CHAPTER 3

DISEASE CONTAINMENT: SURVEILLANCE SYSTEMS, EMERGENCY RESPONSES, AND TRANSBORDER REGULATIONS

The cliché that the world is becoming a smaller place has a particular resonance in the field of global health. Outbreaks of virulent diseases can occur anywhere at anytime, and given how interconnected the world is nowadays, a disease can spread around the globe in a matter of days. Therefore, it is imperative that outbreaks of infectious diseases are contained rapidly to prevent them from becoming global threats. To accomplish this feat, three things are necessary: sophisticated surveillance systems to discover outbreaks in a timely fashion; efficient emergency response programs for medical experts to contain disease outbreaks before they spread; and finally effective transborder regulations to prevent or slow the propagation of diseases. This chapter examines how all three of these strategies of disease containment have evolved and thus how they have helped to create a stronger coordinated global health regime.

Human health is a dynamic field of study. New and improved medical knowledge continuously enhances our ability to prevent, diagnose, treat, and cure diseases. However, as quickly as we learn new ways to protect ourselves, new threats emerge. There are three contemporary challenges to disease containment: emerging (or new) diseases, reemerging diseases (often owing to the development of antimicrobial resistance), and threat of bioterrorism, which has garnered significant attention in recent years. New diseases, which have never before been encountered by humans, have been emerging at a consistent rate of one per year for the past 30 years.[1] Probably the best-known example of such a disease is Ebola, which was first discovered in 1976. It can have a mortality rate of more than 90 percent, gruesomely killing its victims within 48 hours, and to date it is neither treatable

M. W. Zacher et al., *The Politics of Global Health Governance*
© Mark W. Zacher and Tania J. Keefe 2008

nor curable (although it can be controlled through effective hospital measures). New diseases pose an obvious threat to humankind because treatment options are often unknown, as are prevention and containment methods. Moreover, according to the Institute of Medicine, diseases are going to play an increasingly important role in global health in the future as "[w]e will inevitably see more emerging infections in the future as the factors that lead to emergence become more prevalent and converge with increased frequency."[2]

Reemerging diseases are known illnesses that have been brought under control by medical science, but have undergone some kind of change that makes them a significant threat once again. The most common contemporary reason for disease reemergence is antimicrobial resistance. As the 2003 Institute of Medicine report states, "The world is facing an imminent crisis in the control of infectious diseases as the result of a gradual but steady increase in the resistance of a number of microbial agents to available therapeutic drugs."[3]

One of the best examples of this phenomenon is tuberculosis (TB). TB was largely brought under control owing to advances in living standards in the post–Industrial Revolution era; however, due to a variety of factors (but especially improper treatment) TB bacilli have developed resistance to many first-line drugs, and there is even a strain called XDR TB (Extreme Drug Resistant Tuberculosis) that has developed resistance to almost all known drugs and is therefore virtually untreatable. Thus, TB, which was thought to be under control a decade ago, is now reemerging as a serious threat. Influenza is also an important example of a reemerging disease because the influenza microbe has the ability to mutate. It does this approximately every 12 months, rendering previous vaccines useless. Therefore, medical experts continuously have to develop new ways to prevent and treat this familiar disease. Numerous influenza experts are concerned that one day influenza will mutate in such a way that it becomes highly pathogenic and impossible to treat.[4]

The third contemporary challenge to disease containment is bioterrorism, which can be defined as the deliberate release of viruses, bacteria, or other germs used to cause illness or death in people, animals, or plants to advance the political, social, or religious aims of the group.[5] Most people have heard of the Aum Shinrikyo sarin nerve gas attack on the Tokyo subway in 1995 that killed 12 people and injured hundreds of others. Most people, however, are not aware of the fact that Aum Shinrikyo

> . . . dabbled in many different biological agents. They cultured and experimented with botulin toxin, anthrax, cholera, and Q fever. In 1993, [the cult leader] led a group of 16 cult doctors and nurses to Zaire, on a supposed

> medical mission. The actual purpose of the trip to Central Africa was to learn as much as possible about and . . . to bring back samples of Ebola virus. In early 1994, cult doctors were quoted on Russian radio as discussing the possibility of using Ebola as a biological weapon.[6]

The subway sarin gas attack was not notable in its lethality; indeed, in biological terms the attack was largely unsuccessful. However, it is immensely significant because the attack and the active research into other diseases demonstrated unequivocally for the first time that nonexperts could gain access to and manipulate biological weapons. Nowadays, "[t]he knowledge needed for developing biological weapons is accessible to individuals through the open literature and the Internet; the technology is readily available and affordable; and, perhaps most alarming, as the field of molecular genetics advances, an increased capability exits to bioengineer vaccine- or antimicrobial-resistant strains of biological agents."[7] Thus, since 1995, security specialists have been clamoring for more research funding and surveillance to combat the threat of bioterrorism.

The anthrax letter campaign, which followed the 9/11 terrorist attacks on the United States in the fall of 2001, greatly exacerbated the perceived need to fund bioterrorism defense systems. Since late 2001, spending on bioterrorism has increased exponentially. In the United States alone, spending has increased from $424 million in 2001 to $7.6 billion in 2006, and other countries have augmented biodefense programs significantly as well.[8] Anthrax, smallpox, plague, tularemia, and botulinum toxin have been identified as high priority threats that could be used in a bioterrorist attack, and as such significant research grants have been allocated to developing treatment and response options to these diseases. The development of emergency plans to counter a biological attack has been deemed a priority as "[n]umerous commissions have . . . uniformly concluded that the United States is vulnerable to a bioterrorist attack and that the likelihood of such an event is high."[9]

These three factors—emerging diseases, reemerging diseases, and bioterrorism—have increased the likelihood of disease outbreaks and the likelihood that an outbreak will have a severe global impact. When combined with other nonmedical factors such as advances in transportation technology, it becomes even more apparent that outbreaks can impact people around the globe, wherever they occur. This chapter deals with attempts to combat emergency disease outbreaks, and in doing so it has three main sections. The first examines the significant changes to global health surveillance since 1990. The second section reviews several important multilateral interventions intended to control infectious disease outbreaks. These interventions have shaped the ongoing political dialogue regarding international

controls concerning infectious diseases. The third section focuses on the development of international controls on the spread of infectious diseases—largely owing to the revision of the International Health Regulations (IHR). Efforts to revise the Regulations formally commenced in 1995, and they came to fruition in 2005. As the third section of the chapter explains, the 2005 Regulations provided some significant changes in global health governance, but they included some marked continuities between the pre- and post-1995 regimes.

Advances in Global Surveillance Capabilities

The period from the early 1990s to the present has unquestionably been the most innovative and interesting period in the development and politics of global health collaboration. One of the most important developments about controlling the transnational spread of diseases has been improved surveillance. As recently as 15 years ago, a study from the U.S. Institute of Medicine noted that "[T]here is insufficient awareness and appreciation for the value of comprehensive surveillance programs."[10] Before the mid-1990s, countries were obligated by the IHR to report outbreaks of only three diseases to World Health Organization (WHO)—plague, cholera, and yellow fever—that occurred on their territories and on ships and aircraft arriving in their ports/airports.[11] Even though this was an established requirement of the Regulations, states frequently chose not to report disease outbreaks for fear of the imposition of embargoes on goods and travelers by other countries. To make matters worse, governments, especially in developing countries, were often ignorant of health conditions in their own countries, making effective reporting impossible. Since the late 1990s, however, there have been immense changes to the way disease surveillance is conducted, and these changes have fundamentally altered the nature of the contemporary global health regime.

In the mid-1990s, dramatic advances in communications technology, especially e-mail and the Internet, reformed the global health surveillance system almost overnight. Surveillance shifted from being a weakly enforced and often flouted system of reporting by state governments to WHO, to an open system of communications involving a variety of sources—including health professionals, nongovernmental organizations (NGO) representatives, and government officials. Because of this, WHO began to receive information on dozens, if not hundreds, of diseases, and for the first time state governments did not have complete control over the flow of health information leaving their countries. The establishment of computerized surveillance programs able to detect disease outbreaks (or events) and alert appropriate responders, immediately and dramatically, altered the global

system of disease monitoring. This is evidenced by the fact that in recent years approximately 65 percent of first reports of infectious disease outbreaks have come "not from country notifications, but from informal sources, including press reports and the internet."[12]

The significance of this shift cannot be underestimated as effective disease detection is the cornerstone of any containment program and is essential in limiting global fallout from outbreaks. As two high-level WHO officials have noted, "[I]nadequate surveillance and response capacity in a single country can endanger national populations and the public health security of the entire world. As long as national capacities are weak, international mechanisms for outbreak alert and response will be needed as a global safety net that protects other countries when one nation's surveillance and response systems fail."[13]

Although the most notable changes in the surveillance of disease outbreaks starting in the 1990s concerned nongovernmental actors, there were some important alterations in WHO arrangements for reporting outbreaks. The main vehicle for reporting outbreaks, before the 1990s was the Weekly Epidemiological Record (WER), which was created as early as 1926 by the Office International d'Hygiene Publique (OIHP). Between 1951 and the mid-1990s, under the authority of the WHO, it published suspected and confirmed outbreaks of the diseases that were specifically noted in the IHR.[14] In recent years, reflecting the shift in disease surveillance, the WER has published reports on a much wider spectrum of disease outbreaks. Beginning in 1996, WHO published an online list of officially confirmed disease outbreaks called *Disease Outbreak News*.

The following section highlights and explains the significance of a handful of surveillance bodies that have developed over the past several years. Although this listing does not purport to be comprehensive, it does provide an overview of some of the most important surveillance mechanisms currently available as well as an idea of the effect they have had on the nature of disease surveillance in general. Before examining the newer surveillance groups, however, it is necessary to mention one of the oldest and best-established surveillance bodies in the global health regime, the WHO Global Influenza Surveillance Network. This initiative is important because due to its effectiveness, it paved the way for future initiatives to gain legitimacy and become respected members of the global health regime. The network was established in 1952 and is currently comprised of 117 National Influenza Centers (NICs) located in 88 countries, four Collaborating Centers located in Australia, Japan, the United Kingdom, and the United States, and the WHO. The role of the network is to provide recommendations to states about which vaccine will be effective against circulating influenza viruses. To this end, the NICs collect 175,000

samples of influenza viruses each year. These samples are sent to the WHO Collaborating Centers for analysis, and eventually a vaccine is developed and recommended for widespread use. In fact, "more than 250 million doses of influenza vaccine are produced annually which contain the WHO recommended influenza strains."[15] The network serves an important secondary purpose as well, and that is to monitor the mortality rates of influenza viruses and to alert the medical community if a virus develops with the potential to cause a pandemic.

For most of the latter half of the twentieth century, the WHO Global Influenza Surveillance Network stood alone as virtually the only organized, multilateral initiative to provide accurate information on the nature and spread of a disease. However, as previously noted, technological innovations in the early 1990s revolutionized the entire system of global disease surveillance. In response to these changes, the global health surveillance system began to change starting in 1993. In that year a group of medical experts met to consider the creation of the Program for Monitoring Emerging Diseases (ProMED) and an electronically linked network of health professionals throughout the world, called ProMED-Mail. The deliberations were successful, and in 1994, ProMED and ProMED-Mail were launched. The program is "an Internet-based reporting system dedicated to rapid global dissemination of information on outbreaks of infectious diseases and acute exposures to toxins that affect human health, including those in animals and in plants grown for food or animal feed."[16] Importantly it accepts information from a variety of sources—not just government. The information is then vetted by experts, published on the ProMED-Mail Web site, and distributed to its subscribers.

ProMED was initially administered by the Federation of American Scientists, but, as of 1999, responsibility was transferred to the International Society for Infectious Diseases. Soon after its founding, it had 40 subscribers in 7 countries. Currently, it has more than 30,000 subscribers in 150 countries. It is available in English, French, Spanish, and Portuguese. It is presently funded by the Gates Foundation, the Rockefeller Foundation, and the Oracle Corporation, and its e-mail services are provided by the Harvard School of Public Health. ProMED has become one of the most important sources of disease outbreak news in the world owing to its careful screening of reports and wide distribution base.[17]

Another important contemporary surveillance system is the Global Public Health Intelligence Network (GPHIN), which was created by the Canadian government in 1997 in collaboration with the WHO. GPHIN monitors media sources from around the globe for information on disease outbreaks, bioterrorism threats, contaminated food and water supplies, nuclear material leaks, and natural disasters. A sophisticated computer program

filters the information for relevance and accuracy, which is then further screened by officials working for the Public Health Agency of Canada. Information is then released to GPHIN subscribers who can further disseminate the information. The main characteristic of GPHIN that sets it apart from other surveillance systems is that it operates around the clock. News sources are scanned 24 hours a day, and pertinent information is released to appropriate health experts almost as soon as it is discovered. It currently scans reports on numerous Internet sites in Arabic, English, French, Russian, simplified and traditional Chinese, Farsi, and Spanish. GPHIN's importance to current disease containment issues can be clearly demonstrated by the fact that information on 40 percent of the approximately 250 outbreaks that WHO investigates every year comes from GPHIN.[18]

Although ProMED is an example of a network of private individuals and GPHIN is an example of a government-administered surveillance organization, there is another important actor in the disease surveillance realm and that is the military—particularly the U.S. military. Most militaries are, in varying degrees, concerned with infectious disease agents owing to the likelihood that their troops will make the first contact with either a deliberate or naturally occurring outbreak. As a result, the U.S. Department of Defense "is playing an increasingly important role in global disease surveillance, particularly with regard to building the epidemiological capacity of foreign laboratories."[19] As part of this expansion of duties, the U.S. military also runs the Global Emerging Infections Surveillance and Response System (GEIS), which was created by a presidential directive in 1996. GEIS is a network of domestic and overseas military research units with a mandate of supporting surveillance, training, research, and appropriate responses to infectious diseases. Overseas, it is linked with five army and navy laboratories (located in Egypt, Kenya, Indonesia, Peru, and Thailand) that monitor infectious diseases of concern to the military and host countries.[20]

The growing importance of the WHO Global Influenza Surveillance Network and the development of initiatives such as ProMED, GPHIN, and GEIS should highlight the fact that surveillance regarding the international spread of diseases has improved significantly in recent years. However, the earlier discussion is not designed to suggest that disease surveillance has become entirely transparent and effective: there is, in fact, much room for further improvement. In developing countries—precisely where accurate surveillance is most necessary—the medical infrastructure is often so lacking that simple diagnostic tests for common diseases such as TB and HIV/AIDS are impossible to carry out. "Basic health indices, such as death rates or causes of death, are unknown in such contexts. Health

ministries may generate health reports, but the data are generally unreliable."[21] Members of medical NGOs such as Medecins sans Frontieres (MSF) and Merlin may have access to information in certain cities or regions of developing countries, and they may be willing to share that information with groups like ProMED and GEIS, but NGOs cannot be expected, and nor are they equipped, to amass epidemiological data on entire countries. Therefore, until state health infrastructures are strengthened and linked into the growing global network of disease surveillance groups, we are still at risk that an outbreak with the potential to threaten the globe could occur.

Effective surveillance mechanisms are crucial to contain disease outbreaks; however, merely knowing that an outbreak is occurring is not sufficient to prevent its spread. Containing a disease once an outbreak has begun requires other social and economic factors as well. Evidence of such threats can be seen in recent occurrences regarding avian influenza outbreaks in Southeast Asia. In many instances, farmers dealing with outbreaks in poor communities were unwilling to have their flocks culled and therefore quickly sold birds without reporting symptoms of the disease to authorities. To make matters worse, the governments of some Asian countries afflicted by avian influenza were unwilling to release information to WHO for fear of causing panic, and losing tourist and export dollars.[22] But as Dr. Juan Lubroth, who runs the emergency prevention system for infectious animal diseases at the Food and Agriculture Organization (FAO) states, "any benefits of hiding data are short-lived" because lack of information sharing makes it virtually impossible to develop appropriate pandemic preparedness plans.[23] Surveillance regarding zoonotic diseases is in an even worse state as "the World Animal Health Organization cannot accept information on wildlife diseases in a country unless that information has been submitted officially by a national agricultural authority—few of which are mandated or organized to monitor wildlife diseases."[24] Essentially, surveillance of animal disease outbreaks has remained where surveillance of human outbreaks was until the 1990s: it has not evolved concomitantly with human outbreak surveillance. This is potentially disastrous as "more than 60 percent of the 1,415 infectious diseases currently known to modern medicine are capable of infecting both animals and humans" making it likely, if not probable, that a pandemic will begin in animals before affecting humans.[25]

Overview of Emergency Multilateral Interventions

This section provides a description of a handful of significant disease outbreaks that have occurred over the past several decades. The discussion

provides an analysis of how the outbreaks came to light, what was done to contain them, and what roles different actors played in the containment process. It should be noted that minor outbreaks of infectious diseases occur throughout the world every day; fortunately most are not serious and thus do not attract the world media or the major international health organizations. In recent years WHO has become involved in verifying the medical characteristics of approximately 250 outbreaks annually. In approximately 20 percent of these outbreaks, WHO regional commissions became involved, and in about one percent of all cases—the cases that pose the most severe threat—WHO headquarters assumes an active role in containing the outbreak. Before continuing with the review on the multilateral interventions, however, a description of the different actors commonly involved in outbreak interventions is necessary.

The Actors

Generally, six types of actors are involved in managing a contemporary outbreak intervention: WHO; the WHO regional office of the area experiencing the outbreak; one or more advanced research laboratories such as Centers for Disease Control and Prevention (CDC) or the Pasteur Institute; one or more medical NGO such as MSF or Merlin; the Ministry of Health (MoH) of the state in question; and one or more United Nations (UN) body such as United Nations Children's Fund (UNICEF).

The WHO is often at the center of international efforts to control disease outbreaks, but its main efforts generally concern the mobilization and coordination of other expert individuals and groups. Countries experiencing outbreaks often approach WHO for assistance as the first point of call—this can be likened to a global equivalent of dialing 911 in an emergency. WHO then acts as a facilitator as it has the capacity, knowledge, and legitimacy to mobilize the most appropriate people to assist with the disease outbreak in question. Although the facilitator or coordinator role is undoubtedly the predominant role WHO plays, it does also have infectious disease experts who can be deployed in an emergency to provide on-the-ground medical expertise. Representatives from WHO regional offices are often particularly helpful in this regard as they have more local knowledge regarding language, local customs, endemic diseases, weather patterns, and infrastructure conditions, all of which are important factors in developing an appropriate outbreak response plan. Also, in some recent cases a representative of WHO and/or the WHO regional office has assumed a central role in relaying information to the media. With increasing frequency, WHO issues statements that inform the world about the evolution of a disease outbreak, via media releases and its Web site. Thus, the central roles of

WHO bodies during outbreaks are legitimizing the inclusion of foreign medical experts into the outbreak response, facilitating the involvement of appropriate humanitarian health organizations, providing general advice to the MoH, and providing information to the media and the public. The main roles of WHO in outbreaks can be summarized as follows:

> The work of coordinating large-scale international responses to the unexpected [outbreak] . . . is facilitated by WHO operational protocols which set out standardized procedures for the alert and verification process, communications, coordination of the response, emergency evacuation, research, and relations with the media. WHO has also revised its guidelines for the behavior of foreign nations during and after field operations in the host country.[26]

National research laboratories play crucial roles in an emergency intervention. Understanding the precise nature of the virus, bacteria, or microbe causing an outbreak is of key importance in developing the proper response protocols. As seen in the discussion on Ebola outbreaks, scientific research facilities are even more important when an outbreak of a new disease occurs. In this situation, there is no precedent to follow; experts on the ground need as much technical knowledge about the new disease as possible to determine how to proceed with a containment strategy. One of the best-known research facilities is the CDC based in Atlanta, Georgia. It is known as "a world leader in outbreak investigations."[27] CDC has advanced research facilities as well as a high caliber staff of medical experts. As such they are frequently called upon to supply information, equipment, or expert personnel in outbreak interventions. Other important laboratories involved in outbreak research are the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)[28] located at Fort Detrick, MD, the global network of Pasteur Institutes that have their headquarters in Paris, France, the British Porton Down Institute and the National Institute of Virology in South Africa. Most of the national research laboratories that participate in controlling disease outbreaks are affiliated with WHO as Collaborating Centers. WHO creates agreements with these laboratories ensuring that they will provide specialized assistance if called upon during medical crises. There are presently close to 300 research institutions that have the status of WHO Collaborating Centers. This system of linkages gives WHO considerable leverage in coordinating outbreak response efforts. It is significant that the activities of foreign research institutes in outbreak response efforts are politically more acceptable as they operate under a WHO umbrella.

Numerous NGOs have become involved in providing health assistance in recent years; however, only a few have developed a reputation for being

sufficiently organized and possessing sufficient medical training to assist in disease outbreak situations. Three prominent examples of members of this select group are MSF, the International Committee of the Red Cross (ICRC) and various national Red Cross groups,[29] and Merlin. MSF, which was founded by a group of French doctors in 1971, maintains and operates medical facilities in third world countries afflicted by poverty, drought, famine, and/or war. It also has teams of emergency responders who are capable of assisting with the medical treatment of victims of natural disasters and disease outbreaks.[30] The ICRC was founded in 1863 in Geneva as a humanitarian organization dedicated to alleviating the suffering of soldiers in wartime. In 1919, the organization expanded its mandate, and a second group, the International Federation of Red Cross and Red Crescent Societies (IFRC), was created. Currently, the 185 national Red Cross and Red Crescent offices are autonomous but are loosely coordinated by the IFRC. Owing to the asset of name recognition, Red Cross and Red Crescent groups are able to mobilize large amounts of funding from individual donors in developed countries as well as large numbers of volunteers in both developed and developing countries. Merlin (which takes its name from the caption "Medical Relief, Lasting Health Care") was established as a humanitarian health organization in 1993. It is based in the United Kingdom, but it has run emergency and long-term health operations in Rwanda, Afghanistan, Kenya, Sudan, and many other countries. Its personnel, made up of health professionals including volunteer doctors, nurses, and health specialists, provide medical treatment in disaster situations such as earthquakes, tsunamis, conflict zones, and disease outbreaks.

The MoH of the country experiencing an outbreak is often the first to know about the disease. If unable to manage the crisis with available resources, the MoH can call upon the international community for assistance. This often takes the form of a call to the WHO. A call or invitation is still considered necessary by custom and convention, and indeed it is a legal requirement of the IHR before WHO can organize a foreign team to assist in the health emergency. After permission has been granted to allow a WHO-coordinated team into the crisis zone, the MoH is involved in relaying information from the expert team to the public. The MoH usually provides trained medical staff to work with the expert team as well as material goods, such as hospital supplies and diagnosis equipment.

The last group of actors that are commonly involved in emergency outbreak situations are UN bodies. Groups such as the UNICEF often have a presence in developing nations, and they can provide valuable assistance when an outbreak occurs. UNICEF is frequently an important source of material assistance during outbreaks. For example, they have been known to provide oral rehydration salts during cholera outbreaks, basic hospital

supplies such as soap, and importantly vaccines and medicines to treat common diseases, especially those that predominantly affect children. Halting the spread of a disease can be greatly facilitated if a program of immunization can be administered quickly and effectively, making UNICEF's contributions to outbreak assistance very significant.[31] As seen in the discussion on avian influenza, the FAO also becomes involved in disease containment in which animals are involved. The FAO has expert teams of veterinarians and animal health specialists who can provide valuable advice on how to best control diseases that spread from animals to humans.

Over the years, these six types of outbreak response actors developed a loosely coordinated network that allowed for better communication and more effective response procedures. In April 2000, the network was formalized under the WHO-led Global Outbreak Alert and Response Network (GOARN).[32] GOARN consists of a large group of more than 120 governments, NGOs, and multi-partner health initiatives. It was created in recognition of the fact that "no single institution or country has all the capacities to respond to international public health emergencies caused by epidemics and by new and emerging infectious diseases."[33] The network cooperates to accomplish four tasks: conducting epidemic intelligence, verifying outbreak rumors, alerting appropriate groups in outbreak situations, and organizing rapid response reactions when necessary.[34] Owing to the existence of this network, WHO can mobilize GOARN partners and send medical teams to states experiencing outbreaks within 24 hours of notification. Between 2000 and 2004 it launched operations involving response teams to 17 developing countries in Africa and Asia. GOARN is led by a Steering Committee made up of health experts, and an Operational Support Team that is based within WHO headquarters. It receives funding support from WHO regular and extra-budgetary accounts. It is significant that the WHO Outbreak and Alert Response Team, which meets every morning to assess rumors and reports of outbreaks,[35] is composed of health experts generally associated with the WHO secretariat, and is not accountable to a governmental or intergovernmental body.[36] In many ways GOARN can be seen as the consolidation of collaborative efforts since the mid-1990s—including the revision of the IHR between 1996 and 2005.

The Outbreaks

Cholera has been a scourge of humanity for millennia; however, medical advances in treatment of the disease have greatly reduced the number of cases and the mortality rate since the mid-1900s. In fact, in modern times, the fatality rate is usually as low as 1–2 percent because effective medical

treatment is easy to administer, inexpensive, and readily available. Nevertheless, cholera outbreaks—particularly in poor countries—can still be devastating without prompt and proper treatment, and the death rate can skyrocket to levels reminiscent of the nineteenth century. An outstanding example of this occurred in the Democratic Republic of the Congo in 1994. Refugee camps were set up for survivors of the Rwandan genocide; and when cholera broke out, medical assistance and supplies were nonexistent, resulting in a 49 percent fatality rate. Shockingly, 23,800 of the 48,000 infected persons died.[37] This tragedy was an example of what happens when surveillance and response mechanisms fail.

The best-known and the most widespread outbreak of cholera, in recent years, began in Peru in 1991 and spread throughout the Americas. In 1991 and 1992, there were 400,000 cases with 4,000 deaths, and in the period between 1991 and 1995, 1.4 million cases were reported with more than 10,000 deaths in 19 countries. The cause of the outbreak, still not determined, is often cited to have been the discharge of contaminated water from a foreign vessel in a Peruvian port. Foreign reactions to the outbreak were dramatic. Bolivia, Chile, and Ecuador banned imports of perishable foods from Peru; Argentina banned fish imports; the EC banned all fish and all goods from Peru; and the United States required tests of all foods coming in from Peru.[38] A team of medical specialists from the Pan-American Health Organization (PAHO) was active in assisting Peruvian and other Latin American authorities with control measures. The PAHO officials also argued that bans on fish, foods, and goods were not effective measures against cholera. The U.S. CDC also sent doctors to Peru to provide advice on treatment options and control measures.[39]

The crisis led the WHO to create the Global Task Force on Cholera Control that is composed of experts on cholera containment, which can be called on by countries facing serious outbreaks. It was created with the passing of Resolution 44.6 at the 1991 World Health Assembly (WHA) and was officially launched in 1992. The task force has two primary goals: to reduce the morbidity and mortality rates of the disease and to reduce the socioeconomic effect of outbreaks. To this end, "it brings together governmental organizations and nongovernmental organizations, UN agencies, and scientific institutions to coordinate activities against epidemic enteric diseases and to develop technical guidelines . . . for cholera control."[40] Since its inception, the task force has assisted cholera-afflicted countries in several ways, such as giving medical advice, disseminating information on the disease, and training health professionals.

Plague has been one of the most harmful infectious diseases in human history, and major outbreaks often originated in southern Asia. Owing to the disastrous impacts of past outbreaks, it is not surprising that people from

both within and outside the region fear any rumor of a plague outbreak in the Indian subcontinent. However, these fears are generally exaggerated today because plague can be completely cured with very inexpensive antibiotics.[41] In September 1994, the media reported a number of cases of plague in Surat, India, and this set off a flight of 500,000 people from the city. As it turned out, the outbreak was not particularly lethal and resulted in less than 6,500 cases with 56 deaths, but over much of September and October people feared a much larger disaster.[42]

Soon after the first reports of the plague outbreak, India called on WHO for assistance. The latter then organized a team of experts from Geneva headquarters, the regional WHO office, the United States, and Russia. The WHO team recommended control measures to the Indian government, and they were largely accepted. These measures included mandatory screening of airline passengers, fumigation of aircraft, inspection of vessels for rats, and the requirement of deratting certificates from ships. Early in the crisis, WHO provided advice to travelers moving to and from the infected area of India, but it stated that there should not be travel restrictions, and there should be no vaccination requirements.[43] During the crisis of September and October the Gulf States, Pakistan, and Sri Lanka banned entry of all travelers and goods from India. The Gulf States even banned the entry of mail. Their policies of imposing an embargo on travelers and goods from India were also adopted by Russia, China, Egypt, Malaysia, and Bangladesh. The European Union and North American States kept trade and travel routes open with India, but air passengers were subject to inspection. The total loss to India's economy was approximately $2 billion. Laurie Garrett accuses WHO of being weak in allowing the imposition of all these restrictions, but there was not a lot that it could have done at the time given popular fears in the Middle East and parts of Asia. The degree of public concern in the world is indicated by the fact the U.S. CDC established a plague hotline for its citizens and also distributed information sheets on the plague to travelers in its airports and hospitals. Medical specialists were certainly not convinced that the threats were serious, but they had to do something to allay public anxieties.[44]

When people think of virulent, epidemic-prone diseases in the late twentieth century, they generally think first of diseases like Ebola hemorrhagic fever. The disease was first discovered through several outbreaks in Sudan and Zaire in the mid-1970s. After a nearly two-decade hiatus in Ebola outbreaks there have been, on an average, annual outbreaks in Africa since the mid-1990s. The incubation period for the disease is generally between 2 and 10 days, and it kills between 50 and 80 percent of the people who contract it. The fact that hemorrhagic fever leads to profuse bleeding heightens fear of the disease.

The most publicized case of Ebola was the outbreak in Zaire (now the Democratic Republic of the Congo) in 1995. There were 316 cases and 245 deaths over a period of several months. Contact was first established between the Zairian government and WHO thorough interpersonal channels, and WHO soon responded by sending several staff members to Zaire. The head of the infectious diseases division at WHO, David Heymann, assumed a role of press secretary for the multiorganizational effort to control the Ebola outbreak. WHO staff also assumed a role of coordinating the increasing number of foreign medical staff arriving at the outbreak zone in Kikwit. The biggest problem facing the medical teams was the lack of adequate medical supplies necessary to deal with the outbreak. The success of the small WHO team in coordinating foreign workers is remarkable as it had such a small staff, poor equipment, and very limited financial resources and because there were so many health workers from different countries and organizations. In fact, most foreign financial assistance (approximately $2 million) was provided by a group of European corporations and foundations but an additional $1 million came from the U.S. CDC and several NGOs provided material assistance. Journalist Laurie Garrett, in fact, has attributed the success of the international effort largely to the efforts of these NGOs (particularly MSF) because they provided the necessary health care materials and skills. Volunteers from the local Red Cross group also provided crucial assistance as they helped care for patients. An interesting comment concerning the international effort in Zaire was that "nearly all Europeans, who took part in Kikwit did so under the aegis of the American CDC, *Medecins sans Frontieres*, or WHO—not under their own country's sponsorship."[45] This indicates a kind of ad hoc adjustment of foreign medical staff to the diversity of backgrounds, resources, and expertise, and the size of different medical assistance groups. Regarding the testing of blood samples to determine the nature and lethality of the virus, CDC, USAMRIID, and the Pasteur Institute worked out their own coordination of research efforts.

An equally virulent outbreak of Ebola occurred in Uganda between 2000 and 2001. There were 425 cases and 224 deaths. The disease was reported to WHO in the fall of 2000. WHO immediately called for assistance from its network of governmental, intergovernmental, and nongovernmental bodies. Within 24 hours, a WHO-led investigative team arrived in Uganda and created an isolation ward for infected patients. CDC also sent a group of medical scientists who confirmed the outbreak of Ebola.[46] Soon 190 foreign experts from 22 different medical institutions were on the scene, many of whom had been mobilized by WHO. The major organizations apart from WHO that participated in the containment effort were the International Committee for the Red Cross, the IFRC, the

International Rescue Committee, MSF, and nine governmental agencies. WHO acted as a coordinator of these organizations, and it also acted as spokesperson of these agencies to the world media.

Rift Valley fever is a viral disease that is transmitted to humans by mosquitoes that carry the disease as a result of biting infected animals. Every year approximately 18,000 cases are reported, and there are approximately 600 deaths in East Africa where the disease is concentrated. Also, deaths of animals cause major economic damage in endemic areas. A serious outbreak of Rift Valley fever occurred in Kenya and Somalia in December 1997 and January 1998 that killed about 500 individuals. WHO was informed of the outbreak, which together with a number of foreign medical laboratories and NGOs sent medical assistance. WHO assumed a role as coordinator among the various agencies, but its policies sometimes elicited criticisms. The laboratory work throughout the crisis was performed by the South African National Institute of Virology and the CDC. WHO sent groups from both Geneva and its regional commissions, and medical assistance was also provided by the IFRC. In addition, international bodies that specialized in livestock, such as the International Livestock Research Institute and the FAO, also sent representatives. The medical experts did warn people in the region about the need for protection from mosquito bites, but they did not recommend that travelers alter plans to visit the area.[47]

In talking to health professionals about their fears of future disease pandemics, they usually mention the likelihood of an influenza outbreak along the lines of the 1918–1919 Spanish Flu, or the smaller but still deadly influenza pandemics of 1957 and 1968. The Spanish Flu pandemic is estimated to have killed approximately 50 million people.[48] A virus with a comparable mortality rate could kill many times that number in today's interconnected world of fast and easy air travel.[49] Fears along these lines have been accentuated by the mutation of a dangerous influenza virus—the H5N1 virus—in Asia since the late 1990s. Avian influenza has been recognized as a common affliction for a variety of species of birds (and occasionally pigs) for centuries; however, recently the virus has changed such that it can now cause illness in humans.

The first known case of the virus jumping the species barrier from birds to humans occurred in Hong Kong in 1997. In total, 18 people contracted the disease, 6 of whom died. Importantly, the disease was (and remains) transmissible predominantly via direct contact between an infected animal and a human. As the virus was not easily communicable between humans, it did not cause a pandemic. Nevertheless, the particularly high mortality rate combined with the frightening similarities between H5N1 and the virus that caused the Spanish Flu pandemic led influenza experts to call for

a dramatic response to the 1997 outbreak. The spread of the disease was controlled by the killing of 1.5 million birds in less than a week. The WHO Global Influenza Surveillance Network was activated to prescribe control strategies, and CDC influenza experts played an important role in advising the Hong Kong government.[50] Although contained with relative speed, this outbreak prompted WHO to develop the Influenza Pandemic Preparedness Plan in 1999, which lays out steps to be taken following confirmation of an outbreak.[51]

The disease lay dormant for several years after the 1997 outbreak, but in February 2003 reports of a human infected with H5N1 avian influenza once again emerged from Hong Kong. This second outbreak caused two illnesses and one death, but similar to the first outbreak it was quickly contained by the culling of large numbers of infected and potentially infected poultry flocks. It is now known that the third outbreak of avian influenza began in China in November 2003;[52] unfortunately, however, this outbreak has not yet been contained. In fact, it has now spread throughout Southeast Asia and has affected countries in Central Asia, Europe, and Africa.[53] As of 2007, avian influenza has spread to 12 countries on three continents and it has caused 300 cases of illness with nearly 200 fatalities.

Three hundred cases of illness is certainly a minute number compared to disease goliaths such as TB and AIDS. However, the very legitimate fear that the highly pathogenic H5N1 virus has the capability of becoming easily transmissible between humans makes this disease a predominant concern for global health experts. Hence, under the auspices of the WHO, GOARN has mobilized teams of medical experts to treat patients and explore outbreak sites to learn as much as possible about the source of infection. Due to the importance of understanding the exact nature of the virus, many WHO affiliated laboratories (including the four key Collaborating Centers in Australia, Japan, the United Kingdom, and the United States) that specialize in influenza, have been called upon to conduct research on the samples of virus taken from various victims of the disease. Given that this disease originates in animals that are used primarily as food sources, the FAO and the World Organization for Animal Health (OIE) have also been heavily involved in multilateral efforts to limit the spread of avian influenza. To coordinate the differing activities of these organizations in a better way, the WHO, FAO, and OIE jointly established a regional consultation mechanism for consulting on the prevention and control of the disease. WHO's main role in controlling and containing the current avian influenza outbreak has taken the form of advising state governments on how best to treat patients and prevent new infections. The predominant method for the prevention of new infections has been to cull infected poultry flocks, but this has not been a popular solution in the eyes

of many government officials as poultry production is a major source of income in some Southeast Asian countries. In one notable incident in 2003, the Indonesian government initially refused to cull flocks of infected birds but quickly succumbed to international pressure when WHO officials publicly criticized the lack of action. This is an interesting example of WHO successfully employing the tactic of "naming and shaming" to induce compliance with regulations that are not legally binding.[54] Beyond providing treatment and prevention recommendations, WHO has also taken on an active role providing information to the public and it releases avian influenza outbreak updates to its Web site almost daily.

Without question the SARS crisis of 2002 and 2003 was the most notable disease outbreak in recent decades. The significance of the SARS outbreak derives from its rapid global spread and financial impacts as well as the variety, strength, and innovation of the multilateral responses combining governmental and nongovernmental actors. The key health, financial, and political impacts can be broken down into the following categories. First, infected individuals have no overt signs of the disease for about 10 days, meaning that the disease was unknowingly spread from human to human. Second, SARS can progress very quickly into severe pneumonia and respiratory collapse; and death can come within a matter of weeks.[55] Third, although the number of people who were infected (approximately 8,000) and the number of people who died (approximately 700) were relatively small, SARS had a profound global impact as the disease spread from China to 30 other countries in less than 4 months. A handful of countries experienced the brunt of the outbreak, particularly China, which accounted for 83 percent of the cases; Taiwan with 8 percent and Canada and Singapore with 3 percent, but numerous other countries suffered from the outbreak as well.[56] Fourth, according to some reports, SARS cost Asian countries alone between $11 and $18 billion in lost trade and income. Estimate as to the global losses owing to SARS ranges between $40 and $80 billion.[57] In the case of Canada, the drop in passengers between Toronto and Asia went from 27,000 passengers a week to 19,000.[58] Fifth, the scope and impacts of multilateral collaboration, largely through WHO, can be justly called "one of the great success stories in global public health efforts on infectious diseases."[59] The nature of the multilateral activities was of such diversity and importance that one can honestly look at the international collaborative efforts as demarcating a change in the nature of the international health regime. To quote a major study on the development and effects of SARS; "the quality, speed, and effectiveness of the public health response to the SARS brilliantly outshone past responses to international outbreaks of infectious disease, validating a decade's worth of progress in global public health networking." It went on to say that the

accomplishments are significantly due to WHO efforts.[60] However, it is important to highlight that WHO's role was significantly enhanced by its cooperation with numerous research institutes from around the world.[61]

We now know that the first cases of SARS originated in Guangdong province of China in November 2002. The earliest information regarding the outbreak was reported by two electronic reporting networks—GPHIN and ProMED—although they could not identify its character. For several months it was labeled as a case of unique pneumonia by Chinese authorities. Central to the spread of the disease from Guangdong was a trip by a Chinese doctor to Hong Kong in mid-February 2003 where he infected 12 people at a hotel. They then carried the disease to Singapore, Vietnam, Canada, Ireland, and the United States. Both WHO and the CDC sent a team to China to investigate the outbreak but were not allowed to enter Guangdong province. On February 28, 2003, a WHO representative in Vietnam identified some of the unique features of the disease, and this was followed on March 12 by a WHO global alert about the outbreak of an atypical pneumonia. The alert included recommendations that humans who contracted the disease should be immediately isolated, be subjected to strict infection control, and also be subject to vigorous contact traces to determine the source of infection.[62]

On March 15, WHO issued the first of its now famous Travel Advisories. It called on travelers and health professionals to adopt certain practices to avoid contraction or spread of the disease, and it called on all states to report suspected outbreaks. However, it did not call for any restrictions in travel practices.[63] On March 27, WHO issued its second travel advisory in which it called on airport authorities to screen passengers coming from infected areas. It also advised airlines on how to evaluate whether passengers had the disease.[64] On April 2, WHO announced its third travel advisory that adopted a notable recommendation to individuals to postpone nonessential travel to areas that were identified as having infected residents. At this point, Guangdong province in China and Hong Kong were the only areas that were identified as being covered by the travel advisory. On April 4, WHO laid out reporting procedures for governments to adopt regarding the reporting of suspected cases of SARS in its Weekly Epidemiological Record.

Several weeks later, on April 23, WHO added Toronto, Beijing and the province of Shanxi to those areas to which travelers should postpone nonessential travel. The Canadian government objected to the application of the travel advisory to Toronto as there was no evidence of the disease being transmitted to the general population. Following political representations at the highest level, the ban was removed on April 29. The dispute between Canada and WHO officials focused on the criteria that should

lead to travel advisories for particular areas, whether Toronto met these criteria, and whether the travel advisory should have been applied to Toronto without prior notification by the WHO. WHO's decision had been based on the number of cases, the number of cases exported, and the mode of transmission.[65] Subsequent to the application of the travel advisory to three areas on April 23, it was applied to Taiwan and several other areas in China in May.[66]

Although WHO's involvement in the SARS crisis is best known for the application of travel advisories to individuals throughout the world, there was a host of other WHO activities that were very important from both health and political perspectives. Of great significance was the issuance of more than 20 sets of guidelines and recommendations regarding the control of SARS.[67] They were not legally binding, but they had marked effects on states' and nongovernmental actors' management of the disease outbreak. Many of these sets of recommendations or guidelines emanated from three networks that were created by WHO. First, there was the network of researchers from 13 laboratories in 10 countries that tackled the problem of identifying the etiology of the SARS virus. It was only with such knowledge that it was possible to prescribe many control strategies. One of the 13 laboratories, the British Columbia Cancer Agency in Vancouver, announced that it had succeeded in isolating the SARS pathogen in April 2003. The Agency released data on the previously unknown *coronavirus* on April 12. Two days later, the CDC in Atlanta announced that it had replicated the success of the BC Cancer Agency, and on April 16, the WHO released internationally accepted data on the *coronavirus*. It is significant that during the crisis WHO was very helpful to the CDC and other national laboratories in securing disease samples from China where the disease started.[68] Second, WHO created a network of 50 clinicians in 14 countries who developed definitions of the disease and control guidelines. Its members had regular teleconferencing meetings throughout the crisis.

Finally, WHO formed a network of 32 epidemiologists from 11 countries that were responsible for collecting data on the disease and conducting studies on the characteristics of SARS—including those features influencing its transmission and control. To quote an Institute of Medicine study, "A virtual network of epidemiologists brought together public health institutions, ministries of health, and WHO Country Offices to analyze the spread of SARS and to define appropriate public health measures."[69] In the case of Vietnam, the WHO team of scientists specializing in SARS came from nine different countries.

In addition to the above activities to control the outbreak, GOARN mobilized 115 experts from 26 institutions in 17 countries to help manage the outbreak. Approximately two-thirds of the experts employed by

GOARN came from the CDC. Most of them were sent by the Western Pacific Regional Office of WHO that was one of WHO's six regional offices.[70] According to two WHO officials the most important partner institutions of GOARN were GHPIN and the WHO Global Influenza Surveillance Network of 117 laboratories.[71] Finally, it should be noted that throughout the crisis there was a Global WHO Senior Management Group of between 6 and 8 members who met twice a week (often by teleconferencing) and issued 18 recommendations after March 15. Relevant to the activities of all these networks was WHO's establishment of a SARS Web site that received between 6 and 10 million hits each day during the outbreak from March through July. The data for this Web site came largely from "The Daily Country Summary of Cases of SARS."[72] A number of NGOs with personnel in various countries were also active in efforts to control the disease. This was particularly the case with the IFRC that distributed information on treatment strategies.

WHO's relations with China during the crisis constitute an important landmark in its promotion of state compliance with recommendations and directives. Following the March 15 travel advisory calling on states to report possible outbreaks, WHO specifically called on China to provide information. On April 4, China finally began to send electronic reports—in part because information on cases of SARS was reaching the outside world through NGOs within and outside of China. On April 16, WHO expressed "strong concern over inadequate reporting." Fidler has noted that "WHO's public criticism of the Chinese government presented a radical break with the traditional diplomacy that characterizes relations between the Organization and member states."[73] To mute external criticism, the Chinese Premier, on April 20, fired the health minister and the mayor of Beijing on the grounds of their promoting a cover-up. A WHO publication of May 20, noted,

> Cases during the earlier phase of the SARS outbreak [in China] were not openly reported, thus allowing a severe disease to become silently established in ways that made further international spread almost inevitable. This is the most important lesson for all nations: in a globalized, electronically connected world, attempts to conceal cases of an infectious disease, for fear of social and economic consequences, must be recognized as a short-term stopgap measure that carries a very high price—loss of credibility in the eyes of the international community.[74]

Despite the retreat by China in May 2003, the deputy minister of health argued on May 30, that China had never concealed the truth. In response to this statement, WHO announced that it would remove all staff from China if the deputy minister did not recant. Within a couple of days he

reversed his stance, revealing a remarkable amount of effective political pressure by WHO officials.[75]

It is significant that in the last week of May 2003, the WHA passed resolutions that supported WHO's practices during the preceding three months of the SARS crisis. It supported the ability of WHO to create communications networks, to draw on nongovernmental sources of information, to send teams of experts into countries to assure that they were following effective policies, to promote increased national capacities for monitoring and control, and to undertake containment efforts.[76] On July 4, WHO was able to declare that the SARS outbreak had been contained and that the world now looked at WHO as a much stronger and more important organization than had ever been the case in the past.

The above section has provided an overview of outbreaks of half a dozen diseases—cholera, plague, Ebola hemorrhagic fever, Rift Valley fever, avian influenza, and SARS. In analyzing these examples of outbreaks of infectious diseases, one can observe that representatives from all six different types of actors involved in disease containment are usually present in outbreak situations. This fact exposes the important trend that disease containment processes in the twentieth century are almost always multilateral in scope. There are virtually no cases in which outbreaks are managed solely by one state or one actor; rather the different actors have developed a complex, loosely governed arrangement whereby the different actors are responsible for different aspects of the containment procedure. Although there are still gaps in cooperation and incidents of overlapping activities, the regime governing disease containment is moving toward one of greater coordination.

The 2005 IHR: Rule-Making for Contemporary Global Health

The first stage in the negotiations to revise the IHR occurred from 1996 to 1999 following the authorization of the negotiations by the WHA in 1995. The deliberations produced a draft IHR in January 1998. In the foreword to that draft there were several important points. One statement concerning a change in the basic strategy of regulation read:

> It is now clear that international infectious disease control is more effectively undertaken by surveillance and intervention strategies taking advantage of the considerable evolution in communications technology, laboratory science and diagnosis, treatment and control of infections, rather than by the application of quarantine practices or other measures at sites distant from the source of the infection.[77]

This represents a major strategic change from seeking to control the spread of diseases at points of entry (ports, airports, and borders) to reducing the incidence of diseases within bounded territories. At the same time the actual changes in the regulations relating to surveillance and medical interventions concerning disease outbreaks that were integrated into the 1998 draft IHR were very modest.[78]

Of greater significance than the above trend was a major change that was noted in the foreword to the 1998 draft IHR, and that was the change in disease coverage from three epidemic-prone diseases (cholera, plague, and yellow fever) to a host of diseases that fell under six syndromes—acute hemorrhagic fever, acute respiratory, acute diarrheal, acute jaundice, acute neurological, and other notifiable diseases.[79] As it turned out, field trials concerning the diseases that fell within the syndromes in 1998 and 1999 did not prove very successful since many countries did not have the medical resources to evaluate the outbreaks. Consequently the entire focus on syndromes was dropped in 1999. However, at the same time that WHO was dropping the syndromic approach in developing a revised IHR, there was also a culmination of thinking within WHO about a variety of changes in disease controls. These proposed revisions of the IHR appeared in a number of publications between 2000 and 2004, and they culminated in the Interim Draft of the IHR in January 2004. In November 2004 an international conference was convened to consider the January draft during which some changes were recommended. At a subsequent conference in May 2005, the participants approved the 2005 IHR.[80]

The first key publication in the 2000–2004 period was coauthored by nine WHO officials and appeared in the journal *Emerging Infectious Diseases* in early 2000. It focused on outbreak verification and envisaged a proactive role for WHO in sending verification teams to states where disease outbreaks were reported and in assisting states in building their surveillance capabilities.[81] Another important WHO publication issued in 2002 was *Global Crises—Global Solutions* and this was followed in 2003 and 2004 by a number of publications that focused on the lessons of the SARS crisis and which influenced the reform of the IHR. Some of these publications appeared after the Interim Draft of the IHR in January 2004 and after states' comments on the Interim Draft in the early months of 2004. There were a large number of issues and interstate differences in the deliberations to formulate the new IHR, and they were partially rooted in states' experiences in controlling diseases during the 1990s. The proposed revisions also flowed from resolutions of the annual meetings of the WHA in the post-1998 years.[82] The subsequent discussion on the 2005 IHR provides an overview of its major provisions, and explores some of the reasons for changes in the regulations. As will become clear, many of the changes

emerged from established state and WHO practices over the decade between 1995 and 2005.

Throughout most of the twentieth century the character of WHO institutions were similar to that of other UN bodies. The WHA and Executive Board could adopt recommendations on a variety of matters by simple majority or two-thirds votes; accepting a new convention required a two-thirds majority.[83] In fact, the IHR was the only binding treaty that the WHA approved between 1948 and 2000. The director general could adopt a mediatory role in interstate conflicts, but with the exception of one interstate conflict in 1970, the director general was not an active mediator.[84] The recent disease outbreak in which the director general took an active role in recommending governmental responses to a disease outbreak was the SARS crisis of 2003 in which Director General Brundtland recommended certain dramatic policy changes for states and travelers. However, her role here was not a mediatory one between states; it was an international executive's recommending remedial policies for both states and individuals to reduce the incidence of infections and deaths.

The most important institutional changes in the 2005 IHR concerned a number of new bodies that operate under the WHA. First is the IHR Expert Roster that is composed of one person from each member state.[85] Second is the Emergency Committee that is appointed by the director general from the IHR Expert Roster and other expert bodes, and it gives its views on the existence of "public health emergencies of international concern" and necessary control measures that are referred to as "temporary recommendations."[86] Third, there is the Review Committee whose membership is also taken from the IHR Expert Roster and other expert groups, and its decisions are taken by simple majority. It is particularly charged with proposing amendments for the IHR as well as "standing recommendations" pertaining to long-term health problems.[87] Fourth, there are a variety of approaches for dispute settlement that are suggested in the 2005 IHR—namely, negotiation, mediation, conciliation, and arbitration (particularly by the WHO director general or the WHA), but there is no legal obligation to accept the judgment of a particular body.[88] Finally, it should be noted that the 2005 IHR, like the previous versions, provides states with an option to reject the agreement or make reservations concerning particular provisions within 18 months of the IHR acceptance by the WHA.[89] The remarkable thing about these provisions in the past is that so few states have rejected the IHR in its entirety or voiced reservations.

As has been noted earlier, the IHR were not important to global health politics and law during most of the twentieth century. States did not comply with the rules in many circumstances, and there was little effort to expand the scope of the IHR beyond the three diseases of cholera, plague,

and yellow fever. In fact, David Fidler has pointed to the "obscurity" of the IHR in his work on international heath law.[90] Although there was considerable optimism that the IHR would be revised and their importance would be enhanced during the late 1990s, this was not the case. The negotiations to revise the IHR in the late 1990s attracted little political attention, and in fact there was considerable opposition to the 1998 draft that focused on expanding coverage to six groups of syndromic diseases.[91]

There was a significant transformation in the political importance of the negotiations on the IHR's revision starting in 2000. This change in political thinking was marked by the creation in 2000 of the GOARN that legitimized a broad range of interventionist strategies. The change was due significantly to a variety of disease outbreaks throughout the world. Particularly, the SARS crisis of 2002–2003 had the most dramatic impact on states' perception that the IHR required important changes. Between 2002 and 2005 the member states of the WHO approved some important revisions in the IHR, but it would be an exaggeration to claim that revolutionary changes occurred.

A notable change in the 2005 IHR is an expansion in the values that the IHR promotes. In the case of previous IHRs, the most recent being the 1983 version, they were designed to limit the international spread of infectious diseases and to reduce interference with the flow of international commerce. In the 2005 IHR, states are called upon also to promote human rights, environmental protection, and security as well as the original two goals. David Fidler has labeled this spreading of political goals as "integrated governance."[92] It is quite possible that this augmentation of regime goals will be regarded as the most significant change in global health governance. One should not underestimate the IHR's commitment to "avoid unnecessary interference with international traffic and trade," but at the same time one should not ignore the growing importance of human rights, economic development, environmental protection, and security in the health regime.[93] The first principle in the 2005 IHR states "the implementation of these regulations shall be with full respect for the dignity, human rights and fundamental freedoms of persons."[94] This commitment harkens back to the preamble of the WHO constitution that was approved in 1948. It states that "the health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest cooperation of individuals and states." The preamble also posits that "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, and political belief, economic or social conditions."

The major obstacle in developing an effective set of Health Regulations during the twentieth century was the long-standing clause that WHO

could only publicize information on disease outbreaks that it received directly from the government of the afflicted state. This inevitably led to many outbreaks going unpublicized as states often chose not to release information on outbreaks for fear of expensive trade embargoes or quarantines being imposed on goods and citizens. As explained earlier in this chapter, this began to change in the 1990s owing to advancements in information technology that prevented states from controlling the flow of information from their countries. WHO began to accept nongovernmental sources of information with the informal establishment of GOARN in 1997; however, the practice was only formally approved in the 2005 IHR. According to the most recent Regulations: "WHO may take into account reports from sources other than notifications [from states] or consultations [with states] and shall assess these reports according to established epidemiological principles and then communicate information on the event to the State Party in whose territory the event is allegedly occurring."[95]

Although it is certainly true that some states chose not to report outbreaks owing to fear of financial losses, it was also understood that states sometimes did not report disease outbreaks as they lacked the technical capacities to monitor the health of their citizenry and thus were simply unaware that an outbreak was occurring. During the negotiations leading up to the 2005 IHR, this point was often stressed as many countries wanted to strengthen state obligations to detect, assess, and share information regarding outbreaks. The main provision in the current IHR on states' obligation to develop surveillance capacities is "Each State Party shall develop, strengthen and maintain . . . the capacity to detect, assess, notify and report events in accordance with these Regulations as specified in Annex 1."[96] The Regulations, and more specifically Annex 1.A, spell out the capacities that states should acquire. To enhance the surveillance capacities of both states and WHO, the Regulations specify that every state should create "a National IHR Focal Point" for communicating with other states and WHO, and WHO commits itself to establish "IHR Contact Points" for communications with states.[97] Also, WHO is obligated to assist states in developing their communications and surveillance capabilities, and the WHO must provide guidelines for developing these capabilities.[98]

A central obligation of State Parties to the IHR is that they must report,

> all events which may constitute a public health emergency of international concern within its territory in accordance with the decision instrument, as well as any health measure implemented in response to those events. If the notification received by WHO involves the competency of the International Atomic Energy Agency (IAEA), WHO shall immediately notify the IAEA.[99]

It is also important to highlight that in the 2005 IHR, states are obligated to report public health emergencies of international concern "irrespective of origin or source." This opens the door for WHO to address security threats that do not concern infectious diseases.[100] Some countries, such as the United States, wanted all State Parties to be obligated to report emissions of materials that could be used for weapons. This was fought by some developing countries including Iran and Brazil. In the end an article was accepted that satisfied the outlooks of both developing and developed countries. The negotiated provision states, "If a State Party has evidence of an unexpected or unusual public health event within its territory, irrespective of origin or source, which may constitute a public health emergency of international concern, it shall provide the WHO all relevant public health information. In such a case, the provisions of Article 6 . . . shall apply in full."[101]

The most important issue during deliberations on the 2005 IHR was how State Parties should determine which disease outbreaks constitute public health emergencies of international concern, and therefore which ones must be reported to the WHO and the broader international community. Articles 5 and 6 (and Annex 2) of the 2005 IHR identify three ways to classify disease outbreaks. The first classification applies to diseases that are *always* deemed a public health emergency of international concern and must therefore always be reported. This group of diseases includes smallpox, poliomyelitis (owing to wild-type poliovirus), human influenza caused by a new subtype, and SARS. The second classification includes a group of diseases that *sometimes* pose a public health emergency of international concern, and these are cholera, pneumonic plague, yellow fever, viral hemorrhagic fevers (including Ebola, Lassa, and Marburg), West Nile fever, and other diseases of special national or regional concern. If an outbreak of one of these diseases occurs, it is examined in terms of four criteria for determining its potential global impact, and these are whether it is serious; unusual or unexpected; capable of posing a serious risk of international spread; and/or capable of posing a significant risk to international trade or travel. The third classification for disease outbreaks provides a channel for reporting emerging or reemerging diseases because it includes any disease outbreak that possesses two of the above four criteria.[102]

An interesting provision in the 2005 IHR pertains to the "transport and handling of biological substances, reagents and materials for diagnostic purposes." It provides that "States Parties shall, subject to national law and taking into account relevant international guidelines, facilitate the transport, entry, exit, processing and disposal of biological substances and diagnostic specimens, reagents and other diagnostic materials for verification and public health response purposes under these Regulations."[103] This provision is

very important in that it establishes that States Parties and WHO can request that particular biological substances be sent to them, and the recipient of the request is obligated to comply. This is a significant measure for international surveillance of diseases in that it assures that states and medical laboratories have access to specimens for research purposes. It is, however, important to stress that the WHO has found it difficult on occasion to enforce compliance with this rule.

Most of the substantive recommendations related to the promotion of public health in the 2005 IHR are in Parts 5 and 6. They are concerned with public health measures and conditions of ports and ships, travelers, goods, containers, and health documents. They clearly focus on the facilitation of commerce. In Annexes 4 through 8 there are specific guidelines with regard to the character and conduct of the maritime and air transport industries.[104] These articles and annexes deal only marginally with national public health systems, and in so far as they do, it is largely with regard to points of entry and exit.

It is important to note that a large body of recommendations regarding particular international health problems emanate from the WHA and its subbodies, and many of these sub-bodies in the past have been groups of medical experts from a number of countries. It is very likely that these groups of experts will continue to be central to WHO practices and decision-making processes. It is, of course, probable that the newly created Review Committee and Emergency Committee will assume crucial political roles and that the WHO director general will have an enhanced role in proposing international health strategies like Dr. Gro Brundtland proposed during the SARS crisis of 2003. Brundtland and her advisory committee of experts from within and outside the WHO had crucial impacts throughout the crisis. In retrospect it is remarkable that WHO member states accepted such a broad and important role for WHO organs in the SARS crisis as they did. For example, the director general's issuance of "travel advisories" symbolized an acceptance of the director general's status and influence that had not existed in the past.

A contentious issue concerning IHR regulations during the twentieth century was labeled the problem of "excessive measures" or "more stringent measures." Some states favored restrictions on countries' ability to adopt regulations that are more stringent than those in the IHR, and other states wanted significant freedom for states to legislate more stringent rules. From the early twentieth century through the late twentieth century the developed countries opposed the right of states to adopt more stringent measures since their application could impede the flow of commerce. This thinking changed recently as more developed country governments judged that they desired greater freedom of action to control outbreaks of emerging diseases. In the negotiations on the 2005 IHR this issue was dealt with under the title "Additional Health Provisions."[105] The convention gave

countries significant leeway in adopting more stringent measures. All that was required of states was that they discuss the more stringent measures that they intended to implement with WHO officials. In other words, states' sovereign rights of legislation have won out in the debate over excessive measures.

An issue that arose at a number of points in the negotiations was whether the rules of the IHR should be legally binding as they had been in the past. Of course, states often did not treat them as legally binding—indicating this by their frequent noncompliance with the rules. The prevailing attitude among the developed countries was that even if many states did not treat the IHR as a legally binding treaty, maintaining the IHR's original legal status would enhance the probability of compliance with the rules (which they generally favored). Also, many developed countries moved toward strong support for their own political autonomy into health crises, and ironically this brought them closer to the views of the developing countries. Relevant to this change in policy orientation Fidler has remarked that "the revision process has moved away from binding legal rules on notification—one of the classic regime pillars—to reliance on global information networks."[106]

It is valuable to note that there have been other international organizations apart from WHO that have become involved in preventing the transnational spread of infectious diseases. The key global bodies are the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO). However, their roles are relatively minor in comparison to those of WHO. IMO is responsible for three major conventions: the International Convention for the Prevention of Pollution from Ships (knows as MARPOL 1973), the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (known as the London Convention, 1972), and the Convention on Facilitation of International Maritime Traffic (1965). Another convention that has recently been accepted at an IMO conference is the International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004). Most of the substances that are banned or controlled by the MARPOL and London convention do not threaten outbreaks of infectious diseases, and the same is largely true of the Ballast Water convention although ballast water can spread some infectious diseases such as cholera. The Facilitation Convention largely concerns practices of port authorities, and this includes support for WHO standards in ports.[107]

The key health regulations prescribed by ICAO are in Annex 9 (the Facilitation Annex) of the Convention on International Civil Aviation. Provisions in annexes are not formally regarded as legally binding, but there is a very high level of compliance. Almost all of the provisions that are

directly and indirectly related to the protection of health support WHO standards. They state that ICAO members should comply with the IHR, should use methods of disinfection prescribed by WHO, should utilize the International Certificate of Vaccination and Revaccination prescribed by WHO if vaccinations are needed, and should maintain facilities in ports that are necessary for the promotion of public health.[108] It is clear that IMO and ICAO largely defer to WHO on regulations that concern health matters. However, ICAO does have an Aviation Medicine Section of its Secretariat that recommends a variety of control strategies regarding particular disease problems.

Conclusion

This chapter focused on certain developments relating to disease containment. It first addressed the governance strategy of disease surveillance, which is important as an issue in-and-of-itself and as an issue that influences other strategic approaches. It then addressed controlling emergency outbreaks. Finally, the chapter analyzed reforms of the IHR that are particularly concerned with preventing the transborder spread of diseases.

A major problem of the global disease-control regime throughout the twentieth century was the continuing reluctance of states to provide the outside world with information on disease outbreaks because they feared embargoes of their goods and citizens. A major change regarding this issue occurred in the mid-1990s when transformations in information technology made it very difficult (if not impossible) for states to block the spread of information regarding disease outbreaks within their borders. The particular change that revolutionized what states could do was the development of the Internet. From this point on, the emergence and impacts of diseases were significantly more transparent.

Owing to technological changes, health experts and national officials soon began to establish institutions that would facilitate the sharing of information on disease outbreaks. The first significant institutional development was the creation of a network for sharing information among health professionals who sent information on outbreaks to a Web site in the United States. Its title is ProMED and it was created in 1993. It stands as one of the two most important medical networks for distributing information on outbreaks. The other very important information network (the GPHIN) has quite a different structure. In 1997, the Canadian government in partnership with the WHO created an electronic system that collects information from a large number of Web sites that publish data on disease outbreaks throughout the world. Canadian government employees then

organize the data and send it to WHO and a large number of other health organizations who evaluate the reports.

After ProMED and GPHIN the most important surveillance organizations are probably media groups such as CNN and BBC as well as humanitarian NGOs such as MSF and Oxfam that are exposed to a great deal of information on local disease problems in the course of their work. In considering these comments on disease surveillance it is important to realize that by the late 1990s information technology had given most people a de facto right of access to news on disease outbreaks throughout the world. Embedding such a right in a legal text was valuable, but not crucial.

One of the three most important strategies for controlling the spread of diseases is the provision of material and financial assistance to areas with existing and potential disease outbreaks. Sometimes the problems that states face are long-term infrastructure issues that require the improvement of health systems (see chapter 5), but at other times countries face short-term problems of emergency outbreaks. Five of these emergency situations are reviewed in this chapter, and the patterns of external assistance are remarkably similar. WHO encourages and coordinates assistance from a wide variety of sources. Governments provide research assistance and funds although they some times operate under the umbrella of WHO (either its global headquarters or one of its regional commissions). In fact, the research labs operating as WHO Collaborating Centers are national bodies that sign assistance agreements with WHO. There are also usually NGOs that provide assistance to states in need, but again the funding often comes from states. In reviewing programs to control emergency outbreaks it is important not to exclude the local MoH since it often coordinates various groups participating in control efforts. The government of the afflicted state also plays a crucial role in that it must request assistance from various actors, but particularly WHO. Without this formal invitation, WHO is not legally permitted to send emergency response teams to the outbreak site. WHO staff are often active in advising state officials, particularly from local ministries of health, regarding treatment protocols. Owing to WHO's strong network of health experts, they are often able to persuade states to comply with medical practices even without a legal structure to force compliance. Much of WHO's legitimacy derives from the widely accepted view that it has a genuine interest in improving global health outcomes. In fact, UN bodies are generally perceived as having a bias for improving the welfare of developing countries, and this is why bodies such as UNICEF, FAO, and even the World Bank are often participants in international efforts to assist developing nations. The final group of actors that are

important participants in health assistance networks are NGOs such as MSF, Merlin, Oxfam, and CARE. A number of these bodies are often active partners, and their strong presence demarcates contemporary international assistance efforts from those in the past.

A variety of changes in international health practices occurred during the early 1990s, but starting in the mid-1990s WHO turned its attention to the revision of the IHR that are the most important legal arrangements concerning health governance. The negotiations on IHR reform began in 1996 and ended in 2005, but the key deliberations took place between 2003 and 2005. Although a wide variety of changes were accepted, the number of major, substantive alterations in the Regulations was relatively small.

First, the key change in reforming the IHR concerned broadening its coverage of diseases from just 3 to more than 15, with the door open to include more. Second, the 2005 IHR for the first time formally permitted WHO to accept information on outbreaks from nongovernmental sources. WHO's inability to receive and disseminate such information was a major object of criticism during most of IHR's history. Third, states committed themselves to acquire capabilities to gather and distribute information on diseases. Fourth, states were given greater latitude to adopt more stringent measures than in the past. This provision indicated that the developed countries were moving in the direction of the developing countries on the issue of legislating "more stringent" measures. Finally, WHO was given new decision-making bodies to create more specific rules or guidelines with respect to emergency outbreaks and long-term health problems—referred to as "emergency recommendations" and "standing recommendations." In addition to these provisions concerning the powers of the WHO membership it is important to point out that the WHO secretariat was recognized as having the power to "name and shame" states if they refused to comply with directives of major WHO bodies. This particularly developed in the context of the SARS and avian flu crisis.

It is clear that states still fear the multiple negative ramifications of outbreaks of new and old diseases. Paradoxically, increased medical knowledge in the twentieth and twenty-first centuries regarding infectious diseases has made us more aware of the fragility of human health and the dangers of global interdependencies in terms of the spread of disease. This understanding has driven states into the acceptance of a decidedly stronger surveillance and containment regime than they were willing to accept in the past. One of the most powerful forces driving the evolution of a stronger regime is the increasing awareness that the health of peoples in the industrial world is profoundly influenced by the health conditions in the developing world. Health-oriented nongovernmental groups have always had a strong

humanitarian foundation for their grassroots political pressure. Nowadays, the deeper understanding of the self-interested benefits of disease containment has made it easier to argue that a strong global surveillance and containment system is not just desirable for humanitarian reasons but necessary for survival reasons.