essential, for example, in such areas as:

- **Detection and identification of agents** (currently the highest priority in biological defense programs). Rapid detection and accurate identification of a biological agent is the key to successful biodefense measures, both active and passive;

- **Development and production of vaccines, antimicrobics, and other medical countermeasures.** Currently, vaccines exist for only a limited number of agents. Research over the next decades will yield a much greater understanding of the human immune system function and disease mechanisms, and shed light on the circumstances that cause individual susceptibility to infectious diseases. This information can translate into more effective medicines for both the prevention and the treatment of diseases caused by the deliberate use of BW;

- **Development of more effective individual and collective protective equipment.** Technology advances are being pursued, for example, to produce mask systems that provide fully compatible vision capabilities, laser/ballistic protection, and further reductions in logistical and physiological burdens; and

- **Enhanced confidence in compliance with the BWC.** Biotechnology advances can be used to facilitate the implementation of measures that may be specified in the

protocol currently being negotiated in Geneva to enhance confidence in compliance with the BWC. Such technologies as gene probes, PCR, and gene sequencing analysis can help in the identification of microorganisms, their functions, and their products. These types of technologies would be particularly useful in detecting mutations and gene manipulation.

Work currently is under way in many of these areas, trying to produce results as quickly as possible. The Unconventional Pathogen Countermeasures Program of the Defense Advanced Research Projects Agency (DARPA) is one such effort. With DARPA funding, a California-based company, Maxygen, is using a technique called "DNA shuffling" that randomly combines potentially useful gene fragments to evolve potential DNA vaccines. Another DARPA-sponsored project is making progress in developing a system for the rapid detection and identification of biological agents that utilizes new techniques for very high-speed DNA sequencing.[116]

What about the longer term? What opportunities will exist at the end of the next decade? Will we be in a position to maximize the positive impact those new developments will create? Just as it is critical to extend the time horizon with respect to the impact of the biotechnology revolution on weapons development, it is crucial to apply a longer-term perspective on the potential opportunities that it also creates. Only by doing so will the response keep pace with the evolution of the threat.

If one does not devote sufficient attention to the positive potential of the biotechnology revolution on meeting the BW challenge, opportunities may be lost. Good planning is based on good information, and the knowledge of what the biotechnology revolution might make possible must be made available to decision makers in the executive branch, Congress, and the military. It also must be shared by the broader community whose support will be critical for sustaining progress in the national effort to combat and eliminate the threat of BW.

---

116. "From the Bioweapons Trenches: New Tools for Battling Microbes," *Science,* June 11, 1999.

CHAPTER 4

How Do We Respond? What Are the Right Questions?

The intersection of health and security is not a comfortable place. For all of the actors who can be involved—the stage can get very crowded at times—the junction poses tough questions, both short- and long-term. The players confront dilemmas generated by competing imperatives. The United States, in particular, must make difficult choices; the convergence of health and security raises profound questions about the kind of role the country wants to play in the world and the sort of leadership it will provide.

The Challenge of Balance

The basic dilemma that confronts any actor working at the intersection of health and security is the choice the actor must make between the desire to help and the desire to avoid risk. This dilemma is described as a tension between altruism and self-interest,[117] between charity and strategy.[118] The choice, however, is not either/or; instead, the challenge is to strike an appropriate balance between these competing imperatives.

Several factors drive the need for such a balance. First, the resources available for meeting these challenges are limited, and their impact must be maximized to the greatest extent possible. Ideally, constrained resources would be utilized in ways that could benefit both health and security instead of promoting one at the expense of the other. Targeting such resources in this way could be done only if the requirements were examined together and if a sense of their relationship exists.

Second, achieving a balance between charity and strategy, or between being motivated by values as well as by interests, reduces the chances of making serious mistakes that make a situation worse. On the one hand, as Jack Chow points out, "Without a clear [strategic] rationale, the altruistic tradition of the American people is a tenuous license for action."[119] Critics of NATO's action in Kosovo contend that it provides an example of Chow's point. Michael Mandelbaum of the Council on Foreign Relations, for example, argues that "NATO waged the war not for its interests but on behalf of its values."[120] As a result, the military action led to increased loss of life and forced

---

117. "Balms for the Poor," *Economist,* August 14, 1999, p. 65.
118. Chow, "Health and International Security," p. 73.
119. *Ibid.*
120. Michael Mandelbaum, "A Perfect Failure: NATO's War Against Yugoslavia," *Foreign Affairs* 78, No. 5 (September/October 1999), pp. 2–8.

displacement of the Albanian population it was intended to protect; increased instability in the Balkan countries whose precarious stability the action was intended to bolster; and negatively affected political relations with Russia and China—whom NATO members, and the United States in particular—had been courting assiduously. According to Mandelbaum, the action represented a "perfect failure."[121]

On the other hand, responding to complex crises—both short- and long-term—solely on the basis of self-interest also can promote disasters of immense proportions. A self-interest motivation tends to foster neglect of such tragedies as those in Rwanda, Sudan, or other places deemed of less strategic importance to national interests. Those tragedies then can spin further out of control and become crises, creating not only immense humanitarian burdens but unavoidable security challenges.

Third, an approach that balances interests and altruism is likely to have the best chance of engendering domestic public support and rallying international cooperation. On the domestic front, a situation that is seen to entail values and interests creates higher stakes. The higher the stakes, the stronger the rationale for accepting risks—particularly with respect to potential costs—and the stronger the case that can be made to the American people. This is not a cynical call for "spin" purely for public relations purposes. The experience in Somalia underlined in a negative way that domestic support, including from Congress, is essential for successful responses to complex emergencies. But success usually does not come without costs and risks, and accepting the actual risks and potential costs is a prerequisite of success. Combining interests and altruism is likely to enhance the probability of that acceptance by the American people and their representatives.

On the international front, casting an issue as one of either values or interests is likely to diminish the ability to tap the complex influences that lead others to accept some role and responsibility in shaping an effective response. Not everyone shares the same set of values or the same assortment of interests. There could be a reluctance, for example, to join a United States that is perceived to be acting purely out of national interest at a time in which its status as the "world's only superpower" not only fosters resentment but also provokes suspicion that the U.S. government seeks to remake the world to suit its own purposes. Casting the situation as one that needs only an altruistic response to a humanitarian disaster may not be sufficiently weighty to convince others to run risks or expend limited resources. The willingness in other national capitals to become involved will flow from a variety of motivations. Conveying the understanding that it is precisely a combination of factors that promotes the need for action will be critical for mobilizing others in the international community.

Tempering humanitarian impulses with the awareness of the broader risks that are entailed, therefore, is crucial to shaping responses to the challenges that lie ahead. But so, too, is informing strategic calculations with humanitarian concerns. Precisely the need to strike such a balance makes the job so difficult. Different situations will require drawing that balance at different places. There is no right answer that will serve for every contingency or crisis.

---

121. *Ibid.*

What Can We Do at the Macro Level?

The need for balance in confronting the intersections of health and security suggests that the United States should integrate health issues more systematically into its overall national strategy. This is not an argument for making every health challenge a national security problem. But if deteriorating health conditions are an increasingly important factor in promoting instability in key countries or regions, then there are national security reasons for combating global health issues. Introducing even a limited national security perspective into one's thinking may add a greater sense of urgency about addressing such problems, shift the calculations that support current thinking, or open up new approaches.

It is not the purpose of this report to evaluate every program, initiative, or proposal to address the current challenges of global health; instead, this report seeks to examine a limited number of issues that are particularly useful in helping to cast the relationship between health and security into sharper relief.

Medicine and Poor Countries

One such issue is the development and production of drugs to combat diseases in poor countries. According to the WHO, more than $56 billion per year is spent on health research, less than 10 percent of which is directed toward diseases that afflict 90 percent of the world's population. Between 1975 and 1997, at least 1,223 new compounds were introduced; only 11 of them were designed for tropical diseases.[122]

On average, it costs $300 to $500 million and takes more than a decade of effort to bring a new drug to market. These resources are well beyond the reach of poorer countries, in which endemic diseases wreak havoc and have the propensity to provoke political instability. As a result, if drugs to deal with malaria, tuberculosis, and other devastating diseases are to be available, they must come from somewhere and someone else. Poor countries are likely to remain dependent on efforts of large pharmaceutical firms in developed countries. As the figures suggest, however, those companies have not been addressing those requirements. Their vaccine research, for example, tends to focus on the viral strains prevalent in North America and Europe, not Asia and Africa.[123]

The drug companies have good reasons for their priorities. They are businesses concerned with markets and profits. The pharmaceutical firms justifiably are concerned that if they invested what is needed in developing drugs and other medicines for poor countries there would be neither the means to offset the high costs and risks of their research nor secure funding to ensure that the drugs could be sold when they were ready. A second concern relates to the prospect that their drugs would be pirated, not only to be used in the poor countries but also to be reintroduced as lower-cost alternatives in the markets of developed countries.

Pharmaceutical companies cannot be blamed for their current priorities. They do what businesses tend to do—responding to the market. But the private sector must not be alone in determining the response of developed countries to the challenge of

---

122. "Balms for the Poor," p. 65.
123. Jeffrey Sachs, "Helping the Poorest," *Economist,* August 14, 1999, p. 17.

health care in the world's poor countries, even in the limited area of providing drugs, vaccines, and other medicines. If the broad challenge of global health has a security dimension, then governments must be involved. Yet again, however, a balance must be drawn. The legitimate interests of the corporate community must be sustained while the health challenges in poor and potentially unstable countries are addressed more effectively.

Adding a national security filter could influence government perceptions of its positions on issues involved in delivering needed drugs to poor countries. Questions of multitiered pricing, for example, deserve a close look to determine whether a system of differential prices for drugs in developed and developing countries could be established while ensuring legitimate corporate profits. There is no reason, for example, that the United States and Europe could not continue to maintain their existing strict controls of imports of drugs from outside their borders while finding ways to make affordable drugs available in poor countries. Guaranteed dosage prices that would require government subsidies; contingent lending to global trust funds to purchase vaccines when necessary; and support of international consortia involving donor and recipient countries, international organizations, philanthropic entities, and private-sector companies are only some of the ideas now being considered or pursued. There is more than enough creativity to bridge the needs of the poor, the requirements of corporate actors, and opportunities created by the scientific community. The point is that decisions must be made, and the world must get on with its business, with the United States taking a lead. Adding a national security dimension to the mix of considerations could create a greater urgency for doing so.

Similar comments could be made about the issue of intellectual property rights. The United States has supported strong patent codes and other measures to prevent intellectual piracy. It is right to do so. Harvard economist Jeffrey Sachs notes, however, that

> In a world in which science is a rich country prerogative while the poor continue to die, the niceties of intellectual property rights are likely to prove less compelling than social realities.[124]

For this reason, South Africa is on the verge of authorizing manufacture of AIDS medicines, despite the fact that the patents for those medicines are held by U.S. or European firms that have neither made the drugs available at what the South Africans consider an affordable price nor licensed production on acceptable economic terms. South Africa was on that list of countries mentioned in Chapter 1 whose health profiles suggest that it could experience political instability in the future. It is the most important country in southern Africa. It confronts a major health crisis. What does the United States do? Some accommodation must be achieved.

Science, Technology, and Security

The issue of intellectual property rights leads to a second set of issues confronting the United States in responding to global health as an issue with important security

---

124. *Ibid.,* p. 19.

implications. The United States is the leading scientific and technological country in the world. Together with Canada, in 1993, for example, the United States was responsible for 45 percent of the peer-reviewed biomedical research published worldwide.[125] U.S. scientific and technological leadership is evident not only in health-related areas but also agriculture and food production whose importance for both health and stability is emphasized in this report. How does the United States inject the fruits of that scientific and technological leadership into the global system so that it can have the most decisive impact? A 1997 Institute of Medicine report suggests some key steps including expanded investment in biomedical research and development at home, support for education and training in the health sciences, more effective international cooperation, and creating a high-level focus for health leadership within the U.S. government.[126]

Such steps can be extremely useful in moving the global health agenda forward. From a security perspective, however, particularly with respect to the challenge of BW, these steps represent only one side of the balance that must be drawn. Particularly as pure science is applied and translated into technology, a requirement confronting governments is balancing the need to share the best of what is available with the need to protect against its misuse.

The global process of developing and disseminating science and technology has changed radically over the past three decades. But conceptual and policy thinking about the balance between technology sharing and technology protection remains locked in modes more appropriate for an earlier time. Business as usual—embodied in strategies of technology denial implemented through export controls—increasingly is untenable in a world in which the security, prosperity, and economic and physical health depend on technologies that are ever more available on a global basis yet also can make considerable contributions to destabilizing and potentially devastating military applications.

Tension over technology sharing has become a *leitmotif* of international discourse. The issue for critics in developing countries with the current policy of the United States and other like-minded countries is not necessarily export controls per se but the ad hoc coordination of such controls by a self-selected group through the AG. Such efforts are deemed by these nonaligned states to be discriminatory and inappropriate, a sign of bad faith that reflects an attempt to "keep the third world third" in terms of economic development. They also contend these policies reflect the developed countries' lack of commitment to such multilateral agreements as the BWC or the Chemical Weapons Convention as the principal instruments for dealing with the challenge those weapons represent.

Industrialized countries simply cannot extol the virtues of advanced technologies and then attempt to deny those technologies to others. They are not doing so, but developing states flatly reject any efforts that suggest developed states are trying to

---

125. Board of International Health, Institute of Medicine, *America's Vital Interest in Global Health: Protecting Our People, Enhancing Our Economy, and Advancing Our International Interests* (Washington, D.C.: National Academy Press, 1997), p. 41.

126. *Ibid.,* pp. 42–44.

preserve their dominant position in a technological hierarchy (regardless of whether those developing countries can produce even some of those technologies).

For their part, developing countries cannot continue to use arguments about non-discrimination, their right to a level playing field, and the obligations of former colonial masters to provide technological assistance to struggling, even failing, economies. Developing states must acknowledge that the security problems associated with technology diffusion are as much a challenge for them as they are for developed states, and that they also have the obligation to contribute to a solution. It does little to advance any country's interests to try to score debating points by blaming the West or the superpowers for writing the ground rules; nor do arguments that complain that export controls are racist and the product of an unsophisticated inability to distinguish between one country and another.[127]

Resolving the technology diffusion problem is a multifaceted challenge, and requires an equally multifaceted, strategic response. What is involved is basically a move away from coordinated, but essentially unilateral, strategies of denying technology transfers toward a multilateral strategy of managing technology diffusion. Such a shift would acknowledge and be responsive to the differences that must be recognized between today's world and that of the 1950s and 1960s in which the West's fundamental approach to technology protection initially was defined. It would involve a larger group of governments whose participation is likely to be critical to the success of any effort. The private sector has become the most important conduit for the global diffusion of technology, and it also must be integrated more systematically into efforts to manage that diffusion. New mechanisms performing new functions are needed, not just old ones made to work better or new ones that do old jobs more efficiently.

The political support of developing countries is crucial to the viability of any regime designed to balance the economic, social, health, and security imperatives of technology flows. Finding common ground on which to begin to build the foundation for sustained, meaningful dialogue on these issues is critical. In such a dialogue, both sides must refrain from the temptation to score rhetorical debating points but listen to the legitimate concerns of the other side. The challenge for the United States and its allies is not to give in to the demands of developing states, but to cooperate in recasting the system so that they share—and see that they share—a stake in it.

Information Is Crucial

Good information is the foundation of good policy, and addressing problems at the intersection of health and security must include efforts toward bolstering both the quality of and the transmission mechanisms for health-related information that may have security implications. Calls have become frequent, for example, for improved reporting on infectious diseases worldwide. Such an effort could build on the capabilities that the WHO already has in place and enhance global epidemiological surveillance networks. Such steps not only would be useful in supporting more effective responses to health problems, but also would have implications for enhancing the international community's efforts to identify attacks with BW. States parties to the

---

127. K. Subrahmanyam, "Export Controls and the North–South Controversy," in Brad Roberts, ed., *U.S. Security in an Uncertain Era* (Cambridge, Mass.: MIT Press, 1993) pp. 359–369.

BWC already have in place a confidence-building measure that requires states parties to report disease outbreaks to the WHO. Understanding the patterns of naturally occurring outbreaks may make people more sensitive to information that does not fit those patterns and suggests a deliberately planned attack.

This relationship, however, must be addressed very carefully with regard to political sensitivities. The WHO has little desire to be pulled into the political process that will consider allegations of biological attack. The WHO is correct to warn against asking it to play a role for which it was not intended or designed. Some exchange of information, however, between the WHO and the international body that is proposed to oversee better implementation of the BWC could prove useful.

Improving epidemiological surveillance networks is important not only on a global basis, but also on a national level, including in the United States. The fact that U.S. public health reporting networks have been allowed to erode has been identified as a major vulnerability in U.S. capabilities to respond effectively to a bioterrorism incident. Efforts currently are under way to rebuild them. Doing so represents one of those measures that maximizes limited resources by promoting efforts that have both important health and security implications.

In addition to emphasizing improvement in disease surveillance and reporting, the United States also should exert leadership in convincing other countries of the need to share information related to health as an essential principle in the fight against global disease. States often are reluctant—for reasons of politics, economics, or prestige—to provide important information. India's plague outbreak demonstrated the economic impact of a disease outbreak, and other countries surely have noted India's experience. One can argue, however, that India's example also shows that not sharing information can make a situation worse. If Indian officials had allowed international health workers into the country in a timely fashion and the limited scope of the actual outbreak had become known, perhaps the economic distress that resulted would not have been so severe.

The absence of information also allows a situation to be manipulated for political purposes. Again drawing on India's example, after Indian authorities were informed by the Centers for Disease Control and Prevention (CDCP) that the yersinia pestis bacillus responsible for the outbreak was unknown and presumably a new strain, they promptly accused rebel militants (*Ultras*) of procuring the bacillus from a pathogen-manufacturing facility in Almaty, Kazakhstan, with the goal of fostering an epidemic in India.[128] Another example is the hantavirus outbreak in the United States. The outbreak had many characteristics that could foster suspicions about a possible BW-related incident: it occurred in an isolated part of the country, infected proportionally greater numbers of the young, adult, male segment of the population, happened in a region in which there are key government-sponsored laboratories, and so on. Indeed, some public media suggested that the outbreak was perhaps an accident stemming from a questionable U.S. BW program. The rapid work of state health officials and the CDCP allowed for the correct information to be made public to quell such

---

128. Andrew Price-Smith, "Infectious Disease and Global Stability at the Turn of the Century," p. 19.

suggestions and, more important, provided critical information to people in the afflicted area about the necessary steps to prevent further spread of the disease.

What Can We Do at the Micro Level?

The complex emergencies in Somalia, Haiti, and Kosovo raise difficult questions about when, how, and why the United States should become involved in such crises. The emergencies in Rwanda, Sudan, and elsewhere pose issues about when, how, and why it should not. In some cases, the right choices are made; in others, the decisions are more debatable. Clearly, there is no single correct answer for all situations. There is no intervention template that makes choices clear about what to do and what not to do when complex emergencies arise.

Dealing with Politicized Aid

One's initial inclination is to think that the toughest choices relate to the issues of whether a complex emergency is more than just a humanitarian problem but also an issue of national security that requires the application of military power. Certainly, such decisions raise substantially the risks and costs of action. But the notion that the choices are easier when the situation is viewed as only a humanitarian problem and aid must be provided regardless is overly simplistic. To give aid may not be a difficult choice; but the way in which aid is provided can become problematic as it gets intertwined with aspects of the conflict.

The preference of aid donors that their relief is provided on the basis of neutrality and impartiality, for example, is difficult to sustain when the parties to the conflict do not view it as neutral or impartial. Recognizing this reality may have an impact on the means by which relief is provided in certain situations and to whom, making it less vulnerable. Andrew Natsios points out, for example, that, in an insecure setting, preferred grains are more vulnerable to attack than less desirable ones, so it makes sense to select grains that people will eat but that are not necessarily preferred.[129]

Which specific form of aid will be provided, however, is not always a government decision but determined by nongovernment relief organizations. Nongovernmental organizations (NGOs) must be sensitive that their actions will not make a security situation worse. But they are not always attuned to that concern as they battle famine, disease, and other forms of human misery on a daily basis. Key actors are discussed in the next section, but it should be noted here that government and nongovernment entities must not only work together, but also understand one another as well as all of the concerns the other brings to the enterprise. Only by doing so can the full implications of specific courses of action be appreciated and taken into account in making decisions.

Beyond the Camps

A similar set of concerns exists with respect to refugee camps, described by one author as "unproductive, violent, and unhealthy places."[130] Because they are unproductive,

---

129. Natsios, *U.S. Foreign Policy and the Four Horsemen of the Apocalypse,* p. 157.

the camps delay or deny those who must stay there both the short-term capability to provide for themselves and the long-term opportunity to build capacities for promoting civil societies. The violence in the camps underlines their potential for becoming either politicized tools in the conflict or sources of power for authoritarian thugs. The unhealthy dimension of refugee and displaced peoples camps is stressed throughout this report. One only can hypothesize that the longer the camps exist, the more the negative spiral among health, instability, and conflict will intensify.

In some complex emergencies, there are no alternatives to camps. But how they are run and how long they are allowed to exist are questions that must receive greater attention, even as the camps are created to provide vital humanitarian assistance to people forced from their homes. At the very least, the suggestion that camps must be demilitarized deserves careful analysis. In situations in which people have next to nothing, the adage that power flows from the barrel of a gun has special relevance; so the guns should be removed. Unfortunately, unless peacekeepers are present, there is no one to do it. Even if peace support forces are in place and given the responsibility for keeping arms out of the camps, demilitarizing them and keeping them that way is no easy task, especially in conflict environments awash with light arms.

The location of camps, particularly those that spring up immediately across an international border, is a further problem to which prior consideration must be given. It may be the case that there is little or no opportunity to influence the location of a camp because refugees mass together at the first location that appears to provide them some modicum of safety. But because they can become a safe haven for guerrillas and a pawn in regional politics, camps immediately across a border can contribute to both the intensity and the longevity of a conflict.

At best, camps are short-term, stopgap responses to an immediate humanitarian crisis. Closing down camps as quickly as possible is, in general, a useful objective. The obvious issue in trying to do so is where the masses of people will go.

Repatriation is one possibility, but it, too, is an option fraught with difficulty, particularly if one is looking toward long-term conflict resolution. So long as the violence remains out of control, it simply is not possible. As the world has witnessed in Kosovo, repatriation also can inflame passions and lead to further violence as the returning population seeks revenge for the violence wrought on it. In some situations, even if there is no violence, how and where a population is repatriated can determine longer-term political outcomes. Does it make sense to repatriate populations in ways that only reinforce the ethnic cleavages that were a major reason for a conflict in the first place? Giving in to demands for ethnic separation, however—especially independence for small ethnic enclaves—also is not necessarily a long-term solution or a principle on which policy necessarily should be based. There is no guarantee, for example, that an independent Kosovo would be any more viable as a state over the long term than an independent East Timor.

The logic that runs from dealing with refugee camps through the question of repatriation to the long-term political arrangement for the geographic space in which violence erupts underlines the complex relationship between humanitarian and security requirements that characterize complex emergencies. It highlights the range of

130. *Ibid.,* p. 152.

interests in play, the stakes involved in both personal and political terms, and the reality that there are going to be no easy answers. In the final analysis, there is likely to be no substitute for good situational judgement. Policy choices can be informed, however, by a sense of what the right questions are.

Military Intervention?

Asking the proper questions is critical, too, to making the proper decision regarding when and how to intervene in a complex emergency with military forces. Following the 1994 operation in Zaire to assist the hundreds of thousands of Rwandan refugees, then secretary of defense William Perry described his rationale and criteria for U.S. involvement that he had shared with President Bill Clinton: it is a major emergency; the need for relief is time-urgent; the solution is unique to the U.S. military; and the risks to U.S. forces are minimal. According to Secretary Perry, the mission plan was to save lives, protect U.S. troops, and pass the mission on as soon as possible to those who would handle it normally. In the case of Rwanda, Secretary Perry firmly opposed "mission creep" that had been urged by others in the United States and that had been blamed as the reason for much of the disaster in Somalia.[131]

More recently, Richard Haas of the Brookings Institution suggested another set of questions and criteria to consider in the decision to intervene with military power.[132] First, what is the scale of the problem? Not all humanitarian tragedies are catastrophic and not all repression is genocide. This is similar to Secretary Perry's point that the situation must be a major emergency although, of course, the point at which to draw the line is likely to be the subject of some disagreement. Second, what other interests beyond humanitarianism are involved, and are they sufficiently serious to argue for military intervention? This suggests the sense of balance emphasized earlier. Third, who else is willing to help and what is he willing to do? Although it is important to ask this question, it is not necessarily appropriate for the United States to wait passively for an answer. If a situation is serious enough, the United States should seek out partners and convince them that they share responsibilities for dealing with it. Finally, what are the costs and consequences of military intervention, particularly in comparison with the costs and consequences of other options, including doing nothing? Answering this question is likely to lead to a further differentiation of options, including possible military actions, that tailor policy responses to the actual situation on the ground and the stakes that are truly involved.

Although Haas would be likely to include it among the possible costs of intervention, he is less explicit than Secretary Perry about the risks to U.S. forces as a determining factor in a decision to deploy military power. The issue of "casualty-free" operations has become an ongoing debate, particularly since the Clinton administration's decision to limit its military intervention in Kosovo to air operations and apparently rule out deployment of ground forces. The argument has been made that

---

131. John E. Lange, "Civilian–Military Cooperation and Humanitarian Assistance: Lessons from Rwanda," *Parameters* (Summer 1998), at *http://carlisle-www.army.mil/usaswc/parameters/98summer/lange.htm/.*

132. Richard Haas, "What to Do with American Primacy," *Foreign Affairs* 78, No. 5 (September/October 1999), pp. 45–46.

the U.S. public will not accept casualties in responses to complex emergencies because the stakes are not high enough to warrant them. The example of the domestic reaction to the images of what happened in Somalia frequently is cited to support this view.

A response to this line of argument is that casualties are an integral risk in military operations, and if a situation is serious enough to warrant military deployments, the prospects of casualties must be accepted. Casualty-free operations are not only unrealistic, but the expectation that they can be conducted also is an unfair measure of the success or failure of an operation.

For the Key Actors: Promoting Engagement, Reconciling Tensions, Fostering Cooperation

This report highlights the potentially sizable number of key actors that can be found at the intersection of health and security issues. They include different government actors that focus on distinct political, security, and humanitarian interests; a variety of NGOs that reflect a range of diverse relief, medical, and other concerns; the corporate community; the scientific establishment; and international or regional organizations from the UN to its subsidiary bodies like the WHO and the Food and Agriculture Organization to such entities as the OAU or even NATO. With so many actors possibly involved, it should not be surprising that the convergence of health and security issues fosters a variety of tensions: national vs. international, public vs. private, and civilian vs. military among them. Reconciling those tensions will be a critical part of any successful effort to make effective policy at the intersection of health and security. Doing so means addressing three challenges.

First, in some cases, the need is for key constituencies to become more actively engaged. The scientific community, for example, must be better integrated into policy discussions. Its contribution to confronting the BW problem, for example, could be enormous. Unfortunately, according to Stephen Block, there is

> a regrettable lack of involvement by members of the professional biomedical community in issues related to biological warfare, particularly among molecular biologists working in industry and academia.[133]

Considering the broader sensitivities that exist with regard to biotechnology, it probably should not be surprising that those involved would not want additional concerns to be raised that could undermine support for their legitimate biological research. To some extent, there also is a legacy of the 1960s and 1970s that not only saw little involvement of these communities in the BW issue, but in some cases also reflected active resistance to such involvement. Even today, efforts to engage representatives of these communities can encounter uncomprehending, or even hostile, responses. This situation must change, not only with respect to the BW issue, but also in terms of finding more effective means to incorporate scientific capabilities into the full health–security agenda.

---

133. Block, "Living Nightmares: Biological Warfare Threats Enabled by Molecular Biology."

The second challenge is to define appropriate roles for each of the key actors in such a way that those definitions are well understood and accepted by all parties. "Culture clashes"—such as those between the military and those civilians responsible for providing relief—must be anticipated.[134] Significant differences in perceptions of fundamental purposes, basic attitudes, and existing priorities all contribute to alternative perspectives of a given situation and what a particular entity's role should be in dealing with it. The U.S. military, for example, always is likely to consider the protection and support of civilians in complex emergencies as secondary to its primary war-fighting mission. Accepting differences, however, does not mean accepting that each entity is entitled to define its own role in each emergency situation; nor does it mean that differences cannot be reduced and expectations clarified by prior consultations and exchanges among those that are likely to find themselves needing to work together in such emergencies.

The development of a strategic perspective by all the critical actors that widens their appreciation beyond their own interests is a crucial task that can promote useful interaction prior to the onset of an emergency. Key actors—whether the military, relief organizations, international organizations, or any others—have a job to do and must concentrate on doing that job well. But understanding the way that job fits into the larger framework of what all the actors should be trying to accomplish together helps to promote an appreciation of the ways in which one's actions relate to those of others and are either mutually reinforcing or working at cross purposes. A strategic perspective also allows for leveraging limited resources to maximize their impact, and it promotes a mentality that is not reactive to events, but proactive in seeking to shape them.

A third challenge for actors at the health and security intersection is forging stronger cooperative relationships. The issues created by the convergence of health and security are not amenable to solutions through the action of one party alone. This report frequently cites problems whose solutions can be achieved only if key players work together. For this reason, there is considerable merit in the calls for the creation of "strategic partnerships," particularly between governments and nongovernmental entities, especially in the corporate sector and the scientific community. Motivated by the recognition of compatible if not identical objectives, such partnerships can leverage limited resources and expertise, enhance research and development, open up new opportunities for action, and bolster policy implementation.

The United States should seek to establish more strategic partnerships internationally out of the realization that the problems in this area are global in nature and require global solutions. The United States cannot, and will not, shoulder the entire burden itself. The pursuit of such partnerships creates an opportunity to demonstrate an appealing style of leadership in this period of U.S. ascendancy. If it grounded its approach to developing these partnerships in the balance that is emphasized at the outset of this chapter, the rest of the world could see a United States that listens as well as asserts, persuades rather than dictates, operates multilaterally rather than on its own, and articulates shared interests rather than narrow national priorities.

---

134. See Lange, "Civilian–Military Cooperation and Humanitarian Assistance," p. 106.

Final Thoughts

Some may see the previous statement as an overblown paean to the benefits of bringing health and security considerations together in U.S. national strategic thinking and policy planning. It perhaps lends itself to charges that the authors of this report—for whatever reason—are trying to make the health and security linkage a more important factor in the contemporary international environment than it really is. Hyperbole in stressing the importance of addressing this "novel" dimension of security produces exaggerated claims of positive results from doing so.

Indeed, the authors are sensitive to such charges. In fact, their operative watchwords are *moderation* and *caution*—in claims of novelty, importance, and impact of health as a global security issue. This report, however, provides enough information to convince the authors that health and security are coming together in today's world in ways that merit examination and assessment. But as they do so, they also entwine themselves with many other factors, and unraveling and understanding the relationship between health and security is as difficult as undoing a cat's ball of string. Much more work remains to be done to clarify, evaluate, and draw conclusions about the impact that the intersection of health and security will have in shaping the global environment of the next decade and beyond.

It is, however, an effort worth making. This is not because health problems will be the most important security challenge for international community. Rather, it is because the health and security nexus represents so well the complex problems that await us in the future. Health as a security issue brings together the personal and the public, the individual and the international in a world characterized by globalization and fragmentation, enormous wealth and crushing poverty, soaring human achievements and incomprehensible human brutality. By focusing on the ways health and security interact, we may achieve a better understanding of how to live in such a world.

CHAPTER 5

Conclusions and Recommendations

This report suggests a number of conclusions and recommendations whose consideration could enhance efforts to deal with the challenges posed by the convergence of health and security in the years ahead. They are presented here as a series of direct assertions without elaborate discussion or nuanced qualification. In that sense, they represent the authors' bottom line.

Addressing Health Issues Is in the Security Interest of the United States

1. The United States should integrate health concerns more systematically in its strategic planning.

2. The U.S. approach toward health and security should be proactive and not just reactive to specific situations or crises, short- or long-term.

3. The U.S. approach must emphasize striking an effective balance among competing political, security, economic, and humanitarian interests that come into play in the convergence of health and security.

4. Emphasis should be placed on identifying measures that leverage limited resources by serving both health and security objectives. Examples include bolstering disease surveillance and reporting at both an international and national level and supporting medical research and development that is applicable to infectious diseases and defense against BW.

5. The U.S. government should seek to forge strategic partnerships with nongovernmental entities—particularly in the corporate sector—and the medical, relief, and scientific communities.

6. Special attention should go to developing ways to utilize more effectively U.S. leadership in science and biotechnology.

7. The United States should conduct a major review of major global patterns in the diffusion and utilization of technology with the goal of supplementing, if not replacing, its approach to the protection of dual-use technology for the prevention of its misuse.

8. International partners will be important in combating the challenges posed by the intersection of health and security, and the United States should lead an effort to engage others in a systematic assessment of that relationship and the responsibilities it imposes on all members of the international community.

9. Complex emergencies, particularly those in which there is widespread "community/humanitarian warfare," impose complex demands that strain traditional ways of doing business.

10. Although no "intervention template" can be applied, U.S. decisions regarding involvement in complex emergencies must be disciplined by a set of answers to questions that

   • Determine the scale of the potential disaster or size of the emergency;

   • Array the full set of national and global interests involved;

   • Identify the costs and implications of all realistic policy options;

   • Specify any unique and indispensable U.S. contributions; and

   • Suggest an appropriate role for the United States in the context of the broader international response.

11. The U.S. government should develop a process for engaging nongovernmental actors in complex emergencies to

   • Develop a better shared understanding of the respective roles and responsibilities, strengths, and limitations of key actors;

   • Foster strategic perspectives among all the players that widen their outlooks beyond narrow interests to incorporate a holistic understanding of the full set of priorities and objectives;

   • Conduct activities and exercises that anticipate problems in future complex emergencies; and

   • Encourage creative thinking about new ways to deal with such problems as the increased politicization of aid and the destabilizing potential of refugee and displaced persons camps.

12. The United States should encourage examination of ways in which health issues can promote conflict resolution in complex emergencies. Examples include cease-fires to allow health measures, such as the vaccination and immunization of children, to be implemented as well as the identification of health enhancement measures across communities.

13. The evolution of the political environment will have long-term implications for national and international abilities to address challenges at the intersection of health and security but, to some extent, that evolution can be shaped.

14. The United States should exert leadership in prosecuting violations of existing international law, including the laws of war, represented by the practices of community/humanitarian warfare and promote additional legal measures where necessary. Other legal instruments that can be brought to bear, such as the

Biological Weapons Convention, should be strengthened, too, but in ways that ensure a balance among potentially competing interests.

15. The United States should continue to lead efforts to foster as much "transparency" of critical health-related information as possible and to create a culture of information sharing on health on a global basis.

16. The United States should promote a systematic, sustained dialogue with rich and poor countries, nongovernmental donors, and international institutions and organizations about ways to make available the financial and other resources needed to combat the negative spiral between declining health and increasing instability.

APPENDIX

The "Electronic Delphi" Method

Overview

In cooperation with the Chemical and Biological Arms Control Institute (CBACI), the Center for Strategic and International Studies (CSIS) undertook a "proof-of-concept" test of an Internet-based Delphi method survey in support of the joint CBACI/CSIS study, "Contagion and Conflict: Health as a Global Security Challenge."

Delphi Method Survey History and Methodology

The Delphi forecasting method is an iterative, consensus-building process that employs a group of experts to pool their collective knowledge and opinions. The Delphi method was developed originally at the RAND Corporation in the 1950s as a tool to help the U.S. Strategic Air Command to prioritize targets in the event of a war with the Soviet Union. Since its inception at RAND, the Delphi process has been used for hundreds of surveys in fields ranging from forecasts of broad future economic, societal, and political changes to much more specifically focused topics like forecasts of future issues in grievance arbitration, developing family therapy models, and evaluating potential commercial products. (See Figure 11: Generic Delphi Process.)

All Delphi method surveys follow a similar basic structural process. It begins when the survey managers assemble a list of participants for the survey. These participants need not be collocated for the purposes of the survey because face-to-face meeting is unnecessary; in fact, the Delphi method requires anonymity among the participants. The survey managers then pose the survey questions to participants and collect their responses. In some cases, a "round zero" would be performed in which the participants were asked to suggest relevant questions themselves, but more often the survey managers develop their own question set. The results of the first round then are analyzed, and a summary of the round's results is composed. The summary then is sent to the participants, who are asked to re-evaluate their answers to the survey questions in light of the results of the first round. This process continues until the results of the survey reach a degree of stability in which the participants' responses cease changing. Literature on the Delphi method suggests that three to four rounds usually suffice, with rapidly diminishing "movement" obtained after that point. Once the responses stabilize, survey managers generate a final report based on the survey results. (See Figure 12: Key Features of the Delphi Method.)

Figure 11

Generic Delphi Process
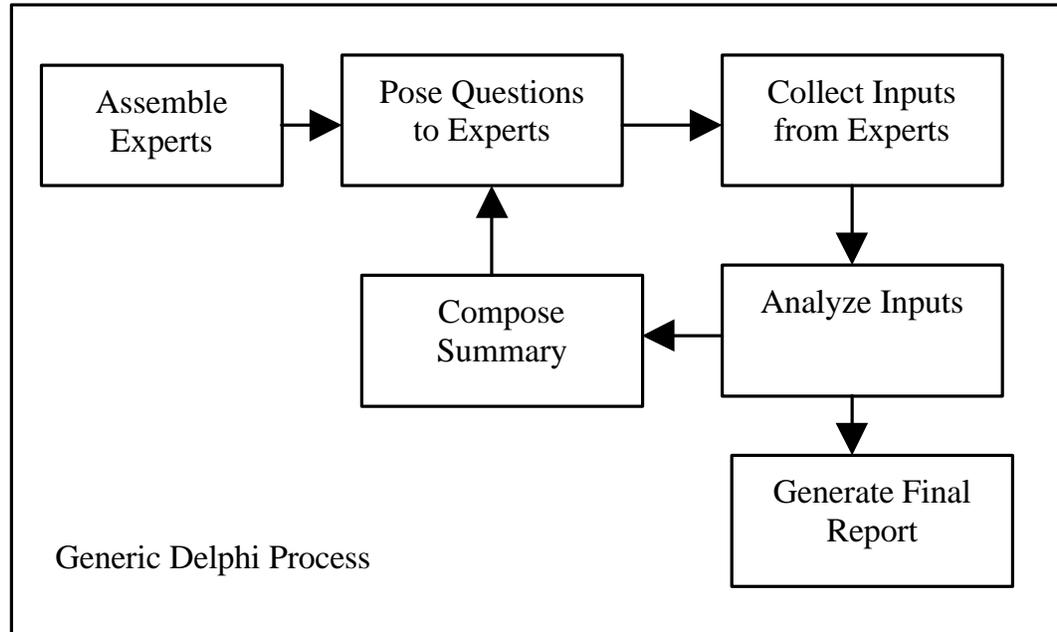
Traditional Delphi surveys have been performed by means of postal mailings. Although this allows the surveyors to draw on a wide geographic area when creating their base of participants, it also has led to traditional Delphi surveys' taking huge amounts of time because of requirements posed by a multi-round, (and potentially) international survey. By using e-mail, facsimile transmissions, and the Internet, however, the time required to run such a survey is greatly reduced.

There are a number of major features of the Delphi method that separate it from more conventional means of polling or building a working group consensus. Among these features are anonymity among participants, structured questioning, iteration of results, controlled feedback, and a highly diverse panel of participants. Anonymity prevents the identification of a specific opinion with any individual or organization. The Delphi method gains a great deal of its utility from the fact that individuals are able to adopt, assess, and freely abandon a position without embarrassment, or potential organizational or professional conflict, that might result from a face-to-face meeting. Further, interpersonal politics are removed, ameliorating any biasing effects that may arise from participants' being controlled by dominant personalities. Structured questioning keeps the results focused toward the intended goal, encouraging iterative feedback instead of allowing opinions to digress. By providing iterative feedback, the Delphi method allows participants to engage in a structured "discussion" on the questions at hand while permitting re-evaluation of their positions. In its most basic form, feedback is the result of the earlier round of polling. After the first round, however, survey managers may request that individuals whose opinions fall outside the group's consensus provide a short "defense" of their position. The intent is not to force consensus among the participants but instead to ensure that all opinions are heard instead of buried by "groupthink." Finally, because a Delphi survey does not require geographic collocation of its participants, survey managers are free to seek out

Figure 12

Key Features of the Delphi Method:

Anonymity among participants

Structured questioning

Iteration

Controlled Feedback

Highly diverse panel of participants

---

participants from different regions, backgrounds, and expertise. The presence of such a highly diverse panel of participants helps to ensure that biases deriving from national origin, educational background, or political affiliations are reduced.

Study Methodology

For the CBACI/CSIS Delphi study, the survey questions were provided by CBACI in consultation with CSIS staff. The list of prospective participants was generated by drawing on the mailing lists and databases of both organizations. Approximately 30 individuals were engaged in this exercise. These invitees spanned a wide area of expertise and included academics, government officials, drug company executives, health care personnel, and the members of the print media.

The survey consisted of 58 statements divided into two broad categories covering Humanitarian Warfare and the Security Implications of the Spread of Infectious Diseases. We asked participants to assess their degree of confidence, on a percentage scale, that the statement—as given—was accurate. In addition, participants were asked to give short (i.e., one to two sentences in length) comments in which they could defend, explain, or expand on their level of confidence. As results came back from the survey, we realized that splitting the answers up into "slices" of 10 percentage points was too fine-tuned an approach, so we then amalgamated the answers into broader groupings.

Emerging Patterns in Delphi Responses

From the first and second round results we received, a number of patterns in the types of answer sets that emerged. Generally, the results of a given question could be broken down into one of three broad classes of responses regardless of the specific levels of agreement to given question.

In the first case, the survey results showed a strong degree of clustering of responses centered on a given degree of agreement. This case is largely self-explanatory and suggests that the question either was self-evident or that there was little or no controversy about the subject of the question. (See Figure 13: Delphi Question 30.) Question No. 30, "Malnutrition is a critical factor increasing the mortality of infectious disease," is a good example of this type of answer. Every respondent marked at least a 70 percent level of agreement, and there is little room to argue that the statement is incorrect. These cases, while informative, tend not to pose many interpretation or evaluation problems and tend not to generate much significant "movement" of responses over the course of additional rounds of the survey process.

The second group of cases yielded bifurcated opinions. In these cases, several clear axes of agreement emerged. The formation of several different opinion clusters suggests that a real debate existed among the respondents concerning the validity of a

Figure 13
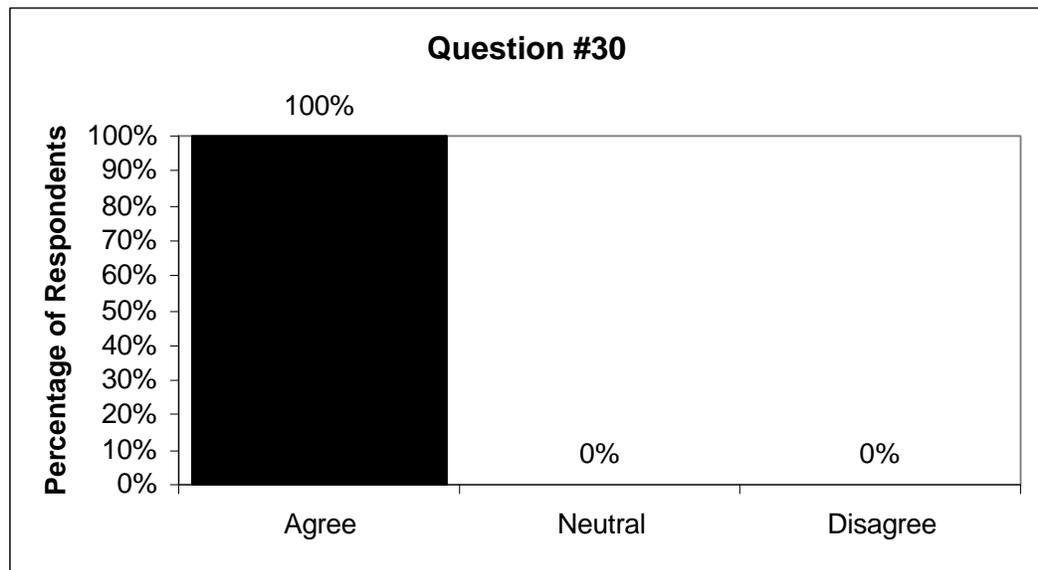
given statement. This disagreement may be traced to differing political views or other factors among the participants. (See Figure 14: Delphi Question 50.) Question No. 50, "Health care assistance should be used as a bargaining chip by the United States," is a typical example of this type of response. The participants split nearly down the middle, with slightly over half strongly opposed (0 percent to 10 percent level of agreement) to this statement with a large minority averaging a strong (an average of 75 percent) level of agreement. Again, these questions tend not to generate a great deal of movement because they suggest two (or more) fairly well-developed schools of thought. These questions, however, are prime candidates for further clarification by the participants. It is important to note, however, that the Delphi method does not require—or try to force—unanimity of responses. The existence of a stable, multi-polar response is a legitimate, and useful, end state for a survey.

The final case shows a great deal of scattering of results across the spectrum of answers, with no clear centers of gravity emerging. This case suggests that either there truly is a great deal of uncertainty about the response or that the question was poorly chosen, producing a degree of confusion over what, exactly, was being asked. (See Figure 15: Delphi Question 51.) The former case was well illustrated by Question No. 51, "Due to the threat to international security that health issues can pose, the international community will use the United Nations to intervene legally in the internal affairs of states to establish or facilitate the delivery of health care." The responses for this question were evenly spread across the range of possible answers. (See Figure 16: Delphi Question 33.) Question No. 33, "Health concerns in megacities threaten to destabilize states," is representative of the latter possibility. As with Question No. 51, respondents' opinions varied widely, but in this case there also were a number of comments in which the respondents express confusion or concern over the undefined "megacity." In either case, one can expect a great deal of movement on these sorts of questions because the participants receive their feedback and debate the issue. Finally,

Figure 14
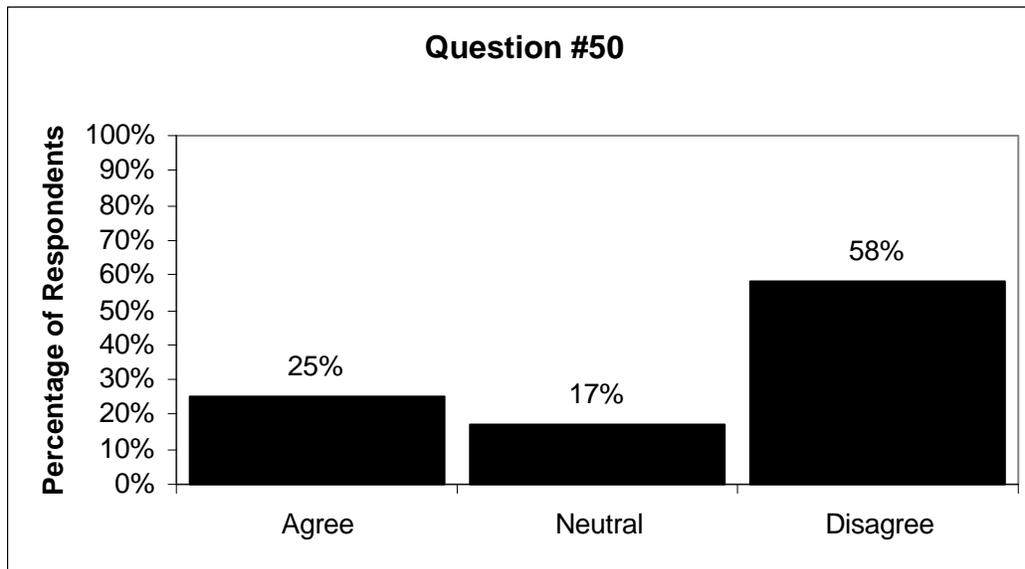
it is possible that, in some of these cases, the answers clustered around three or more axes instead of a truly random result, but the sample size was too small for these axes to emerge clearly. Such cases are likely to be more the product of genuine confusion over the "correct" answer instead of the vagueness of the question.

Findings

As stated in the Study Methodology section, the questions in the Delphi survey were broadly divided into two topics: Humanitarian Warfare and Security Implications of the Spread of Infectious Diseases. Obviously, there is a degree of overlap between the two groups of questions, and in many cases results from one section reinforce those from the other; in other cases, however, the opposite occurs. We identified a number of trends suggested by the survey results as particularly interesting for the purposes of this study. Bracketed numbers within the text refer to the question used as the basis for the finding(s).

Humanitarian Warfare Is Not a New Phenomenon

One of the first lessons drawn from the participant's response is that humanitarian warfare (HW), or aggression through the control and denial of vital human needs to civilian populations, is not a new phenomenon. Although a small group of the respondents gave moderate support to the idea that HW is a new phenomenon, the overwhelming majority strongly felt that this is an ages-old practice [1, 2]. Among the comments provided by the participants were appeals to such historical examples as the campaigns of Genghis Khan and medieval siege warfare. This sort of aggression is more prevalent in civil or ethnic strife than in conventional warfare [4], further suggesting that HW may not be new, but that its frequency is rising as the forces that
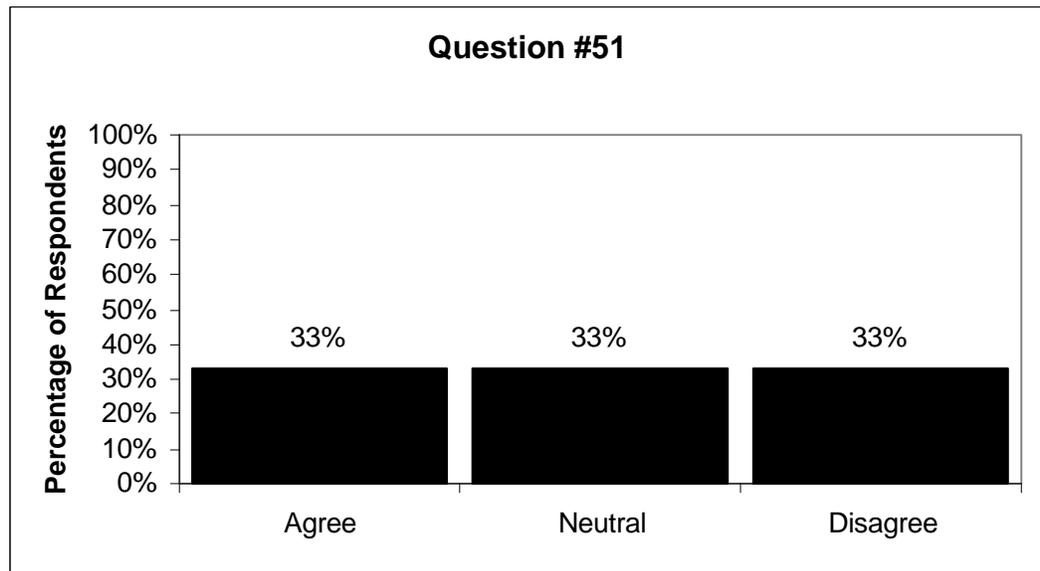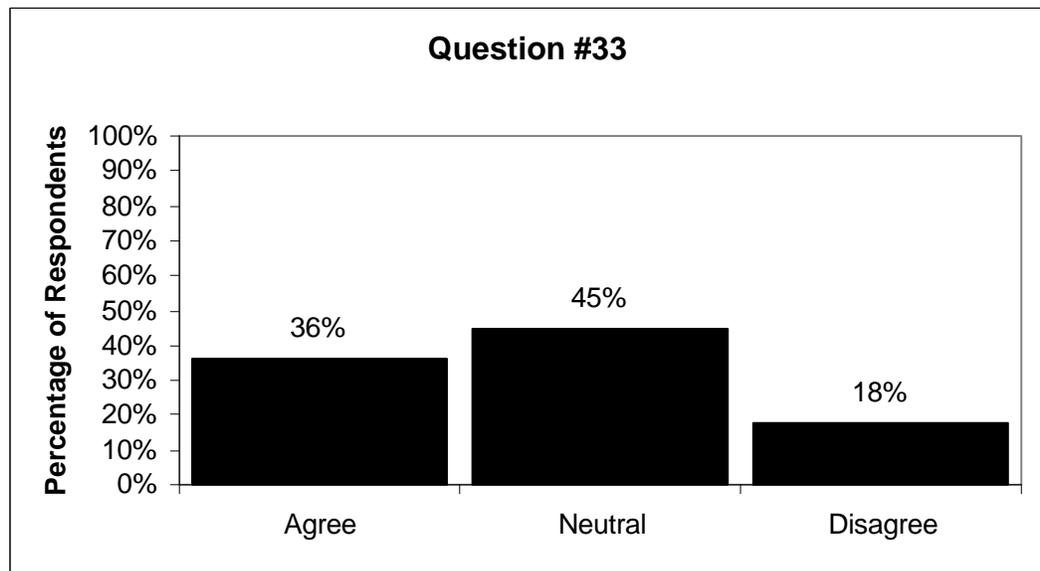
Figure 15

Question #51

(Bar chart: Percentage of Respondents vs. Agree, Neutral, Disagree. Agree 33%, Neutral 33%, Disagree 33%.)

Figure 16

Question #33

(Bar chart: Percentage of Respondents vs. Agree, Neutral, Disagree. Agree 36%, Neutral 45%, Disagree 18%.)

inhibited ethnic and civil strife are released in the post–Cold War world. This belief, coupled with the recent public awareness of this phenomenon, strongly suggests that, even though the "CNN Effect" has great impact on the public's awareness of this form of aggression, the claim that HW is simply a media creation is wrong.

There was moderately strong support from the participants for the proposition that health care delivery sites, refugee camps and medical personnel increasingly are becoming targets in ethnic/civil conflicts [8, 14]. Despite that belief, the survey group did not accept a view that HW and genocide are the same thing; in fact, the vast majority disagreed with the statement, "Humanitarian warfare is no different from

genocide" [7]. This result would seem to suggest a degree of acceptance of HW as a (at least pseudo-) legitimate form of aggression, or at least that it is not on the same level as genocide. Such issues as the lack of acceptance of "innocent civilian" or "noncombatant" status on the other side of an ethnic/civil conflict [5] as well as the potential political advantages of having one's own side appear to be the "victims" of HW [16] both act to increase the perceived value of HW to combatants, and may sufficiently obfuscate clear-cut distinctions about who is to blame for such actions. This certainly is the case in Bosnia, in which allegations have emerged that parties to that conflict went so far as to shell their own people in an attempt to be perceived as "victims."

The Politics of Aid

The act of delivering aid to one side of a conflict was seen as automatically politicizing that assistance [17], suggesting the aid-giver may be drawn in more deeply than originally intended. Concerning the legitimacy of such a perception of the politicization of aid, the survey participants were split. The majority felt that giving aid to only one side indeed does make the provider a legitimate target for the non-recipient side, while a strong minority felt that such aid in and of itself does not legitimize aggression against aid providers by non-recipients [18]. Regardless of whether aggression against a nominally "neutral" aid-giver is legitimate, there was broad agreement that neutrality is not needed to deliver health assistance [52]. In light of the U.S. experience in Somalia, however, it may not be politically viable for the United States to render assistance in those cases in which one side or the other of a conflict sees the United States as a non-neutral party.

Along the same lines, a similar, although less pronounced, split existed on the topic of withholding aid to apply pressure to end a conflict. The majority of the respondents felt that aid should not be withheld for political ends, but a small minority held that such action would be justified in order to bring opposing sides to the negotiating table [19]. When the same proposition was stated a bit differently, there was a slight increase in respondents' willingness to suggest that health care assistance be withheld as a bargaining tool, but the consensus generally was against such actions [50]. Despite this consensus, there was equivocation concerning whether health assistance should be placed above all other concerns (i.e., political and economic agendas), suggesting that some room for consideration of other factors should remain [57]. Regardless of the moral implications of withholding aid, attempts to use aid as a lever to resolve a conflict were seen as both potentially effective [23] and likely [25]. Surprisingly, the perceived effectiveness of such leverage was positive even toward states that do not possess high health care expectations [27]. In the end, however, the respondents were almost unanimous in the opinion that more attention needs to be paid to using health issues as a means to promote conflict resolution and confidence building [58].

The case of the United Nations–sanctioned intervention in East Timor provides an interesting case in light of the participants' uncertainty about whether the international community would use the UN to intervene legally in the internal affairs of a state to establish or facilitate the delivery of health care [51]. The survey results, conducted well before the current situation, suggest that the participants were evenly split on their opinions about the likelihood of such an intervention. A more comprehensive

Delphi poll might shed light on the circumstances that would allow such an intervention.

International Responses to the Threat of Humanitarian Warfare

The final set of conclusions drawn from the Delphi survey concerns the preparedness of the United States and international health care communities to deal with the types of health issues that HW can create. There was a strong agreement that an international convention should be established to control HW, but an equally strong belief that such a convention would be likely to fail to achieve its goals [21, 22]. One of the respondents remarked that any such convention would be simply a "feel-good" exercise. This dichotomy may be explained in part by the strong wording of the second question. One respondent noted that such a convention could not hope to "control" HW, but that it could restrict its spread and scope. The survey produced one reason for the importance of efforts to control the effects of HW, that is, modern technology makes it far easier for diseases to spread rapidly beyond their place of origin. Although there was a significant dissenting opinion, the majority of the respondents felt containing the spread of infectious disease in a world marked by international trade and travel no longer is optional [24]. In addition, health problems inside a country need not manifest themselves immediately (for example, the outbreak of disease), but they may create long-term regional problems by destabilizing the state and its neighbors [28]. There was not much support for the idea that an overarching executive agent should be created to coordinate the health care systems provided by nongovernmental organizations, again perhaps because of pessimism regarding the likely efficacy of an executive agent [53].

The surveyed group agreed that, to deal with the results of HW, more international cooperation is vital. This cooperation needs to extend from the U.S. Department of Defense, through the Department of State, to such international organizations as the World Health Organization and the international community at large; despite the pessimism expressed by the participants, the form that cooperation should take is unclear [49]. One possible option is the establishment of a robust international disease surveillance network to address global health and security concerns [38]. Such a network would allow the international community to monitor and react to the outbreak of diseases triggered by humanitarian or conventional forms of warfare. This network would allow the international community not only to react as needed to counter the outbreak of such diseases, but also to attempt to separate natural outbreaks of disease—although perhaps triggered by a conflict—from deliberate man-made outbreaks from biological warfare agents released by an antagonist or terrorist organization. In addition to supporting the view that it is possible to distinguish between natural and deliberate outbreaks of disease [36], the survey results suggest that responses required to battle a natural outbreak are the same as those required to battle a deliberate release of biological agents [37]. Therefore, the establishment of such a monitoring network would be of significant value even in areas in which HW is not prevalent. Such a network should include a neutral group of laboratories are capable of conducting analyses of bio-specimens [43], although additional laboratory capacity should not take precedence over increased epidemiological training among

aid-giving actors [44, 45]. Finally the accumulation of baseline data on global out-
breaks of infectious diseases is a top priority for the establishment of an effective
monitoring network [40].