Return of the Fourth Horseman: Emerging Infectious Diseases and International Law

David P. Fidler

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David P. Fidler*

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INTRODUCTION

In 1969, the United States Surgeon General declared that infectious diseases had been conquered and the time had come to focus on chronic diseases like cancer and heart disease.1 In its 1996 annual report, the World Health Organization (WHO) reported that infectious diseases were the world’s leading cause of death.2 WHO’s annual report demonstrated that the demise of infectious diseases predicted twenty-six years earlier was premature. Instead, WHO believes that infectious diseases now constitute a “world crisis.”3 Since 1969, infectious diseases have returned to the international public health agenda. New diseases have appeared, triggering global epidemics; old diseases, once thought under control, returned to cause sickness and death worldwide. WHO and national public health authorities in developed and developing countries are scrambling to deal with emerging and reemerging infectious diseases. Pestilence, the fourth horseman of the apocalypse, is firmly in the saddle spreading sickness and death.4

Infectious diseases have caused illness and death in humans from the beginning of human history.5 Historians of all civilizations have recorded horrible epidemics of infectious diseases.6 Physicians and citizens raised in the era of antibiotic treatments have, however, no memory of life and a society constantly under threat of infectious diseases.7 For these genera-

1. See Emerging Infections: A Significant Threat to the Nation’s Health: Hearings Before the Senate Committee on Labor and Human Resources, 104th Cong. 1 (1995) [hereinafter Emerging Infections Hearings] (statement of Senator Kassebaum, Chairman, Committee on Labor and Human Resources).


3. Id. at 105.

4. In June 1996, Vice President Al Gore asserted that “there is no more menacing threat to our global health today than emerging infectious diseases.” Al Gore, Address Before the National Council for International Health 2 (June 12, 1996); see also Dennis Pirages, Microsecurity: Disease Organisms and Human Well-Being, WASH. Q., Autumn 1995, at 5, 11 (“Infectious diseases are potentially the largest threat to human security lurking in the post-cold war world.”).

5. For an account of infectious diseases in history, see generally WILLIAM H. MCNEILL, PLAGUES AND PEOPLES (1977).


7. Cf. LAURIE GARRETT, THE COMING PLAGUE: NEWLY EMERGING DISEASES IN A WORLD OUT OF BALANCE 11 (1994) (noting that today’s physicians are ill-equipped to diagnose “an old scourge like yellow fever or dengue, much less spot an entirely new microbe”). Garrett is widely recognized as an
tions, the "end of history" for infectious diseases seemed entirely plausible. Nevertheless, the struggle between mankind and the microbial world continues as emerging and reemerging infectious diseases challenge international, national, and local public health authorities.

An important feature of the latest chapter in mankind's struggle with infectious diseases is that the threat of emerging and reemerging infectious diseases is global in scope;\(^8\) a threat which WHO believes requires a global, coordinated response.\(^9\) The transboundary effects of infectious diseases are not new, because microbes have for centuries spread to new regions from their original locations.\(^10\) The need for international cooperation in infectious disease control is not novel either, as states have long cooperated to halt the spread of disease.\(^11\) The threat of emerging and reemerging infectious diseases stresses what history has frequently recorded: microbes do not recognize borders, and states are compelled to cooperate when dealing with infectious diseases.

Although infectious diseases are not unique threats historically, current aspects of the problems they pose are novel. The "global village" metaphor is apt because the unprecedented scale of global travel and commerce today makes any disease outbreak in the world a threat to virtually every other country.\(^12\) Infectious diseases spread through the links created by an interdependent world.\(^13\) Globalization provides infec-

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10. See MCNEILL, supra note 5, at 176-207 (recounting the history of the intercontinental spread of infectious diseases).

11. See Fidler, supra note 8, at 78.

12. See Emerging Infections Hearings, supra note 1, at 20 (statement of Dr. James W. LeDuc, Medical Officer, Communicable Diseases Division, World Health Organization).

13. See INSTITUTE OF MEDICINE, EMERGING INFECTIONS: MICROBIAL THREATS TO HEALTH IN THE UNITED STATES 77-84 (1992) [hereinafter IOM REP.] (citing international travel and commerce as factors in infectious disease emergence).
tious diseases with opportunities to infect human populations across the planet almost as easily as infecting the family next door. Just as companies today create global strategies, public health authorities must view the health of their citizens from a global perspective.

The global dimension of emerging and reemerging infectious diseases brings into focus international efforts to control them. As with other transnational problems, such as environmental protection, international law plays an important role in the international attempts to deal with infectious diseases. WHO recognizes the importance of international law in its international legal strategy for coping with the threat of emerging and reemerging infectious diseases.¹⁴ In this strategy, WHO acknowledges the historical role of international law on infectious disease control as well as its future role in containing and preventing outbreaks of infectious diseases.

This Article is the first attempt to analyze international law and emerging and reemerging diseases comprehensively. The Article has six objectives. First, it looks at emerging and reemerging infectious diseases to answer basic questions: what are they, and what causes them? Defining emerging and reemerging infectious diseases and identifying their causes demonstrates how complicated and troubling the return and control of infectious diseases are. Second, the Article analyzes the reasons why emerging and reemerging infectious diseases create such problems for international relations. Examining infectious diseases in connection with the nature of international relations clarifies that the emergence and reemergence of infectious diseases pose threats of the most serious magnitude.

Third, the Article analyzes the current plans for dealing with emerging and reemerging infectious diseases proposed by WHO and United States federal agencies. These plans share fundamental objectives and can be interpreted as manifestations of a common strategy. Fourth, the Article examines existing international law on infectious disease control. Much of current international law on infectious disease control is inadequate in light of the nature of the new challenges of emerging and reemerging infectious diseases and the ambitious contents of the international action plans.

Fifth, the Article explores WHO’s proposed strategy to improve international law on infectious disease control. I conclude that current WHO proposals for revising existing international law on infectious disease control are inadequate to meet the existing challenges from emerging and reemerging infectious diseases. Finally, the Article offers one alternative legal strategy to WHO’s proposals—an approach that suggests the framework treaty/protocol approach used in other areas of international law—and a brief critique of this alternative in order to explore further the complexity of the issues and the potential international law has in this area. The presentation of an alternative strategy seeks to stimulate thinking about various ways international law might more directly confront the problems of emerging and reemerging infectious diseases.

I. EMERGING INFECTIOUS DISEASES

A. IDENTIFYING EMERGING INFECTIOUS DISEASES

1. Basic Infectious Disease Concepts

A basic grasp of the concepts used by public health officials, scientists, and physicians will help in analyzing whether international law can deliver what these experts deem necessary.

The sources for infectious diseases are found in four types of agents: bacteria, viruses, parasites, and fungi. Such disease agents reside in or on a host, which is the organism that carries the agent. Many infectious agents have no adverse effects on their natural host populations. Infectious

15. For example, the bacterium Yersinia pestis causes the plague. See IOM REP., supra note 13, at 16.
16. AIDS is caused by a virus that weakens the human immune system. See WORLD HEALTH REP. 1996, supra note 2, at 31.
17. Malaria is a disease caused by parasites. See id. at 47.
18. Candidiasis is a fungal disease that can affect the gastro-intestinal tract, vagina, and mouth. See IOM REP., supra note 13, at 41.
20. For example, the parasite that causes malaria has no effect on the mosquitoes that carry it. See GARRETT, supra note 7, at 39. Influenza carried
disease spreads when a host organism transmits the agent to a new organism.\textsuperscript{21} Transmission can occur in many ways: through air, water, direct contact with bodily fluids of a host (e.g., urine, feces, saliva, and blood), sexual activity, and intermediary organisms or vectors (e.g., insects).\textsuperscript{22} Once a new host is infected with the agent, it can also transmit the disease and thus widen the spread of the infection, as long as the introduction of the agent survives the new host’s natural defenses against infectious invaders.\textsuperscript{23}

The keys to treating and controlling infectious diseases in humans are identifying the agent, understanding how it works, figuring out how the human host was initially infected, examining how it causes illness in humans, and discovering how the disease can be transmitted to other humans.\textsuperscript{24} For new diseases, each of these steps often proves difficult and expensive because of the nature of the agent, political obstacles, the lack of an obvious natural host, or lack of adequate research funds.

Once the biology and epidemiology of a disease agent are understood, public health authorities can implement treatment and control measures. Antimicrobial drugs are commonly used to kill pathogenic microbes or to prevent them from reproducing. Some disease agents do not respond to existing antimicrobial drugs, though, so public health authorities concentrate on controlling the spread of the disease by closing off transmission opportunities.\textsuperscript{25} Treatment and control of an infectious

\textsuperscript{21} See Anita Manning, Scientists Say New Virus Could Cause Pandemic, \textit{USA TODAY}, Jan. 17, 1996, at 1A.

\textsuperscript{22} See \textit{WORLD HEALTH REP.} 1996, \textit{supra} note 2, at 23 (noting that infectious diseases spread from the reservoir organism to a susceptible host).

\textsuperscript{23} See \textit{id.} at 24 (breaking down selected infectious diseases by different modes of transmission).

\textsuperscript{24} See, \textit{e.g.}, Bernard N. Fields, \textit{Pathogenesis of Viral Infections}, in \textit{EMERGING VIRUSES} 69, 70 (Stephen S. Morse ed., 1993) ("A virus needs to circumvent or subvert host defenses if it is to be a successful pathogen.").

\textsuperscript{25} Each of these tasks falls within the science of epidemiology, which has been defined as "[t]he mother science of public health" because it involves "the systematic, objective study of the natural history of disease within populations and the factors that determine its spread." \textit{INSTITUTE OF MEDICINE, THE FUTURE OF PUBLIC HEALTH} 40 (1988) [hereinafter \textit{IOM, FUTURE OF PUBLIC HEALTH}].

\textsuperscript{25} For example, "no drug has been developed that can prevent or cure HIV infection." \textit{IOM REP.}, \textit{supra} note 13, at 57. Public health officials thus have to respond by trying to reduce opportunities for transmission of HIV to uninfected persons. \textit{See \textit{WORLD HEALTH REP.} 1996, \textit{supra} note 2, at 36-37 (discussing HIV prevention strategies such as adopting safe sex practices, increasing condom availability, and education).
disease requires public health authorities to be able both to identify an outbreak of a disease and to mobilize resources to treat the infection and control its spread.

The preceding rudimentary description of infectious diseases suggests that pathogenic microbes pose serious challenges to scientific, medical, and political institutions. Painstaking research must be done; complicated epidemiological field work must be undertaken; funding must be found for research and fieldwork; antimicrobial pharmaceuticals must be developed; medical personnel must be trained to administer treatment and to participate in disease surveillance; funding must be supplied to maintain surveillance for future outbreaks; and actors in the political arena must support work on infectious diseases. All these activities consume considerable resources. But, as the threat of emerging and reemerging infectious diseases demonstrates, infectious diseases constantly challenge the scientific creativity, financial resources, and vigilance of even the most wealthy nation.

2. Definition and Examples of Emerging Infectious Diseases

Leading international and national public health authorities usually label emerging and reemerging infectious diseases as "emerging infectious diseases" (EIDs) and define EIDs as "diseases of infectious origin whose incidence in humans has increased within the past two decades or threatens to increase in the near future." This definition includes diseases never before identified as well as previously known diseases that have reemerged in traditional locations or in new regions. Hereinafter, the acronym EIDs refers to both emerging and reemerging infectious diseases.

One category of EIDs contains diseases identified for the first time in human populations during the last two decades. The United States government interagency Working Group on Emerging and Reemerging Infectious Diseases (CISET Working Group) listed twenty-nine examples of new infectious diseases identified since 1973. The emergence of approximately


27. See WORLD HEALTH REP. 1996, supra note 2, at 15.

28. See NATIONAL SCIENCE AND TECHNOLOGY COUNCIL COMMITTEE ON INTERNATIONAL SCIENCE, ENGINEERING, AND TECHNOLOGY WORKING GROUP
thirty new infectious diseases within thirty years of the pro-
claimed conquest of infectious diseases provides sobering evi-
dence of the power of the microbial world.

The second category of EIDs constitutes known infectious
diseases that have in the last twenty years reemerged as public
health problems. Reemerging infectious diseases fall into one
or more of three categories: (1) infectious diseases that have
flared up in regions in which they historically appeared; (2) in-
fected diseases that have expanded into new regions where
they were not present before; and (3) infectious diseases that
have developed resistance to antimicrobial treatments and
have spread through traditional and/or new regions because of
such resistance.29

Tuberculosis is a reemerging infectious disease that falls
into each of the three categories noted above. Tuberculosis is
an old disease that has reemerged as a major health problem
in regions where it has historically occurred. According to the
Institute of Medicine of the U.S. National Academy of Science
(Institute of Medicine), tuberculosis “kills more people world-
wide than any other infectious disease.”30 Experts predict 90
million new cases of tuberculosis worldwide during the 1990s
and 30 million deaths by the year 2000.31 Tuberculosis has re-
turned as a problem in both developing and developed coun-
tries. For example, tuberculosis haunted major American cit-
ties, like New York, during the nineteenth century.32 In the
1980s and 1990s, New York City public health officials waged a
battle to contain a reappearance of the disease. One of the
causes of the reemergence of tuberculosis in New York City
was immigration of tuberculin-infected persons from develop-
ing countries, which makes tuberculosis an infectious disease
that has expanded from places where the disease is fairly
common to a new environment relatively free from the disease.
Finally, certain strains of tuberculosis have developed antimi-
crobial resistance to traditional pharmaceutical treatments
making some cases in New York City even harder to handle.

3. Growth of Awareness of the EID Problem

EIDs have been on the march for the last three decades. Yet it
was only five years ago that alarm over the EID threat
motivated international and national public health authorities
to take action. The public health communities internationally
and in the United States recognize the 1992 report of the Insti-
tute of Medicine entitled Emerging Infections: Microbial
Threats to Health in the United States as the call for action
against EIDs. Why it took so long for public health authori-
ties to understand the EID threat is a controversial story; but,
as will be examined later, the inertia had much to do with the
complacency about infectious diseases that followed the prema-
ture triumphalism of the late 1960s and early 1970s. One
thing however, is clear: the worldwide AIDS pandemic shat-
tered all illusions that science had laid infectious diseases to
rest. The AIDS pandemic brought home the vulnerability of
every society to infectious diseases. By the year 2000, between
30 million and 110 million people worldwide will be infected
with the human immunodeficiency virus (HIV). AIDS made

33. See Emerging Infections Hearings, supra note 1, at 33-35 (statement
of Dr. Margaret H. Hamburg, Health Commissioner of New York City).
34. See Anthony S. Fauci, New Science Aimed at an Ancient Killer, 274
JAMA 786, 786 (1995); Tuberculosis Morbidity—United States, 1994, 274
35. See Raviglione et al., supra note 31, at 224.
36. See Emerging Infections Hearings, supra note 1, at 33-35 (statement
of Dr. Margaret H. Hamburg, Health Commissioner of New York City).
37. IOM REP., supra note 13.
38. See GARRETT, supra note 7, at 5-7 (discussing origins of the IOM re-
port).
39. See U.S. DEP’T OF STATE, PUB. 10296, UNITED STATES INTERNATIONAL
HIV/AIDS] (citing estimates from WHO and the Global AIDS Policy Coalition
at the Harvard School of Public Health). According to the UN CHRONICLE, the
AIDS pandemic “is a calamity whose dimensions are scarcely comprehensi-
clear the urgent need for national and international scientific, medical, and public health policy communities to regroup to create a strategy to deal with their resurgent foe.

*Emerging Infections* as well as two earlier reports by the Institute of Medicine demonstrate that "the ability of the U.S. public health system and our health professionals to deal with emerging infectious diseases is in jeopardy."40 *Emerging Infections* focused on the EID threat to American and global health, stressed the need to overcome years of complacency on infectious diseases in the United States, and made recommendations for federal and state agencies to follow in addressing the threat.41 Since the publication of *Emerging Infections*, the EID threat and the need for global action have become subjects of extensive discourse for international and national public health authorities, in the legislative and executive branch of the United States government, in international meetings of leading industrial countries, and in popular culture.

As the leading agency in the United States public health service, the Centers for Disease Control and Prevention (CDC) responded to *Emerging Infections* by developing an action plan for the CDC specifically and the United States generally. In 1994, the CDC's Emerging Infections Working Group published *Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States.*42 The CDC also began publishing a new journal, *Emerging Infectious Diseases*, designed "to promote the recognition of emerging and reemerging infectious diseases and improve the understanding of factors involved in disease emergence, prevention, and elimination."43

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40. CDC STRATEGY, supra note 26, at 3. The first report issued in 1987 addressed the weaknesses of American public health abilities to handle tropical infectious diseases, such as Lassa fever, Ebola hemorrhagic fever, and drug-resistant malaria. See INSTITUTE OF MEDICINE, THE U.S. CAPACITY TO ADDRESS TROPICAL INFECTIOUS DISEASE PROBLEMS (1987). In 1988, the second Institute of Medicine study criticized the American approach to public health as ineffective and expensive. See IOM, FUTURE OF PUBLIC HEALTH, supra note 24, at 5-6, 170.

41. See generally IOM REP., supra note 13.

42. CDC STRATEGY, supra note 26.

43. Emerging Infectious Diseases Homepage (visited Feb. 5, 1997)
Internationally, WHO also responded to the 1992 Institute of Medicine report. In April 1994, WHO convened an international meeting to discuss the EID threat. At this meeting, participants agreed that "WHO should be encouraged to take a leadership role in implementing and coordinating global efforts" against EIDs. The Director-General of WHO produced a report in February 1995 in which he discussed the background of the EID situation, causes of EIDs, and specific steps "to ensure that a global plan is established to combat emerging infectious diseases." After considering the Director-General's report, the World Health Assembly adopted a resolution in May 1995 urging WHO member states to take action against EIDs, urging international and nongovernmental organizations to cooperate in EID control efforts, and requesting the Director-General to develop a global WHO action plan to combat the threat of EIDs.

Concern about EIDs emerged in the United States Senate as well. In hearings held by the Senate Committee on Labor and Human Resources on "Emerging Infections: A Significant
Threat to the Nations Health," Senator Nancy Kassebaum, Chair of the Committee, used the language of war to describe the EID threat: "New strategies for the future begin with increasing the awareness that we must re-arm the Nation and the world to vanquish enemies that we thought we had already conquered." The efforts of the U.S. interagency CISET Working Group indicated that concern about the EID threat permeated many levels of the United States government. The CISET Working Group convened in December 1994 "to consider the global threat of emerging and reemerging infectious diseases." It produced a report in September 1995 called *Infectious Disease—A Global Health Threat* that identified specific actions the U.S. government could take to improve its ability to contribute to global efforts to fight EIDs. The Clinton administration also mobilized against the EID problem. On June 12, 1996, Vice President Gore announced a new national ini-

49. *Emerging Infections Hearings, supra* note 1. The hearings were called to help "develop a legislative approach to support and complement the U.S. Public Health Service and many other global efforts that are being focused on the deadly problems of domestic and international emerging infections." Id. at 2 (statement of Senator Kassebaum).

50. Id. at 3. Earlier in 1995, Senator Arlen Spector warned about the adverse effects of budget cuts on the National Institute for Health's initiative on EIDs, arguing for "sustained, stable funding" and "a sustained strategic approach" to EIDs. 141 CONG. REC. S7459, 7461 (daily ed. May 25, 1995) (statement of Sen. Spector). During the impasse in Congress over the federal budget in January 1996, Senator Nunn drew the Senate's attention to the virtual shutdown of the CDC because of the lack of federal funding and noted the CDC's role in dealing with EIDs as one of the reasons why the CDC should be spared the effects of the budget impasse. See 142 CONG. REC. S63, 64 (daily ed. Jan. 4, 1996) (statement of Sen. Nunn).

Legislation was also proposed in the U.S. Senate that would heighten the priority the U.S. government gives to EIDs. In January 1995, Senator Kassebaum introduced a bill to "strengthen the capacity of State and local public health agencies to carry out core functions of public health." S. Res. 142, 104th Cong. § 101 (1995). Included in the bill was language that made EIDs a priority public health issue of regional and national significance. Id. § 202. The Foreign Relations Revitalization Act, introduced in the U.S. House of Representatives and Senate in 1995, included a provision that made efforts against EIDs a U.S. foreign policy priority. H.R. Res. 1561, 104th Cong. § 1604 (1995); S. Res. 908, 104th Cong. § 615 (1995).

51. CISET REP., supra note 28, at 1.

52. The CISET Report contains 19 specific recommendations broken down into two major categories: (1) "improve worldwide disease surveillance, reporting, and response" by working with other countries, WHO, and other international organizations; and (2) "strengthen the U.S. capacity to combat emerging infectious diseases." Id. at 7-8.
tiative to combat EIDs. The new policy commits the federal government to tackling the global problem of EIDs through development of a global surveillance and response system, increased funding requests to Congress, and tightening U.S. quarantine regulations at U.S. ports of entry. As Health and Human Services Secretary Donna Shalala commented, the Clinton administration has in essence declared war on EIDs. As part of its efforts, the United States has begun to pursue a number of bilateral EID initiatives with the European Union, Japan, South Africa, and Russia.

The leaders of the Group of Seven leading industrialized nations (G7) also put EIDs onto their agenda by endorsing a project at the 1995 Halifax Summit called "Toward a Global Health Network," designed "to help public health institutions in their fight against infectious diseases and other major health hazards." Infectious diseases were again on the G7's agenda at the 1996 Lyon Summit as the G7 leaders incorporated a statement on infectious diseases in their final summit statement. The states participating in the Asia Pacific Eco-

53. See Gore, supra note 4, at 1; see also Ellen McCleskey, Gore Unveils New Initiative for Fighting Infectious Diseases, BNA HEALTH CARE DAILY (June 13, 1996), available in LEXIS, Nexis Library, Curnws File.

54. See Fact Sheet: Addressing the Threat of Emerging Infectious Diseases, White House Office of Science and Technology Policy (June 12, 1996) (on file with author) [hereinafter Addressing the Threat of Emerging Infectious Diseases].

55. See McCleskey, supra note 53 (reporting Shalala's comment that the "Clinton Administration has made the war against infectious diseases a priority").


57. See Letter from Stephen M. Ostroff, Acting Deputy Director, National Center for Infectious Diseases, Centers for Disease Control and Prevention, to David P. Fidler, Associate Professor of Law, Indiana University School of Law—Bloomington (Nov. 21, 1996) (on file with author) (mentioning U.S. bilateral EID efforts with these three countries) [hereinafter Ostroff Letter].

58. CISET REP., supra note 28, at 4.

nomic Cooperation forum established in 1996 a working group on EIDs.\textsuperscript{60}

Awareness about EIDs was growing in popular culture as well. The publication of books dealing with infectious diseases brought to wider audiences the reality that the microbial world represented a clear and present danger to human populations.\textsuperscript{61} Even Hollywood participated in the infectious disease genre. \textit{Outbreak}, starring Dustin Hoffman and Morgan Freeman, built its plot around an outbreak in California of a lethal disease imported from Africa.\textsuperscript{62} Whatever the entertainment value of this film, one fact about the making of \textit{Outbreak} helps put the danger of EIDs and the level of preparedness for such danger into perspective: "Dustin Hoffman made more money last year playing a disease control scientist in the movie \textit{Outbreak} than the combined annual budget for the U.S. National Center for Infectious Diseases and the U.N. Programme on AIDS/HIV."\textsuperscript{63}

\textbf{B. FACTORS CONTRIBUTING TO EIDs}

No easy answer exists to explain why infectious diseases have returned with a vengeance at a time when mankind’s scientific knowledge and powers are historically unprecedented. The emergence and reemergence of infectious diseases are complex phenomena that touch an awesome array of scientific, social, political, and economic problems.\textsuperscript{64} This section ana-

\begin{itemize}
  \item 60. \textit{See} Ostroff Letter, \textit{supra} note 57.
  \item 62. \textit{OUTBREAK} (Warner Brothers 1995).
  \item 63. Garrett, \textit{Infectious Disease}, \textit{supra} note 61, at 79.
  \item 64. For example, Alan Lifson identifies no fewer than eight factors contributing to dengue epidemics in different parts of the world: international travel, urbanization, population growth, crowding, poverty, inadequate sanitation facilities, weak public health infrastructure, and lack of sustained support for disease-control measures. Alan R. Lifson, \textit{Mosquitoes, Models, and}
lyzes the most frequently cited factors contributing to EIDs. Because these factors vary in relative importance for different EIDs, they are not listed in order of importance or priority. The sheer number and complexity of the factors behind EIDs demonstrates that the EID threat poses tremendous challenges for any attempts to develop global public health and legal strategies.

1. The Power of Nature

One of the crucial lessons learned through the EID problem is that nature is a powerful, ever-changing force. The microbial world has shown a dynamism that confirms the strength of evolution in the natural world. This lesson may seem obvious; Laurie Garrett observes, however, the optimistic triumph of medicine over microbes rested on the false assumption "that microbes were biologically stationary targets." The EID threat drives home that "mutation and change are facts of nature... and that human health and survival will be challenged, ad infinitum, by new mutant microbes, with unpredictable pathophysiological manifestations." For Nobel Laureate Joshua Lederberg, the power of nature's evolutionary forces make disease plagues "natural, almost predictable" phenomena.

Microbial adaptation and evolution take two forms: change as a natural process and change as a result of pressure exerted by antimicrobial drugs. "The ability to adapt is required for the successful competition and evolutionary survival of any microbial form," notes the Institute of Medicine, "but it is particularly crucial for pathogens, which must cope with host defenses
as well as microbial competition. Even absent efforts from humans to kill them or prevent their replication, pathogenic microbes constantly adapt and compete with host immune systems and with other microbes.

Microbes exhibit a similar evolutionary drive when confronted by antimicrobial drugs. One of the most worrying aspects of the reemergence of some infectious diseases is the development of antimicrobial resistance in some disease agents. The list of diseases that have developed antimicrobial resistance is disturbingly long. The development of antimicrobial resistance in disease agents might not be as troubling if the resistant microbes had to confront a new arsenal of effective drugs. But the pharmaceutical industry has been slow to research and market new drugs to combat resistant strains of bacteria, viruses, and parasites. Although some new drugs are being developed, they will not appear on the market for another five to fifteen years because of lengthy clinical trials.

69. Id. at 84.

70. See id. at 92 (stating that the “emergence of resistance in a known infectious agent may be a greater threat to public health than the emergence of a new disease”); Linda F. McCraig & James M. Hughes, Trends in Antimicrobial Drug Prescribing Among Office-Based Physicians in the United States, 273 JAMA 214, 214 (1995) (stating that persons infected with drug-resistant microbes require more hospitalization, have longer hospital stays, and are more likely to die).

71. Bacteria that have shown resistance to antibiotics include streptococcus pneumonia, staphylococci, enterococci, pseudomonas aeruginosa, and tuberculosis. See IOM REP., supra note 13, at 93-97. Viruses with antiviral resistance include herpes simplex virus and HIV-1. See id. at 99-100. Resistance to antimalarial treatments such as chloroquine and mefloquine is also apparent in the parasite that causes malaria, plasmodium falciparum. See id. at 100-01. The development of resistance in the malaria parasite is particularly frightening because the disease “is endemic in 91 countries, with about 40% of the world’s population at risk.” WORLD HEALTH REP. 1996, supra note 2, at 47.

72. See Garrett, Infectious Disease, supra note 61, at 68 (quoting James Hughes, Director of the National Center for Infectious Diseases at the CDC, who asserts that “[t]he pipeline is dry. We really have a global crisis.”); see also CISET REP., supra note 28, at 10 (concluding that “[i]n the race between drug-resistant bacteria and new drugs, the resilient bacteria are winning”); Nancy McVicar, Infectious Diseases Fight Back; Old Cures Don’t Work on Resistant Organisms, SUN-SENTINEL (Fort Lauderdale), July 24, 1994, at 1A (quoting Dr. Stephen Ostroff of the CDC stating that “organisms appear to be developing resistance faster than the industry can make new drugs”); Robert F. Service, Antibiotics That Resist Resistance, 270 SCIENCE 724, 724 (1995) (stating that in some areas there is agreement that drug resistance is near crisis proportions).

73. See Service, supra note 72, at 724 (reporting on a dozen new promising antibiotic treatments).
and regulatory approval procedures.\textsuperscript{74} Further, pharmaceutical companies are reluctant to invest in research on drugs to combat pathogenic microbes that are found mainly in developing countries because the anticipated return on investment is poor.\textsuperscript{75} The Institute of Medicine warns of "potentially catastrophic consequences if the development process is left entirely to free enterprise."\textsuperscript{76} The state of antimicrobial research and development undermines WHO's call for "urgent action" on drug resistant diseases.\textsuperscript{77} The warnings about a crisis created by antimicrobial resistance contain the lesson about the microbial world's immense power to adapt and survive. Even if pharmaceutical companies develop new antimicrobial treatments, resistance will once again develop,\textsuperscript{78} and the process would begin again. In nature, microbial change is constant.

2. Complacency and the Breakdown of Public Health Systems

As well as underestimating the resilience of microbes, the public health, medical, and scientific communities around the world have contributed directly to the EID problem in other ways. A key reason almost universally cited as a cause behind the EID threat is complacency about infectious diseases. Those now struggling to respond to the EID threat bluntly describe the consequences of this complacency among scientists, physicians, pharmaceutical companies, and public officials.\textsuperscript{79}

After surveying the quality of infectious disease surveillance in the United States, a group of CDC and state public health officials concluded: "Our ability to detect and monitor

\textsuperscript{74} See id. at 726.

\textsuperscript{75} See Garrett, Infectious Disease, supra note 61, at 68; see also Drug Firms: Limited Imagination, ECONOMIST, Sept. 28, 1996, at 80, 85 (noting that pharmaceutical research on antimalarial drugs is not undertaken because "[m]ost of the victims . . . are too poor to pay").

\textsuperscript{76} IOM REP., supra note 13, at 11.


\textsuperscript{78} See McCraig & Hughes, supra note 70, at 219.

\textsuperscript{79} See IOM REP., supra note 13, at vi (noting complacency toward the danger of EIDs in the scientific and medical communities, the public, and the political leadership of the United States). Not all public health experts fell victim to complacency. Neville Goodman, who worked for both the Health Committee of the League of Nations and WHO, wrote in 1971 "that the Pale Horse of the Apocalypse has by no means been broken to bit and halter." NEVILLE GOODMAN, INTERNATIONAL HEALTH ORGANIZATIONS AND THEIR WORK 247 (2d ed. 1971).
infectious disease threats to health is in jeopardy. False perceptions that such threats had dwindled or disappeared led to complacency and decreased vigilance regarding infectious diseases, resulting in a weakening of surveillance.\footnote{80} Similarly harsh conclusions were published about the poor condition of infectious disease preparedness in Great Britain.\footnote{81} Outbreaks of Ebola hemorrhagic fever in Zaire in 1995 and plague in India in 1994 demonstrated the lack of preparedness in those two countries and internationally in dealing with EIDs.\footnote{82}

Lack of preparedness for EID outbreaks was not, however, the only consequence of complacency. With complacency came the misuse of antimicrobial drugs. WHO has argued that antibiotics have been excessively and inappropriately used in developed and developing countries.\footnote{83} Such widespread use and misuse of antimicrobial drugs has contributed to the development of drug resistance in many diseases.\footnote{84} Compounding the misuse of antimicrobial drugs, the pharmaceutical industry believed the predictions that infectious diseases were conquered and thus shifted attention and resources into other areas, like the treatment of chronic diseases.\footnote{85} As a result, the industry's past complacency has made it difficult to respond rapidly to the present EID crisis.

Complacency has also had an impact on public health law in the United States, in other countries, and at the international level. Terry O'Brien, Assistant Attorney General for the

\footnote{80. Ruth L. Berkelman et al., Infectious Disease Surveillance: A Crumbling Foundation, 264 SCIENCE 368, 368 (1994); see also IOM, FUTURE OF PUBLIC HEALTH, supra note 24, at 19 (describing the poor condition of the U.S. public health system).

81. See J. Michael O'Brien et al., Tempting Fate: Control of Communicable Diseases in England, 306 BRIT. MED. J. 1461, 1461 (1993) (arguing that Britain's system of infectious disease surveillance "is out of date and needs substantial reform").


83. See WHO Calls for Action, supra note 77.

84. See CDC STRATEGY, supra note 26, at 2 (stating United States faces emergence of drug-resistant pathogens from widespread use and misuse of antimicrobial drugs); WHO Calls for Action, supra note 77 (stating that misuse of antibiotics is largely responsible for drug-resistance crisis).

85. See Service, supra note 72, at 724-25 (noting sources suggesting that bacterial disease research should be subjugated to research for chronic diseases).}
State of Minnesota, has argued that public health law, developed mainly in the pre-antibiotic era, did not change after the advent of antimicrobial treatments because the treatments were successful. The treatments' success reduced the need for state intervention to control diseases.\(^8\) With the arrival of AIDS, public health law in the United States has come under pressure to conform with modern principles of due process and civil rights.\(^7\) O'Brien raises the question whether U.S. public health law can balance sufficient public health powers to combat EIDs and strict restrictions on interfering with individual rights.\(^8\)

At the international legal level, the World Health Assembly has not substantially revised the International Health Regulations (IHR), the main source of international law on infectious diseases, since 1973.\(^9\) In 1975, a WHO publication asserted that it was reasonable to believe that the IHR will "no longer serve any purpose and will eventually lapse" as national systems of infectious disease control and international coop-

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88. See O'Brien, supra note 86, at 39. Similar questions have surfaced about the outdated condition of public health law in Great Britain. See, e.g., O'Brien et al., supra note 81, at 1463 (arguing for the passage of new legislation on infectious disease control in the United Kingdom).

89. See WORLD HEALTH ORGANIZATION, INTERNATIONAL HEALTH REGULATIONS 5 (3rd ed. 1983) [hereinafter INT'L HEALTH REG.] (describing IHR amendment history). According to WHO, the IHR are "the only international health agreement on communicable diseases that is binding on Member States" of WHO. Division of Emerging and Other Communicable Diseases Surveillance and Control, Emerging and Other Communicable Diseases Strategic Plan 1996-2000, at 10 (WHO/EMC/96.1), World Health Org. (1996) [hereinafter EMC Strategic Plan].
eration became sufficiently advanced. As the EID threat grew, it became apparent that such optimism about the IHR was unwarranted. In the face of the EID problem, the IHR look increasingly ineffective for infectious disease control. For example, only three diseases are subject to the current IHR: yellow fever, plague, and cholera. These are the same diseases that the delegates to the first international conference on infectious disease addressed in 1851. WHO member states have not kept the IHR relevant to the global problems EIDs have caused.

Another factor in the EID problem is the poor condition of public health systems around the world, which only partly stems from the complacency analyzed above. Public health capabilities are suffering globally, nationally, and locally, and in developed as well as developing countries. The first crucial step in dealing with infectious diseases is identifying the pathogenic agent, which is entrusted to public health surveillance systems. At global, national, and local levels, infectious disease surveillance capabilities are in bad shape. According to the CISET Working Group, currently "an infectious disease surveillance system does not exist on an international scale." The current global surveillance network for infectious diseases is informal, rudimentary, and limited to a few diseases.

91. See Fidler, supra note 8, at 79-80.
92. See Int'l Health Reg., supra note 89, at 8. As Dr. David Heymann, Director of WHO's Division of Emerging and Other Communicable Diseases Surveillance and Control, observes, many EIDs have the same potential for spreading internationally as the three diseases currently subject to the IHR, but are not included in the Regulations. David L. Heymann, The International Health Regulations: Ensuring Maximum Protection with Minimum Restriction, Address Before ABA Panel on Law and Emerging and Re-Emerging Infectious Diseases (Aug. 5, 1996), in PROGRAM MATERIALS, supra note 86, at 12.
93. See N. Howard-Jones, Origins of International Health Work, BRIT. MED. J., May 6, 1950, at 1032, 1034 (listing the diseases discussed at the International Sanitary Conference in 1851).
94. See infra Part V for a discussion of the proposed revision of the IHR.
95. CISET REP., supra note 28, at 23; see also IOM REP., supra note 13, at 6 (noting that "[t]here has been no effort to develop and implement a global program of surveillance for emerging diseases or disease agents"); Donald A. Henderson, Surveillance Systems and Intergovernmental Cooperation, in EMERGING VIRUSES 283, 285 (Stephen S. Morse ed., 1993) (noting that "we are not today well-structured or staffed on a global level to detect either new or emerging viral diseases").
96. See CISET REP., supra note 28, at 18, 21. Further, what passes as a
Clinton administration has made building a global surveillance system one of the fundamental objectives of its policy on EIDs.\textsuperscript{97}

As the specialized U.N. agency for international health issues, WHO is an important part of any global surveillance system. Yet WHO's financial limitations hinder its ability to improve global surveillance.\textsuperscript{98} Further, WHO depends on its member states making infectious disease surveillance a priority, which has not occurred for decades.\textsuperscript{99} If WHO member states have deficient national surveillance systems, then the prospects for a global surveillance network are grim indeed.

The same story has played out at the state and local levels in the United States as well. The CISET Working Group reported that over the last decade, "state and local support for infectious disease surveillance has diminished, largely as a re-

global surveillance system has suffered as the network has deteriorated and laboratories have declined in capabilities. See Ruth L. Berkelman et al., \textit{Addressing Emerging Microbial Threats in the United States}, 275 JAMA 315, 315 (1996) (noting reduced global capacity to detect and respond to emerging diseases). WHO conducted a survey in 1993 of its global network of laboratories. The survey "highlighted the urgent need for improving global surveillance capacity." \textit{Id.} at 369. For a more detailed discussion of the WHO survey, see James W. LeDuc, \textit{World Health Organization Strategy for Emerging Infectious Diseases}, 275 JAMA 318, 320 (1996).

\textsuperscript{97} See Gore, supra note 4, at 6 ("[W]e must create a global surveillance system.").

\textsuperscript{98} See Leon Gordenker, \textit{The World Health Organization: Sectoral Leader or Occasional Benefactor?}, in U.S. POLICY AND THE FUTURE OF THE UNITED NATIONS 167, 176 (Roger A. Coate ed., 1994) (noting that "reluctance of WHO member states to provide increased funding places real constraints on the organization's ability to fund its broad agenda of health activities").

\textsuperscript{99} A case in point is the United States, the biggest contributor to WHO's budget. See \textit{id.} at 174. Dr. Michael Osterholm, State Epidemiologist for the Minnesota Department of Health, tried to put American commitment to infectious disease surveillance in perspective in testimony to a U.S. Senate committee when he compared the $42 million in federal dollars spent annually on national surveillance with the approximately $225 million the U.S. military spends maintaining musical bands. \textit{See Emerging Infections Hearings, supra note 1, at 33 (statement of Dr. Michael Osterholm)}. Dr. Osterholm predicted that if Congress did not appropriate more money for EID surveillance and control, the United States would suffer large economic costs from the adverse effects of EIDs on the population. \textit{Id.}

Under its new EID policy initiative, the Clinton administration will ask Congress to more than double the CDC's budget for EIDs. \textit{See Gore, supra note 4, at 5}. Other budgetary decisions also affect control of infectious diseases. The American Public Health Association predicts, for example, that cuts in federal Medicare and Medicaid programs will produce widespread increases in infectious diseases. \textit{See Garrett, Infectious Disease, supra note 61, at 77.
suit of budget restrictions.\textsuperscript{100} Such budget pressures at the state and local level have produced understaffed surveillance systems, underreporting of reportable infectious diseases, limited follow-up on reported cases, and reluctance to add new diseases to the list of reportable diseases.\textsuperscript{101} In 1995, twelve U.S. states or territories had no personnel responsible for food or water-borne disease surveillance, and thirty-four states had fewer than one person per million population with responsibility for food or water-borne disease surveillance.\textsuperscript{102} The tuberculosis epidemic in New York City, for example, resulted partly from "the collapse of the local public health infrastructure."\textsuperscript{103} One EID expert observed that American "surveillance and public health systems had reached states of inaccuracy and chaos that rivaled those in some of the world's poorest countries."\textsuperscript{104}

If infectious disease surveillance eroded in the United States, one of the world's most affluent countries, then the state of infectious disease surveillance in developing countries is not hard to imagine. The CISET Working Group observed that in Africa, for example, "[i]nfectious disease surveillance is nearly non-existent, and emerging and reemerging diseases frequently go unreported."\textsuperscript{105} Given the higher incidence of all

\textsuperscript{100} CISET Rep., supra note 28, at 41.

\textsuperscript{101} See id.; see also Berkelman et al., supra note 80, at 368 (noting skeletal staffing levels, reluctance to add new diseases, underreporting, and limited follow-up). Dr. Osterholm observed that the condition of state and local infectious disease surveillance was so bad in the 1993 outbreak of cryptosporidiosis, which infected an estimated 400,000 people in Milwaukee, Wisconsin, that the outbreak was not detected until drug stores ran out of anti-diarrheal medicine and grocery stores ran out of toilet paper. Emerging Infections Hearings, supra note 1, at 45 (statement of Dr. Michael Osterholm).

\textsuperscript{102} See Emerging Infections Hearings, supra note 1, at 32 (statement of Dr. Michael Osterholm).

\textsuperscript{103} Garrett, supra note 7, at 76-77. Dr. Margaret Hamburg, Health Commissioner of New York City, told a U.S. Senate committee that the severity of the tuberculosis problem could be traced back to the 1970s when severe cutbacks accompanied block grants from Congress for public health activities. Emerging Infections Hearings, supra note 1, at 35 (statement of Dr. Margaret A. Hamburg).

\textsuperscript{104} Garrett, supra note 7, at 512. The Institute of Medicine observed in 1988 that the U.S. public health care system was in disarray. See IOM, Future of Public Health, supra note 24, at 19. It commented in 1992 "that there has been little positive change in the U.S. public health system since the release of that report." IOM Rep., supra note 13, at 7.

\textsuperscript{105} CISET Rep., supra note 28, at 17. The CISET Working Group notes that the 1995 outbreak of Ebola in Zaire probably occurred as early as December 1994, but the international community did not learn about it until May
kinds of EIDs in the developing world, the poor condition of infectious disease surveillance there spells trouble for not only the peoples of the developing world but also the peoples of developed countries vulnerable to EIDs through global travel and trade. Inadequate surveillance in the developing world dramatically limits the prospects for a global surveillance system as well. Although the World Bank has called for more investment in public health in developing countries, developing countries do not have the resources to so invest, WHO does not have the money to rebuild national public health infrastructures, and the United States is unlikely to fund such health infrastructure investments in other countries.

One commentator accurately sums up the condition of the current U.S. infectious disease surveillance system as the equivalent of trying to operate O'Hare International Airport, one of the busiest airports in the world, with tin cans and string. More daunting still is the thought that many developing countries—critical parts of a global network—cannot even afford the tin cans and string.

3. Global Travel and Trade

The speed, volume, and scope of global travel stand high on the list of factors contributing to the EID threat for virtually all experts examining the subject. In 1993, approximately 500 million persons crossed international borders on airplane flights. This vast movement of people across borders every year has inevitable consequences for the spread of infectious

1995. The CISET Working Group concluded that "[t]his delay reflects the weak health care systems and the poor state of infectious diseases surveillance in most of Africa." Id.; see also Emerging Infections Hearing, supra note 1, at 21 (statement of Dr. David Heymann commenting on Zaire's lack of an early detection system necessary to detect the Ebola outbreak).
108. See Emerging Infections Hearings, supra note 1, at 32 (statement of Dr. Michael Osterholm).
109. See WHO Meeting Memorandum, supra note 44, at 848 (summarizing data on international travel). In 1951, only 7 million passengers flew internationally; by 1967, the number had grown to 51 million. See P. Dorolle, Old Plagues in the Jet Age, 23 WHO Chronicle 103, 104 (1968) (discussing the increase in international air travel between the 1940s and 1960s). From 1951 to 1993, the number of international air passengers has grown 3,500 times.
diseases. As Mary Wilson has noted, "Travel is a potent force in disease emergence and spread."110

Travel is not a new factor in the global spread of infectious diseases.111 Diseases have traveled with their human hosts and spread to new populations from the beginning of human history.112 According to Wilson, "Human migration has been the main source of epidemics throughout recorded history."113 Further, governments have long considered travel and trade as a conduit for diseases. The Italian city-states of the fourteenth century first introduced quarantine114 measures because, as hubs for commerce between Europe and the Orient, they felt the impact of disease spread.115 In the age of sea travel, infectious diseases usually manifested themselves during the long voyage, making quarantine at the port of arrival a sensible strategy for preventing their spread.116

Even before the advent of the airplane, travel increased so much that quarantine practices became ineffective. The expansion of international travel that took place during the nineteenth century encouraged the spread of infectious diseases.117 The threat from infectious diseases spread by international travelers provided a catalyst for the convening of the first International Sanitary Conference in 1851.118 The impact of travel led some people to argue as early as 1866 that infectious diseases should be limited at their source rather than subject

110. Mary E. Wilson, Travel and the Emergence of Infectious Diseases, 1 EMERGING INFECTIOUS DISEASES 39, 39 (1995).
111. See Dorolle, supra note 109, at 103 (stating that the observation that diseases could be transmitted by man or goods transported by ships is ancient).
112. See McNeill, supra note 5, at 14-68 (discussing the transport of diseases and parasites by ancient humans).
113. Wilson, supra note 110, at 40.
114. "Quarantine" comes from the Italian word for "forty," the number of days the Italian city-states detained ships, travelers, and cargoes in the fourteenth century. See Dorolle, supra note 109, at 103 (discussing the history of quarantines).
116. See Garrett, Infectious Disease, supra note 61, at 69.
118. See Howard-Jones, supra note 98, at 1034.
to ineffective quarantine measures.\textsuperscript{119} The speed, volume, and global scope of travel undermined the state's ability to protect its citizens through quarantine laws and regulations. In 1918-1919, before air travel had even begun, swine flu circumnavigated the planet five times in eighteen months, killing 22 million people worldwide.\textsuperscript{120}

With the introduction of air travel, the trends manifested in the nineteenth century accelerated. The speed of travel and average distances traveled have increased one thousand times over the last two hundred years.\textsuperscript{121} The opportunities for travel to spread disease have likewise increased. Travel has contributed to the spread of many diseases, including malaria, yellow fever, plague, cholera, tuberculosis, influenza, HIV/AIDS, Lassa fever, smallpox, hepatitis, hantaviruses, gonorrhea, syphilis, herpes, and others.\textsuperscript{122} The potential for global pandemics fueled by the ease of travel is illustrated by the AIDS virus. The opportunities offered a virulent airborne pathogen by air travel are perhaps even more frightening. Garrett notes the 1918-1919 global influenza pandemic that killed 22 million people and asks: "How many more victims could a similarly lethal strain of influenza claim in 1996, when some half a billion passengers will board airline flights?"\textsuperscript{123}

The role of travel in the international spread of infectious diseases raises questions about how to deal with the EID threat exacerbated by the explosion in global travel. The choices seem to be to restrict travel through quarantine measures or improve health conditions and infectious disease surveillance within countries. In 1966, exactly one hundred years after the efficacy of quarantine measures were first seriously

\textsuperscript{119} See Gutteridge, \textit{supra} note 117, at 2 (noting the conclusions of the Third International Sanitary Conference in 1866).

\textsuperscript{120} See Garrett, \textit{Infectious Disease, supra} note 61, at 69.


\textsuperscript{122} Travel by itself does not usually produce new disease outbreaks. Wilson observes that most infectious agents introduced through travel do not result in disease. See Wilson, \textit{supra} note 110, at 40. Conditions in the arrival country have to be right for infectious agents to spread disease through a population. Although travel may introduce a pathogenic virus, bacterium, or parasite, transmission involves other factors like poverty, environmental degradation, and inadequate sanitary or health infrastructures. See \textit{id.} at 40-42.

\textsuperscript{123} Garrett, \textit{Infectious Disease, supra} note 61, at 69.
questioned, a U.S. Public Health Service advisory committee concluded that "it is no longer possible to have confidence in the idea of building a fence around this country against communicable diseases, as is the traditional quarantine concept." Unfortunately, as quarantine has declined in importance, U.S. federal and state public health officials have not maintained the next line of defense against importation of disease—public health surveillance and intervention capabilities.

The international movement of goods also contributes to the EID problem. Since the end of the Cold War, free trade dominates thinking about international economic relations, as evidenced by the World Trade Organization, the North American Free Trade Agreement, and the continued building of the common market in the European Union. Trade is, of course, not a new phenomenon in international relations, but the nature of international trade today is historically novel since it is truly universal and involves the movements of unprecedented quantities of food.

Today, up to seventy percent of fruits and vegetables consumed in some U.S. states is imported from developing countries. The Institute of Medicine states that "[i]nternational trade has become so pervasive that it is virtually impossible to screen most of the food entering the country for known microbial hazards, let alone for new microbiological threats." While international trade agreements typically reserve a country's powers to inspect, and even prohibit the entry of imported food under so-called sanitary and phytosanitary provisions,

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124. IOM REP., supra note 13, at 22 (quoting Advisory Committee on Foreign Quarantine, 1966). United States policy since 1966 has relied less and less on quarantine. For example, the United States operated 55 domestic quarantine stations in 1967, but today has only 7. See CISET REP., supra note 28, at 21; IOM REP., supra note 13, at 23. In contrast, the United States has approximately 50 international airports and more than 150 other legal points of entry. See CISET REP., supra note 28, at 21.

125. See CISET REP., supra note 28, at 21; see also supra note 99 and accompanying text (discussing the weakness of the U.S. public health system and its problems funding emerging infectious disease surveillance and control).

126. See Emerging Infections Hearings, supra note 1, at 44 (statement of Dr. Michael Osterholm).

127. IOM REP., supra note 13, at 68.

128. See, e.g., Agreement on the Application of Sanitary and Phytosanitary Measures, Dec. 15, 1993, GATT Doc. MTN/FA II-A1A-4 (stating that members have the right to take certain sanitary and phytosanitary measures to protect
the Institute of Medicine believes that the momentum of free trade will result in decreased inspections of imported food.129

In the United States, increasing occurrence of food-borne infectious disease outbreaks underscores the dangers inherent in the global food trade.130 In 1996, an outbreak of cyclospora131 caught U.S. public health officials by surprise.132 Health officials believe that imported strawberries were contaminated with cyclospora, but little is actually known about the parasite, its host, and means of transmission.133 U.S. officials suspected a link to imported food and consulted the Pan American Health Organization, a unit of WHO, about testing for cyclospora in the water of Latin American countries that export to the United States.134 Other reports suggest that imported Guatemalan raspberries were the source of the cyclospora outbreak.135


129. This situation alarms Dr. Michael Osterholm, chief epidemiologist for the State of Minnesota, who told a Senate committee, “We have so changed our food supply in this country today that the same fruits or vegetables that you eat here in Washington, DC are the ones I would tell you if you went to a developing world country to boil it, peel it, or do not eat it. And you have no idea.” Emerging Infections Hearings, supra note 1, at 44.

130. Escherichia coli 0157:H7 contaminated hamburgers at a fast-food chain and caused a multi-state outbreak of bloody diarrhea and serious kidney disease. See CDC STRATEGY, supra note 26, at 2. Ultimately, this killed four children. See id. Ice cream manufactured in Minnesota was contaminated with salmonella, causing the largest outbreak of food-borne illness in U.S. history. See O’Brien, supra note 86, at 23. Apples contaminated with cow feces were inadequately washed before being processed into cider, which caused an outbreak of cryptosporidiosis in New England. See Peter S. Millard et al., An Outbreak of Cryptosporidiosis From Fresh-Pressed Apple Cider, 272 JAMA 1592, 1595-96 (1994). Scientists have increasingly raised concerns about pathogen contamination of fish and shellfish consumed by humans. See GARRETT, supra note 7, at 562.


132. See id.

133. See id.

134. See id.

135. See David H. Frankel, US Bad Berries May Be From Below the Border, 348 LANCET 185, 185 (1996); Mike Cooper, Guatemalan Fruit Named as
Trade is a significant factor in the EID problem beyond food contamination. Means of transportation themselves—ships and airplanes—can harbor infectious agents. Because transportation offers opportunities to infectious agents, the International Health Regulations require as many ports and airports in a country as possible to have facilities for disinfecting, disinsecting, and deratting of ships and airplanes used in international travel. Certain internationally-traded products are also recurring conduits for infectious diseases. The Institute of Medicine warns that the lack of effective screening of animals imported for scientific research constitutes “[p]erhaps the greatest problem associated with international commerce and its relation to disease emergence.” The globalization of trade in human blood, blood products, organs, and tissue represents another trade-related opportunity for infectious diseases to spread. The spread of AIDS was facilitated partly through the transfusion of commercially sold blood and blood

Likely Outbreak Cause, CHI. SUN-TIMES, July 19, 1996, at 20. Florida public health authorities have threatened to ban imports of Guatemalan raspberries if federal authorities do not develop a way to detect the cyclospora parasites. Glenn Singer, Florida Talks of Banning Guatemalan Raspberries; Agriculture Commissioner Says He’ll Wait to See How CDC Fares in Cyclospora Battle, SUN-SENTINEL (Fort Lauderdale), July 19, 1996, at 3A. Guatemala has, however, defended its raspberry exports, and argued that U.S. public health authorities have not scientifically confirmed the cyclospora parasite is linked to any Guatemalan products. See Guatemala Defends Its Raspberries, REUTERS, July 19, 1996, available in LEXIS, News Library, Curnws File.

136. Bilge water from ships sailing from East Asia introduced a new strain of cholera to South America when the ships released contaminated waters into a Peruvian harbor. Stephen S. Morse, Examining the Origins of Emerging Viruses, in EMERGING VIRUSES 10, 20 (Stephen S. Morse ed., 1993). *Aedes albopictus*, a mosquito capable of infecting humans with dengue, yellow fever, and eastern equine encephalitis made its way from Asia to the United States in a cargo of water-logged tires. See Wilson, supra note 110, at 43. Rats, carriers of the fleas that host the plague, often find their way to new destinations as stowaways on ships. See id. at 40-41.

137. See INT’L HEALTH REG., supra note 89, art. 15, at 15.

138. IOM REP., supra note 13, at 83. Since 1989, the international trade in wild primates captured for scientific research and development has been the source of six recorded outbreaks of the Asian strain of the Ebola virus in the United States. See David Brown, Exporter’s Monkeys Tested for Ebola Virus, WASH. POST, Apr. 20, 1996, at A6. The African strain of the Ebola virus is lethal to humans, while the Asian Ebola strain has not yet caused illness in humans. See id.; see also PRESTON, supra note 61, at 251-54 (recounting the outbreak of the Asian strain of Ebola in research primates in Reston, Virginia). The Marburg virus, another lethal virus that causes hemorrhagic fever, killed primate researchers and handlers in Marburg, Germany in 1967. See GARRETT, supra note 7, at 53-59 (describing the outbreak of the Marburg virus in Germany).
products. Hepatitis B, Chagas' disease, syphilis, and malaria can also be spread through contaminated blood and blood products. No international legal protections for blood and organ safety currently exist.

4. Socio-Economic and Environmental Factors

a. Social Unrest and Civil War

Historically, war has been conducive to infectious diseases by creating conditions ripe for outbreaks. While the prospects for traditional interstate war are probably smaller in the post-Cold War era, social unrest and civil war are currently prominent issues in international relations. With civil unrest and war come the breakdown of political authority, public health services and facilities, and large movements of refugees that generate a rich environment for infectious diseases.

139. See Katarina Tomasevski, Health, in 2 UNITED NATIONS LEGAL ORDER 859, 886-87 (Oscar Schachter & Christopher C. Joyner eds., 1995).
140. See id. at 886.
141. See id. at 888.

Recent events contain classic examples of how civil unrest and war promote the reemergence of infectious diseases. For example, the civil war in Rwanda forced hundreds of thousands of refugees into neighboring Zaire in 1994. See Wilson, supra note 110, at 41. In the first month that the refugee camps existed, disease exploded in the camps and approximately 50,000 refugees died from cholera or shigella. See id. Similarly, a cholera epidemic also broke out in Sierra Leone, where a civil war raged and threatened to create other epidemics of diarrheal diseases, malaria, and acute respiratory infections. See World Health Organization, Threat of Epidemics in Sierra Leone, WHO Press Release, WHO/49 (June 23, 1995) <http://www.who.ch/press/1995/pr-95.html>. The civil war in Liberia has caused widespread displacement of populations within that country and neighboring states, starting a yellow fever epidemic in Sierra Leone that threatens to spread throughout that region of West Africa. See World Health Organization, Yellow Fever Outbreak in Liberia, WHO Press Release, WHO/81 (Nov. 15, 1995) <http://www.
tious diseases do not require, however, actual military conflict to cause epidemics in unsettled countries. For example, the harsh economic and social transitions to democracy and capitalism underway in the newly independent states of the former Soviet Union triggered a diphtheria epidemic that, according to WHO, threatened to spin out of control into a global public health emergency.\footnote{See World Health Organization, Diphtheria Epidemic—International Health Emergency, WHO Press Release, WHO/48 (June 19, 1995) <http://www.who.ch/press/1995/pr95-48.html>.

143. See Morse, supra note 136, at 25-26 (noting the role of environmental degradation in emergence of viruses).


146. See id.

147. See McCormick & Fisher-Hoch, supra note 61, at 90-91 (noting diamond mining as factor in Lassa fever in Sierra Leone).

148. See Paul Salopek, Latest Hot Zone for Diseases May Be Right Out Your Window, CHI. TRIB., Apr. 21, 1996, at A1 (reporting that outbreaks of Lyme disease are associated with the growth of suburbs).

149. See id. (reporting that outbreaks of La Crosse encephalitis are associated with the growth of suburbs).

150. See id.
ehrlichiosis.\textsuperscript{151} Although the natural host or reservoir for Ebola virus has yet to be identified, some experts suspect that destruction of rain forests in Africa has brought humans into contact with this almost always fatal virus.\textsuperscript{152} Human manipulation of the environment can also increase the populations of organisms that host infectious agents, thus increasing the likelihood of transmission to humans.\textsuperscript{153} Predictions about global warming also have ominous portents for control of infectious diseases. Scientists have predicted that global warming could significantly increase the habitats of key infectious disease vectors, such as mosquitoes, leading to more cases of malaria, yellow fever, and dengue.\textsuperscript{154} Global warming could also fuel further growth of algae blooms in the world’s oceans and the pathogens those blooms harbor.\textsuperscript{155}

Ironically, some efforts to improve environmental protection may help the spread of infectious diseases. The Institute of Medicine notes with concern, for example, that U.S. regulations on pesticide use may make it difficult to deal with an outbreak in the United States of a vector-borne disease like malaria or dengue.\textsuperscript{155}

\begin{enumerate}
\item \textsuperscript{151} See id. (reporting that outbreaks of ehrlichiosis are associated with the growth of suburbs).
\item \textsuperscript{152} See PRESTON, supra note 61, at 287 (stating that emergence of Ebola “appears to be a natural consequence of the ruin of the tropical biosphere”).
\item \textsuperscript{153} Experts believe that the construction of dams and irrigation systems have increased the prevalence of Rift Valley fever. See Morse, supra note 136, at 18. Marine pollution has produced fertile conditions for cholera growth in algae blooms that feed off nitrogen-rich, sewage-laden pollution. See GARETT, supra note 7, at 563-67 (discussing relationship of cholera epidemics to algae blooms in the ocean and noting cholera can lie dormant and incubated within algae until the virus has direct contact with humans); see also Paul R. Epstein et al., Marine Ecosystems, 342 LANCET 1216, 1216 (1993) (noting the relationship between algae blooms and infectious diseases like cholera).
\item \textsuperscript{154} See Richard A. Kerr, Greenhouse Report Foresees Growing Global Stress, 270 SCIENCE 731, 731 (1995) (describing warnings from UN-sponsored Intergovernmental Panel on Climate Change about potential spread of tropical diseases because of global warming); Jonathan A. Patz et al., Global Climate Change and Emerging Infectious Diseases, 275 JAMA 217, 218 (1996) (identifying potential for increase in vector-borne infectious diseases as a result of global warming); David Brown, Infectious Disease May Rise As the World Gets Warmer, WASH. POST, Jan. 17, 1996, at A2 (reporting that researchers at Johns Hopkins, Harvard, and George Washington universities found malaria, dengue, cholera, and other diseases could spread because of global warming).
\item \textsuperscript{155} See Patz et al., supra note 154, at 220.
\item \textsuperscript{156} See IOM REP., supra note 13, at 13-14. The Institute of Medicine specifically commented on: (1) the likelihood that U.S. pesticide regulations
The close relationship between environmental degradation and the emergence and reemergence of infectious diseases greatly increases the difficulty in containing and preventing EID outbreaks. Some experts believe that the environment's link to EIDs forces public health officials and scientists to broaden their approach to EIDs to include sensitivity to and surveillance of ecological conditions around the world. Conversely, some experts view global health surveillance and monitoring as important in shaping environmental protection strategies. The intertwined nature of environmental protection and infectious disease control in the global village poses profound questions for formulating international legal strategies against EIDs. As Thomas Lovejoy comments, "All of the major environmental problems, population, deforestation, loss of biological diversity, global pollution, are really all part of one great inter-connected problem and, in many senses, represent the greatest challenge that faces human society."

c. Changes in Human Behavior

New patterns of human behavior comprise additional pieces of the EID puzzle. Changing sexual practices have received the most attention. Sex has long been a method of transmission for infectious diseases. Changes in human

have forced many effective pesticides to become unavailable in the United States, see id. at 13; (2) the inefficient procedures that must be followed before pesticides can be applied in emergency situations in environmentally-protected areas, see id. at 13-14; and (3) the lack of incentives created by U.S. regulations as well as by market conditions for the development of new pesticides. See id. at 14. The report concluded that pesticide development for public health applications needs to be given priority. See id.

157. See Patz et al., supra note 154, at 221.

158. See Andrew Haines et al., Global Health Watch: Monitoring Impacts of Environmental Change, 342 LANCET 1464, 1469 (1993) (arguing that "[g]reater integration of efforts to collect data on health and global environmental change is needed").


160. The growth of urban areas in all civilizations created an environment conducive to multiple-partner sex and increased the chances that sexually-transmitted diseases would spread. See GARRETT, supra note 7, at 235, 245 (commenting that city dwellers throughout the history of urbanization "built centers for sexual activity that allowed microbes to exploit another method of transmission" and noting that "since ancient times urban centers had been hubs of profligacy in the eyes of those living in small towns and villages"). Epidemics of sexually-transmitted diseases are not twentieth century phenomena. For example, a syphilis epidemic broke out in Europe in 1495 and spread worldwide within two years. See id. at 245.
sexual practices in the late twentieth century have, however, resulted in new epidemics of sexually-transmitted diseases. Garrett identifies the 1970s, at least as regards many developed countries, as "a time of sexual liberation and experimentation" for heterosexuals and homosexuals alike. While multiple-partner sex was not new, the sexual liberation trend combined with rapid urbanization and global travel made the "scale of multiple-partnering during the late twentieth century . . . unprecedented." In this fertile environment, pathogenic microbes had an orgy. Between 1965 and 1975, cases of gonorrhea and syphilis in the United States tripled and quadrupled respectively. In the 1970s and 1980s, cases of Chlamydia steadily increased in the United States. Genital herpes, caused by the herpes simplex type II virus, experienced a nine-fold increase in the United States. From 1975 to 1987, reports of chancroid increased tenfold in the United States. A similar story of sexually-transmitted diseases on a rampage could be told in developing countries as well.

161. This section focuses on changes in sexual behavior perceived by experts to be contributing to new epidemics of sexually-transmitted diseases. Sexual behavior changes are complex because they reflect many other socio-economic phenomena. Factors contributing to new patterns of sexual behavior in the developed world are likely to differ from those affecting the developing world. For example, changes in cultural and societal attitudes towards sex (i.e., the sexual revolution) may factor more prominently in the increase in sexually-transmitted diseases in Europe and the United States than in Africa, where urbanization may play a bigger role in sexually-transmitted disease epidemics. Exploring these different socio-economic contexts of the global increase in sexually-transmitted diseases is beyond the scope of this Article.

162. GARRETT, supra note 7, at 262-63.

163. Id. at 263; see also WORLD HEALTH REP. 1996, supra note 2, at 17 ("Increases in the number of sexual partners have been the main factor in the spread of HIV infection and other sexually transmitted diseases.").

164. See GARRETT, supra note 7, at 264; see also IOM REP., supra note 13, at 54-55 (noting cases of syphilis in the United States nearly doubling from 1985 to 1990); WORLD HEALTH REP. 1996, supra note 2, at 33 (recording an estimated 62 million new cases of gonorrhea and 12 million new cases of syphilis worldwide in 1995).

165. See GARRETT, supra note 7, at 265; see also WORLD HEALTH REP. 1996, supra note 2, at 33 (noting WHO estimate of 89 million new cases of chlamydial infection worldwide in 1995).

166. See GARRETT, supra note 7, at 267.

167. See id.; see also WORLD HEALTH REP. 1996, supra note 2, at 24 (recording 7 million new cases worldwide of chancroid in 1995).

168. See GARRETT, supra note 7, at 268 (discussing the rise of various sexually transmitted diseases, such as Pelvic Inflammatory Disease, in developing countries); see also WORLD HEALTH REP. 1996, supra note 2, at 33.
Infectious diseases did more than just explode in terms of numbers of cases. Strains of gonorrhea developed resistance to penicillin, ampicillin, spectinomycin, and finally to all tetracycline antibiotics. The bacterium causing chancroid also developed antibiotic resistance. The changes in human sexual behavior produced a chain reaction: more cases of sexually-transmitted diseases resulted in more frequent use of antimicrobial drugs, which in turn triggered microbial adaptation and drug resistance.

The sexual revolution also helped spread a new virus and disease: HIV and AIDS. Multiple-partner sex, particularly amongst homosexual men, was a key factor in the spread of AIDS in the United States and Europe. In Africa, another epicenter of the AIDS disaster, heterosexual activity fueled the spread of HIV. The history of sexually transmitted diseases in this century shows that microbes are supreme opportunists and that human behavior is dangerously intertwined with the power of the microbial world.

The sexual revolution was not the only change in human behavior to create opportunities for the emergence and re-emergence of infectious diseases. The explosion in the use of such drugs as heroin and cocaine in developed countries in the second half of the twentieth century has provided infectious diseases, particularly AIDS, with new opportunities to spread; sharing contaminated needles has been an effective mode of transmission for HIV.
Other changes in human behavior also created opportunities for infectious diseases. For example, circumstances ranging from personal satisfaction to economic necessity have led many women into the workplace since the late 1960s. One consequence of this change in female behavioral patterns has been the increased use of child care facilities by families with younger children. This increased use of daycare centers and other facilities is directly linked to the dramatic increase in childhood ear infections in the United States. The CDC reports that childhood ear infections increased 150% from 1975 to 1990. Evidence exists that the bacteria causing childhood ear infections are acquiring drug-resistance to the traditional antibiotic treatments as well. Once again, human behavioral changes have encouraged the reemergence of an infectious disease and its development of antimicrobial resistance.

d. Urbanization

Urbanization has always been a factor in the spread of infectious diseases. In the last fifty years, though, urbanization around the world has become "irrepressible and breathtakingly rapid." More importantly, most of the growth seen in urbanization has taken place and is taking place in the developing world. Garrett reports that by the year 2000, twenty-four cities will have populations of 10 million or more, and most of them will be in developing countries. Megacities of 10 million or more residents are only the tip of the iceberg; the fastest growing cities are smaller metropolises, which suffer the same problems as larger urban areas. Population growth and migration to urban areas explain much of the urbanization phenomenon. The Institute of Medicine noted that "the size and density of many cities are . . . increasing, in part because of the overall population growth rate—each year the population of 174. See CDC STRATEGY, supra note 26, at 9.
175. See id. at 12 (noting that drugs are losing their effectiveness against pneumococcal infections, which include childhood ear infections).
176. GARRETT, supra note 7, at 247.
177. See id. at 248; cf. Eugene Linden, The Exploding Cities of the Developing World, FOREIGN AFF., Jan.-Feb. 1996, at 52, 53 (noting the United Nations' prediction that 5 billion people, or 61% of humanity, will be living in cities by the year 2025).
178. See Garrett, Infectious Disease, supra note 61, at 71.
179. See Linden, supra note 177, at 54-55 (positing that the fastest growing urban areas are not the giant metropolises but "anonymous secondary cities").
the world grows by approximately 70 million.”\textsuperscript{180} Moreover, the world’s rural populations are increasingly migrating to cities.\textsuperscript{181} Migration patterns tend to follow a disturbingly familiar format: from rural areas in developing countries to secondary urban areas, then onto the megacity, and finally to the developed world.\textsuperscript{182} Most frequently, immigrants from developing countries end up in large cities in developed countries, which offer opportunities for transmission not unlike those found in the megacity of a developing country. This linkage between urbanization and migration represents a powerful combination that fosters the emergence and reemergence of infectious diseases.

Urbanization has been linked to emergence or reemergence of air-borne diseases (e.g., tuberculosis), blood-borne diseases (e.g., HIV/AIDS), water-borne diseases (e.g., cholera), vector-borne diseases (e.g., malaria and dengue), virtually every kind of sexually transmitted disease, and the development of drug-resistant strains of diseases.\textsuperscript{183} In the eighteenth and nineteenth centuries, urbanization nurtured infectious diseases in North America and Europe as well;\textsuperscript{184} but improvements in sanitation and hygiene made a tremendous impact in North American and European cities before the introduction of antimicrobial treatments.\textsuperscript{185} Most cities in developing countries lack, however, the resources to build adequate sanitation and hygiene infrastructures. According to Garrett, most urban centers in developing countries “are squalid sites of destitution where hundreds of thousands live

\textsuperscript{180} IOM REP., supra note 13, at 49.
\textsuperscript{181} See id. (noting that in 1970 more than one third of the world’s population lived in cities and that by 2000 this will increase to one half).
\textsuperscript{182} See Garrett, Infectious Disease, supra note 61, at 71-72.
\textsuperscript{183} See GARRETT, supra note 7, at 240-41 (discussing the rise of tuberculosis in Europe); id. at 255-50 (discussing link between dengue and urbanization); Cities as Disease Vectors, 270 SCIENCE 1125, 1125 (1995) (suggesting that rapid urban growth in Peru caused a cholera outbreak there); Garrett, Infectious Disease, supra note 61, at 72 (discussing the link between HIV and African urbanization); id. (noting black market access to antimicrobial drugs in urban centers leading to overuse and misuse of the drugs and the emergence of drug-resistance); Lifson, supra note 64, at 1201 (describing the successful exploitation of urban areas by dengue mosquito vector); Linden, supra note 177, at 56 (attributing the spread of malaria to urbanization); id. at 57 (detailing the spread of the cholera epidemic in South America).
\textsuperscript{184} See GARRETT, supra note 7, at 234-47 (describing the history of infectious diseases in urban areas).
\textsuperscript{185} See id. at 242-43 (discussing social reform campaigns aimed at improving urban sanitation and hygiene).
much as they would in poor villages, yet so jammed together as to ensure astronomical transmission rates for airborne, water-borne, sexually transmitted, and contact-transmission microbes.\footnote{186} Urbanization in developing countries will continue to create incubators for infectious diseases. Given the speed, volume, and ease of global travel, such incubators are an alarming prospect. As Linden succinctly noted, "The developed world ignores at its peril the problems of Third World cities."\footnote{187}

e. Poverty

Closely related to urbanization as a factor contributing to EIDs is poverty. People living in poverty suffer a multitude of conditions that create opportunities for pathogenic microbes.\footnote{188} Poor people tend to live in crowded housing that often lacks proper ventilation and adequate sanitation,\footnote{189} generally have worse diets than the affluent, making their weakened immune systems more vulnerable to infectious diseases,\footnote{190} typically have limited or no access to primary health care,\footnote{191} and tend to make up the majority of economic migrants, whether the migration is from rural areas to cities within a country\footnote{192} or from developing countries to the developed world.\footnote{193} As the Director-General of WHO stated, poverty remains the main obstacle

\footnote{186. Garrett, Infectious Disease, supra note 61, at 71.}
\footnote{187. Linden, supra note 177, at 53.}
\footnote{188. See Gostin, The Resurgent Tuberculosis Epidemic in the Era of AIDS, supra note 87, at 39 (arguing that a wide variety of health conditions, including stress, alcoholism, overcrowded housing, air pollution, and low infant birth weight produce an "association between poverty and respiratory disease" that disproportionately impacts the poor).}
\footnote{189. See WORLD HEALTH REP. 1996, supra note 2, at 10-11 (reporting that "[i]n the developing world, a shortage of affordable housing for the majority of low-income urban dwellers has caused a proliferation of slums and squatter settlements" in which sanitation services are "non-existent and opportunities for connecting to city water, sewerage and power supplies are poor").}
\footnote{190. See Gostin, The Resurgent Tuberculosis Epidemic in the Era of AIDS, supra note 87, at 39 (noting that malnutrition is one health condition that affects the immune system disproportionately among the poor).}
\footnote{191. See GARRETT, supra note 7, at 511 (contending that for the urban poor in the United States "the only point of access to the health care system was the public hospital emergency room").}
\footnote{192. See WORLD HEALTH REP. 1996, supra note 2, at 10 (noting that in Latin America many poor people have migrated to cities).}
\footnote{193. See id. at 4 (noting migration patterns from developing to developed countries).}
to health development worldwide.\textsuperscript{194} Poverty is the faithful squire of pestilence.\textsuperscript{195}

Not only does poverty itself generate a fertile environment for infectious diseases but it also contributes to other factors behind the spread of EIDs. Poverty, for example, compels many people to seek a better life in a city or in another, more affluent country. Thus, it increases both urbanization and global migration. Once the migration to a city or separate country is complete, most economic migrants do not escape poverty. Economic migrants usually swap rural for urban poverty.\textsuperscript{196} Urban areas are very good places for disease spread;\textsuperscript{197} migration from rural to urban poverty benefits pathogenic microbes. Urban poverty creates opportunities for poor people to survive economically in ways that encourage transmission of infectious diseases, like prostitution, sales of illegal drugs, and black market sales of antimicrobial treatments. Poverty also encourages agricultural and other economic practices that degrade the environment such as deforestation and marine pollution, and thus creates more chances for transmission of infectious diseases.

\begin{footnotes}
\item \textsuperscript{195} The reemergence of tuberculosis offers a specific example of the influence of poverty on the emergence and reemergence of infectious diseases. Tuberculosis is far more prevalent in developing countries than in developed states, suggesting that the difference in economic wealth plays a role in the prevalence of tuberculosis. See GARRETT, supra note 7, at 243 (discussing the enormous decline in tuberculosis cases in the Northern Hemisphere in the twentieth century even though the disease continued to rage across Africa, Asia, and South America). Within developed countries, the poor suffer tuberculosis more than the rich. See Gostin, The Resurgent Tuberculosis Epidemic in the Era of AIDS, supra note 87, at 38 (contending that those groups that fall below the poverty line “are precisely those groups that are most affected by the tuberculosis epidemic”). Others have made similar conclusions about other infectious diseases. See, e.g., Diane Seligsohn, The New Underclass and Re-Emerging Diseases, WORLD HEALTH, Nov.-Dec. 1994, at 25, 25 (arguing that the “resurgence in infectious diseases observed during the 1990s appears to be linked to the growing poverty and deprivation of a new underclass in many European and North American cities”).
\item \textsuperscript{196} See WORLD HEALTH REP. 1996, supra note 2, at 10-11 (noting problems that migrants to urban centers face, including overcrowding, inadequate sanitation, polluted water and air, and increased risks of infectious diseases).
\item \textsuperscript{197} See supra text accompanying notes 176-187 (discussing urbanization as a factor in the spread of infectious diseases).
\end{footnotes}
Just as poverty contributes to EIDs, infectious diseases are clearly factors in causing and/or perpetuating poverty. Such synergy is most obviously at work in developing countries where infectious diseases exact a huge toll economically. Malaria hurts, for example, economic development in areas where it is endemic. WHO reports that malaria is endemic in ninety-one countries, undermines the health of hundreds of millions, and "is closely linked to poverty and contributes significantly to stunting social and economic development." According to the U.S. Department of State, AIDS is a very serious economic threat in developing countries because it kills productive workers and skilled professionals, decreases output and income, encourages inefficient business and government operations, threatens tourism, and scares off much-needed foreign investment and business. As WHO has observed, diseases are likely to continue to exact their heaviest burdens on the peoples of the developing world for the foreseeable future, crippling their socioeconomic development.

II. EIDS AS A PROBLEM IN INTERNATIONAL RELATIONS

Analyzing the factors shaping the EID problem demonstrates the seriousness and complexity of the EID problem. Part II briefly discusses how pathogenic microbes interact with and affect the structure and dynamics of international relations. The objective of this analysis is not only to measure the impact infectious diseases have on international relations, but also to consider how the nature of the international system itself contributes to the global problem of EIDs.

198. See Health Is Central to Social Development, supra note 194 (noting WHO Director-General's comment that ill-health causes and perpetuates poverty); WORLD HEALTH REP. 1996, supra note 2, at 11 (indicating that increased risks of infectious diseases perpetuate poverty by causing sickness, which produces absences from work and lost earnings).

199. WORLD HEALTH REP. 1996, supra note 2, at 47; see also Emerging Infections Hearings, supra note 1, at 24 (reporting Dr. Kragstad's statement that "meaningful economic development is simply not possible when 80 to 90 percent of a population has malaria for five to 6 [sic] months of the year or more").


201. See WORLD HEALTH REP. 1996, supra note 2, at 9.
A. MICROBES AND THE STRUCTURE OF THE INTERNATIONAL SYSTEM

International relations occur within a system dominated by independent states. Sovereignty has been the organizing principle of international relations since the European Peace of Westphalia in 1648. Under a system of sovereign states, populations, territory, and resources are divided up and placed under distinct political authorities. The international system is, thus, full of boundaries. International efforts to deal with infectious diseases continually confront issues of state sovereignty and control. Initiatives by the United States and other developed countries to improve infectious disease surveillance in developing countries must acknowledge that disease surveillance is currently the responsibility of each sovereign state. Neither WHO nor CDC can assist a country in the midst of an infectious disease epidemic unless that country invites WHO or CDC to provide assistance. In addition, as WHO's financial problems suggest, WHO's authority and resources remain limited by the political and economic priorities of its member states. As Allyn Taylor has observed, "The ability of WHO to affect national health decisions...is limited by a world order dominated by independent nations.

The structure of the international system is, however, irrelevant to the microbial world. Slogans like "germs know no frontiers" and "germs carry no passports" have been used since the founding of WHO. In international relations terms,
pathogenic microbes constitute nonstate actors with transnational power. The consequences are threefold. First, the spread of infectious diseases throughout the international system undermines sovereignty when a state cannot protect the health of its public. As numerous commentators have observed, the distinction between national and international health policy is no longer helpful. When pathogenic microbes combine with global travel and international trade, infectious diseases become part of the globalization process. The EID problem accentuates the extent to which microbes in this global era denationalize health and health policy.

Second, the irrelevance of the structure of the international system to microbes requires that states cooperate to address infectious diseases. As the CISET Working Group observed, international cooperation is critical. The need for such cooperation is evident in the statements of political leaders, the activities of WHO in establishing international programs on malaria, cholera, tuberculosis, and AIDS,

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208. See CDC STRATEGY, supra note 26, at 12 (suggesting that the “concept of ‘domestic’ as distinct from ‘international’ health is outdated”); Berkley, supra note 39, at 3369 (indicating that the distinction between domestic and international health is obsolete); George A. Gellert et al., The Obsolescence of Distinct Domestic and International Health Sectors, 10 J. PUB. HEALTH POLY 421, 421 (1989) (arguing that “traditional and historical bases for differentiating domestic and international health in Western nations have . . . lost meaning”); LeDuc, supra note 96, at 318 (proposing that national health has become an international challenge).

209. Globalization has been defined as the “process of denationalization of markets, laws and politics.” Jost Delbrück, Globalization of Law, Politics, and Markets—Implications for Domestic Law—A European Perspective, 1 IND. J. GLOBAL LEGAL STUD. 9, 11 (1993).

210. See Fidler, supra note 8, at 78 (stating that public health policy has been denationalized because a country cannot tackle EIDs by itself).

211. See CISET REP., supra note 28, at 11.

212. See Gore, supra note 4, at 10 (stating that the international challenge of EIDs must be met with international solutions); Group of Seven Statement, supra note 59 (listing new epidemics as one of several challenges which international leaders must face together).


INFECTIOUS DISEASES

International cooperation on infectious disease control is, of course, not new. The EID problem does, however, give new urgency to the age-old recognition that international cooperation is needed to combat pestilence.

Third, the need for international cooperation makes the structure of the international system an obstacle to global infectious disease strategies. While microbes simply bypass sovereignty, states must adhere to the limitations, procedures, and inefficiencies created by an international system. Put another way, "globalization jeopardizes disease control nationally by eroding sovereignty, while the need for international solutions allows sovereignty to frustrate disease control internationally." The structure of the international system thus helps pathogenic microbes by creating obstacles to effective international disease control. To evaluate the extent to which this is true, we need to examine how microbes affect the dynamics of international relations.

B. MICROBES AND THE DYNAMICS OF INTERNATIONAL RELATIONS

To evaluate the effect of EIDs on international relations, we must understand whether EIDs and their consequences increase or decrease international order, cooperation, and community. Proponents of both views exist. Some believe that the EID threat offers the international community an opportunity to strengthen common interests, values, and institutions through global cooperation on public health policy. William Mock notes, for example, that public health law is no longer within the exclusive domain of the state but has become a subject of international law.

Mock believes that interna-
tional health law now addresses basic issues of human rights, like the right of access to health care and freedom of movement, and issues concerning the internal governance and structure of national public health systems. He further believes that the AIDS pandemic will influence international law positively in the areas of human rights, global governance, and global development. Because international law is evidence that an international society exists, the growth of international health law can be understood as a positive development for global public health by representing the growth in the common interests, values, and rules among states. The decision by member states of the European Community to grant authority to the European Community in the area of public health through the 1992 Treaty on European Union is perhaps the best expression of this sentiment.

The incorporation of public health matters into international law and supranational institutions does not, however, necessarily affect the dynamics of international relations in a positive way. The recent controversy within the European Community concerning the banning of British beef exports because of fears of so-called


221. See id.

222. See id. at 546.

223. See HEDLEY BULL, THE ANARCHICAL SOCIETY 140 (1977) (stating that the first function of international law is to identify the idea of a society of sovereign states).

224. See Christopher Bartlett & Noel Gill, Communicable Disease Control After Maastricht: Germs and Subsidiarity, 341 LANCET 997, 997 (1993) (discussing the treaty and suggesting priorities for joint action across the European Community to control communicable disease). The Treaty on European Union inserted into the Treaty Establishing the European Community Title X on Public Health providing that “[t]he Community shall contribute towards ensuring a high level of human health protection by encouraging cooperation between the Member States and, if necessary, lending support to their action.” EC TREATY art. 129.

“mad cow disease” illustrates how infectious diseases can adversely affect even the most interdependent and peaceful relations between states. \(^\text{225}\) Unfortunately, history suggests that infectious diseases tend to cause friction in international relations rather than build community. As this Article discusses more thoroughly below, \(^\text{226}\) the major set of international legal rules on infectious disease control—the International Health Regulations—have not been successful. \(^\text{227}\) Historically, states have tended not to report serious disease outbreaks to other countries or WHO because they fear such reporting will reduce tourism and trade. \(^\text{228}\) For instance, Garrett reports that “nearly every country initially denied or covered up the presence of the HIV virus within its borders” and that “at least ten nations known to be in the midst of HIV epidemics refuse to cooperate with WHO, deliberately obfuscating incidence reports or declining to provide any statistics.” \(^\text{229}\) Egypt denies that the Nile contains cholera bacteria, Saudi Arabia does not want to warn pilgrims traveling to Mecca about mosquitoes carrying the dengue virus, and Serbia canceled an international epidemic alert concerning the deadly Crimean-Congo hemorrhagic fever when it learned that WHO planned to send American scientists to investigate. \(^\text{230}\) In recent years, several countries in the Caribbean did not notify other countries of dengue epidemics, believing that news of the epidemic would

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225. See, e.g., Paul Mylrea, Britain’s Links to EU at Risk over Mad Cow Crisis, REUTER EUR. COMMUNITY REP., Mar. 26, 1996, available in LEXIS, Nexis Library, Curnws File (discussing strained relations between the British government and the European Community over the ban on British beef exports imposed out of fear of spread of “mad cow disease”); Case C-180/96R, United Kingdom v. Commission, 3 C.M.L.R. 1 (1996) (European Court of Justice rejecting Britain’s application for the annulment of the E.C. Commission’s decision imposing a worldwide ban on the export of British beef and beef products).

226. See infra note 374 and accompanying text (noting WHO officials’ acknowledgment of the inadequacy of the IHR as early as 1966).


228. See CISET REP., supra note 28, at 12 (noting that national governments may not share disease surveillance information because of feared losses in trade, tourism, and national prestige).

229. Garrett, Infectious Disease, supra note 61, at 74.

230. See id.
hurt their tourist industries. The outbreaks only came to the attention of other countries after tourists returning home fell sick.

Another example of how infectious diseases adversely affect international relations comes in states' reactions to epidemics in other countries. Fears of lost trade and tourism appear to be well-founded. The cholera outbreak in Peru in 1991 resulted in an estimated loss in trade and travel of $700 million for that country. Estimates of lost trade and travel in the wake of the 1994 plague epidemic in India run as high as $1.7 billion. As indicated in a 1975 WHO publication on the IHR, states often enact measures to keep diseases breaking out in other countries at arm's length, and "[i]nstances of excessive and useless measures have been numerous in the history of the application of the Regulations since 1951." Relations between states are strained, international trade and travel suffer, and diseases continue to spread; none of which can be seen as a positive influence on international relations.

Pathogenic microbes also exacerbate tensions in international relations that have long existed for other reasons. The most prominent of these tensions is the inequality between rich and poor states. Infectious diseases threaten all states, but they exact the greatest toll in developing countries. In short, the burden of infectious diseases makes poor states poorer. For example, the U.S. Department of State fears that HIV/AIDS "threatens the sustainable economic development of many countries." Not only does HIV/AIDS threaten the domestic...
resources of an economy, but it also has the potential for slowing foreign trade with and investment in developing countries.\textsuperscript{238} These fears about the poverty-enhancing power of HIV/AIDS are magnified in the context of more wide-spread infectious diseases. Long a source of conflict in international relations, the EID problem will deepen the inequality between rich and poor states.

The importance developed countries give to EIDs, especially outbreaks in the developing world, is an indication of the gulf between developed and developing countries. The language of the current discourse on infectious diseases reveals a clearly developed world bias. The concept of "reemergence" in connection with some diseases has little meaning in the developing world. For instance, tuberculosis is considered a re-emerging disease in the United States, but in many developing countries it has long been endemic.\textsuperscript{239} Moreover, a major reason why infectious diseases have reemerged as a serious international issue in the 1990s is because developed nations feel threatened.\textsuperscript{240} Parochial thinking on international infectious disease control has a long pedigree. Examining the origins of international efforts on infectious disease control, Howard-Jones observed that implicit in all the conferences and diplomatic activities from 1851 on was "not a wish for the general betterment of the health of the world, but the desire to protect certain favoured (especially European) nations from contamination by their less-favoured (especially Eastern) fellows."\textsuperscript{241} The attitude towards disease threats from less wealthy states

\textsuperscript{238} The U.S. Department of State believes that "U.S. and other multinationals will be forced to consider HIV/AIDS in foreign investment and trade discussions." U.S. INT'L STRATEGY ON HIV/AIDS, supra note 39, at 4.

\textsuperscript{239} See WORLD HEALTH REP. 1996, supra note 2, at 27 (reporting that "[a]bout 95% of [tuberculosis] sufferers are in the developing world"); Paul Farmer, Social Inequalities and Emerging Infectious Diseases, 2 EMERGING INFECTIOUS DISEASES 259, 263 (1996) (noting that outside the industrialized world, tuberculosis infection rates did not decrease despite the availability of effective therapies).

\textsuperscript{240} The CISET Working Group asserted, for example, that "diseases that arise in other parts of the world are repeatedly introduced into the United States, where they may threaten our national health and security." CISET REP., supra note 28, at 11.

\textsuperscript{241} Howard-Jones, supra note 93, at 1035; see also Michel Bélanger, The Future of International Health Legislation, 40 INT'L DIG. HEALTH LEG. 1, 5 (1989) (stating that international health law in the nineteenth century corresponded "primarily to the requirements of European countries").
that prevailed in 1851 is the same attitude that permeates global infectious disease action plans today.

The tension in international relations between the have and the have-not nations has other potentially malignant features. The growth of awareness about the EID problem has renewed worries in the United States and other developed countries about the possible use of biological weapons by terrorists. The harnessing of pathogenic microbes by terrorists would heighten the problem terrorism poses in today's international system.

The EID problem may also play a role in undermining international order and regional balances of power. The U.S. Department of State has expressed concern that AIDS may begin to undermine the military capabilities of countries in Africa, Asia, and Latin America by degrading manpower resources and military preparedness. Additionally, it may begin to hamper international peacekeeping operations by forcing the United Nations to deal with HIV-infected national contingents from militaries with high infection rates. HIV/AIDS, in combination with other infectious diseases, could alter military power and preparedness in ways not witnessed since diseases killed more soldiers than actual combat.

The undermining of military capabilities in the developing world is linked to the economic problems infectious diseases cause. Increasing economic instability combined with eroding military capabilities could produce volatile conditions within many nations. The U.S. Department of State posits that as HIV/AIDS undermines economies and military capabilities in certain countries "it may be a potential 'war-starter' or 'war-outcome-determinant.'" The adverse impact of other infec-

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242. See CISET REP., supra note 28, at 4, 11 (commenting that an effective global surveillance system could help detect terrorist incidents involving biological weapons); CDC STRATEGY, supra note 26, at 22 (noting that biological warfare is an area of increasing international concern); Garrett, Infectious Disease, supra note 61, at 75-76 (discussing how the threat of bio-warfare has arisen in connection with the emergence and reemergence of infectious diseases).


244. See id. at 4 (enumerating new issues raised by HIV/AIDS that industrialized nations must address).

245. For example, during the American Civil War, "twice as many Civil War soldiers died of disease as were killed and mortally wounded in combat." JAMES M. MCPHERSON, BATTLE CRY OF FREEDOM 485 (1988).

246. U.S. INT'L STRATEGY ON HIV/AIDS, supra note 39, at 40. The U.S. Department of State reports that the impact of AIDS on military forces is
tious diseases on economic and military capacities would only amplify the ravages of HIV/AIDS. Infectious diseases have the potential, therefore, to contribute not only to individual misery and death but also to social disintegration that triggers civil and perhaps even interstate war.

In sum, infectious diseases have a significant adverse effect on the dynamics of international relations. The idea that states can cooperate and use the EID problem to build community among people and states is based more on hope than a serious assessment of the effect of infectious diseases on international relations. The proposed solutions to deal with EIDs must address not only a sobering array of causes but also the malignant effect of infectious diseases on international relations. Whether these proposals adequately face these daunting challenges is the question to which this Article turns next.

III. GLOBAL PLANS FOR DEALING WITH EIDS

In response to the EID problem, scientists, public health officials, and political leaders have been formulating plans to address its many challenges. The Institute of Medicine, CDC, CISET Working Group, Clinton administration, and WHO have produced the major policy documents to date. The efforts of the Institute of Medicine, CDC, CISET Working Group, and Clinton administration focus on the United States and thus do not take into account the national interests of other states except to the extent that all states face analogous risks from EIDs. In contrast, WHO's plan is expressly global in that it is not seeking to change the foreign and public health poli-

247. All the various plans are related, and thus have similar substantive content. The seminal document was, as mentioned earlier, the 1992 report from the Institute of Medicine. See generally IOM REP., supra note 13. The CDC's plan responded to the Institute of Medicine's call for action and contains many of the same objectives. See generally CDC STRATEGY, supra note 26. The CISET Working Group also relied on the work of both the Institute of Medicine and CDC. See generally CISET REP., supra note 28. The new Clinton administration policy follows the path already blazed by the Institute of Medicine, CDC, and CISET Working Group. See generally Gore, supra note 4; Addressing the Threat of Emerging Infectious Diseases, supra note 54. Likewise, the WHO plan has benefited from the work of the Institute of Medicine and CDC. See generally EMC Strategic Plan, supra note 89.
cies of one state. Each of the U.S.-centered plans, however, has a global perspective, making them not only national strategies but international plans for confronting EIDs. Moreover, action by the United States is critical to global efforts because it has power, influence, and resources.

A detailed description of the major plans drafted to date is beyond the scope of this Article, and, to a large extent, unnecessary because the plans share fundamental objectives and exhort the adoption of common approaches. In this part, the Article provides a synthesis of the plans to locate the core features and policy options of a global approach to the EID threat.

A. THE FUNDAMENTAL OBJECTIVES

The plans share four fundamental objectives: to improve international and national infectious disease surveillance capabilities; prevention and control strategies and resources; public health infrastructures; and applied research on infectious diseases. All these objectives are interrelated. Surveillance addresses the identification of an infectious agent, which is the critical first step to any containment strategy for infectious diseases. Once an infectious disease is identified, public health officials can institute control and prevention measures to minimize disruption to social and economic activities. Surveillance activities and prevention and control measures depend on adequate public health systems; trained personnel, equipment, facilities, and resources are needed to identify outbreaks and to implement procedures that prevent and control the spread of infectious diseases. Finally, public health officials rely on research from the scientific community in the fight

248. This approach is in keeping with WHO's objective to promote "the attainment by all peoples of the highest possible level of health." WHO CONST. art. 1.

249. See CISET REP., supra note 28, at 3-4 (noting need for U.S. leadership).

250. See id. at 23-24 (listing surveillance, diagnostic tests, response capabilities, and research as objective of global strategy); CDC STRATEGY, supra note 26, at 1 (listing surveillance, applied research, prevention and control, and infrastructure as goals of CDC strategy); EMC Strategic Plan, supra note 89, at 2 (listing surveillance, infrastructure, prevention and control, and research as goals of WHO). The European Community also seeks to improve surveillance in its regional strategy. See Proposal for a European Parliament and Council Decision Creating a Network for the Epidemiological Surveillance and Control of Communicable Diseases in the European Community, 1996 O.J. (C123) 10.
against pathogenic microbes. Good scientific data produced by applied research can help improve surveillance, prevention and control, and public health infrastructures. The four fundamental objectives fit together as integral parts of an overarching “grand strategy.”

The four objectives address to varying degrees the factors bearing on the EID problem. Most directly, the grand strategy takes aim at the complacency that has plagued infectious disease efforts for decades and at the deterioration of public health systems resulting largely from such complacency. As stated at a WHO meeting, “We must . . . concentrate first on rebuilding our foundations in communicable diseases, if we are to have the capability of meeting the new challenges of emerging and reemerging diseases.” The grand strategy also offers a way for public health officials to control infectious diseases without restricting global travel and international trade. With enhanced surveillance and prevention and control capabilities, diseases that travel through migrants or goods can be identified and largely controlled without resorting to quarantine or other trade-restricting measures. Better public health systems can educate people about the dangers of certain types of behavior, and improved surveillance can help public health authorities intervene more effectively when diseases related to changes in individual behavior appear. Finally, improved research capabilities can help scientists and public health officials keep pace with the changes constantly occurring in the microbial world.

The grand strategy has more limited potential in connection with civil unrest and war, environmental degradation, urbanization, and poverty. Nothing in the four objectives addresses the underlying causes of these allies of pestilence. Experts formulating approaches to the EID threat understand the importance of confronting these root causes of infectious disease spread, but the grand strategy does not attempt to do

251. In the rest of this Article, reference to the “grand strategy” means reference to the four fundamental objectives of the EID plans just outlined.

252. See supra Part I.B.2 (discussing complacency towards EID dangers and resulting breakdown in public health systems).

253. WHO Meeting Memorandum, supra note 44, at 845-46.

254. See CISET REP., supra note 28, at 43-44 (noting that political and economic instability and civil strife provide fertile breeding grounds for microbes, and that “[w]orldwide efforts to promote good governance, economic development and resolution of conflicts are not out of place in a discussion of how to deal with new and re-emerging diseases”).
Strengthened surveillance, prevention and control, public health infrastructures, and applied research may well help public health officials react more effectively against infectious diseases fostered by civil war, environmental degradation, urbanization, and poverty. Because the grand strategy does not attempt to address the root causes of these social problems, though, the plans will constantly be under threat from infectious diseases because socio-economic conditions will continue to foster disease emergence and reemergence.

B. THE FOUR OBJECTIVES EXAMINED INDIVIDUALLY

1. Surveillance

Each plan makes infectious disease surveillance the most important element of its respective strategy. Surveillance is

255. The failure to address the root cause of the conditions that help create the EID problem may be explained by the focus on practical, immediate actions to take against EIDs. Another reason is that the research on EIDs to date has not been informed by probing the socio-economic context of the EID problem. One commentator writes: “Standard epidemiology, narrowly focused on individual risk and short on critical theory, will not reveal these deep socioeconomic transformations, nor will it connect them to disease emergence.” Farmer, supra note 239, at 265. At least one policy proposal attempts to connect the spread of infectious diseases with environmental degradation. Dr. Edward McSweegan has proposed the development of an Infectious Diseases Impact Statement (IDIS), which would be similar to Environmental Impact Statements used in the United States. Edward McSweegan, The Infectious Diseases Impact Statement: A Mechanism for Addressing Emerging Diseases, 2 EMERGING INFECTIOUS DISEASES 103, 103 (1996). McSweegan believes that “[e]mbedding an IDIS requirement into the planning and execution of large-scale projects likely to alter local environments could prevent new epidemics and reduce infectious disease-associated morbidity and mortality.” Id. at 104. None of the proposed plans incorporates or even refers to the IDIS idea.

256. See generally Farmer, supra note 239 (arguing for development of a critical epistemology of EIDs that will confront socio-economic transformations that contribute to disease emergence).

257. See IOM REP., supra note 13, at 2 (stating that the “key to recognizing new or emerging infectious diseases, and to track the prevalence of more established ones, is surveillance”); CISET REP., supra note 28, at 18-28 (making surveillance the first step in its strategy for preventing disease outbreaks and discussing ways to build a global disease surveillance network); CDC STRATEGY, supra note 26, at 12 (stating that “[s]urveillance is the single most important tool for identifying infectious diseases that are emerging, are causing serious public health problems, or are diminishing in importance”); EMC STRATEGIC PLAN, supra note 89, at 4 (stating that strengthening global surveillance is WHO’s first goal in its EID strategy); Gore, supra note 4, at 6 (stating that the first component of the Clinton administration’s new policy is the creation of a global surveillance system).
the "systematic collection, analysis and public health response to the occurrence of infectious disease conditions in our communities" and "encompasses both the report and investigation of cases and the submission of clinical specimens when needed for testing at a . . . public health laboratory." As Frederick Murphy puts it, "[T]here is a universal agreement that we must first know 'what the hell is going on out there?'" Surveillance is vital because scientists cannot identify infectious agents if they have no information on outbreaks. Similarly, public health officials are handicapped in designing and implementing prevention and control measures if they do not know which pathogenic microbe is on the rampage. Surveillance provides the baseline information public health officials need to respond to infectious disease threats and to assign priorities to prevention and control efforts concerning different diseases.

The importance of surveillance reaches beyond the scientific and public health arenas to affect international and domestic politics. The history of ineffective state responses to disease outbreaks in other countries illustrates that poor surveillance information promotes travel and trade restrictions, and results in increased international tension. The breakdown in surveillance fuels a vicious cycle: bad surveillance produces excessive reactions in other states, which in turn encourages states not to improve surveillance for fear of more lost trade and tourist revenue. Poor surveillance also


259. Frederick A. Murphy, Problems in the Surveillance and Control of Viral Diseases with Special Reference to the Developing World, Address presented at the Fifth International Congress on the Impact of Viral Diseases in the Developing World, Johannesburg, South Africa (July 1995) <http://www.uct.ac.za/microbiology/icumurp.html>; see also *Emerging Infections Hearings*, supra note 1, at 31 (statement of Dr. Michael Osterholm that "[w]ithout the ability to know with accuracy when, where, and why infectious diseases are occurring, we cannot begin to prevent them").

260. *See* Berkelman et al., supra note 80, at 368; *see also* IOM REP., supra note 13, at 2 (noting that poor surveillance handicaps public health officials in the development and implementation of disease control policies).

261. *See infra* text accompanying note 390 (discussing WHO's inability to prevent states from imposing excessive and unnecessary quarantine measures).

262. *See* Dorolle, supra note 109, at 109 (noting that states that impose irrational quarantine measures discourage other states from reporting accurate disease information, which in turn further perpetuates irrational quar-
hampers WHO's efforts to better world health through the control of infectious diseases.

Surveillance also concerns sovereignty. The power to monitor a population for infectious diseases flows from the sovereignty exercised over such population. For WHO or any other state to monitor the health of a population through surveillance techniques, the state within which such population resides must give its consent and cooperate. Thus, any global surveillance system will be made up of many parts controlled independently by sovereign states.

Surveillance also relates to domestic and foreign policies. Surveillance information is important in evaluating whether public health regulations are in fact effective. The CISET Working Group states that surveillance on a global basis protects the health of American citizens at home and promotes U.S. foreign policy objectives of promoting international political stability through sustainable economic development as well as helping the United States respond to biological or chemical weapons attacks.

All these scientific, public health, and political reasons demonstrate that "[the importance of surveillance to the detection and control of emerging microbial threats cannot be overemphasized]." Because surveillance is so vital to effective disease detection and control, and because the current condition of national and international surveillance capabilities is so atrocious, the grand strategy particularly emphasizes this objective. Surveillance breaks down if any one step—reporting, collecting, investigating, and evaluating—is not undertaken properly. Currently, local, national, and global surveillance capabilities are breaking down or are broken, giving the emphasis on improving surveillance at every level in the grand strategy a sense of urgency.

263. See Berkelman et al., supra note 80, at 368.
264. See CISET REP., supra note 28, at 11.
265. IOM REP., supra note 13, at 2.
266. See supra note 95 and accompanying text (discussing the current lack of an effective disease surveillance system at the international level).
267. See Berkelman et al., supra note 80, at 368 (noting that surveillance systems break down if testing, reporting, or investigating is not accomplished); Emerging Infections Hearings, supra note 1, at 31 (statement of Dr. Michael Osterholm that surveillance system can break down at any step).
268. The various plans also contain specific proposals to strengthen infectious disease surveillance. The CDC and the CISET Working Group propose,
Notable in the grand strategy’s emphasis on surveillance is its critical linkage of national surveillance systems to an overarching global surveillance system. Improving national surveillance capabilities requires creating an effective global surveillance network. The interdependent nature of national and international surveillance underscores that infectious diseases undermine sovereignty by weakening a state’s power to protect the health of its citizens by constantly threatening national capabilities. This interdependence reinforces sovereignty and makes it an obstacle to global surveillance capabilities by necessitating each state’s agreement to cooperate with global efforts.

The reconstruction of national and international surveillance systems poses a formidable task, given how poorly surveillance systems all over the world currently operate. New electronic and telecommunications resources, however, have the potential to extend and simplify surveillance. All the plans stress the need to utilize electronic links to improve the speed and quality of surveillance data. Examples of electronically-

for example, that the United States take four steps to improve the American surveillance system: (1) strengthen the existing national notifiable disease system, see CISET REP., supra note 28, at 41-42; CDC STRATEGY, supra note 26, at 15; (2) establish “sentinel surveillance systems” that link groups of participating physicians, clinics, hospitals, and laboratories to a central data receiving and processing center, see CISET REP., supra note 28, at 42; CDC STRATEGY, supra note 26, at 16; (3) establish specific public health centers focusing on EIDs within strategically located sites across the United States, see CISET REP., supra note 28, at 42; CDC STRATEGY, supra note 26, at 17; and (4) develop an enhanced global surveillance system, see CISET REP., supra note 28, at 23; CDC STRATEGY, supra note 26, at 20-21. The new Clinton administration policy on EIDs also stresses the importance of strengthening domestic and global surveillance capabilities. See Addressing the Threat of Emerging Infectious Diseases, supra note 54, at 2. WHO also has made specific proposals to create a global surveillance system for infectious diseases. See LeDuc, supra note 96, at 341 (noting WHO efforts to lead and coordinate the effort to create global surveillance program). WHO has four specific tasks to undertake in creating a global surveillance system according to its EID strategic plan: revise the IHR, monitor antimicrobial resistance, monitor viral and bacterial diseases, and disseminate information as widely as possible. See EMC Strategic Plan, supra note 89, at 4.

269. See Berkelman et al., supra note 80, at 369 (noting the need to establish effective global surveillance in addition to strengthening domestic surveillance).

270. See IOM REP., supra note 13, at 4-5 (recommending the development of a comprehensive, computerized infectious disease database); CISET REP., supra note 28, at 5, 23 (advocating application of information technology to disease control programs); CDC STRATEGY, supra note 26, at 21 (advocating use of the Internet to facilitate exchange of information in global surveillance system); EMC Strategic Plan, supra note 89, at 6 (proposing to disseminate
linked public health surveillance systems already exist, and some commentators believe that expanding such electronic surveillance capabilities will facilitate "the rapid collection, analysis, and dissemination of vital public health information" and promote "the establishment of effective international public health policies." Experts who are less sanguine about the will or ability of governments to fund improved surveillance systems find hope in the telecommunications revolution because it may empower individuals across the world to build and operate a private global infectious disease network.


272. Vacalis et al., supra note 271, at 35. Garrett reports on "a hopeful revolution" in the form of the on-line satellite connection to medical libraries in the United States and Canada created for the University of Zambia Medical Library and other electronic connections between developing countries and medical data bases in the developed world. See GARRETT, supra note 7, at 615.

273. See Murphy, supra note 259 (noting in 1995 the failure of governments to adequately fund infectious disease surveillance and control programs and the prospects for a private "Global Infectious Disease Network"). Such a private infectious disease surveillance effort does exist in the form of the Program for Monitoring Emerging Diseases, which the Federation of American Science started in 1993 "to create a global system of early detection and timely response to disease outbreaks." The Program for Monitoring Emerging Diseases Homepage (visited March 10, 1997) <http://www.healthnet.org/programs/promed.html>. Efforts to create private public health surveillance networks emulate pathogenic microbes in that they attempt to bypass the state.

Another interesting private initiative is SatelLife, which electronically connects developing country physicians and scientists to electronic resources and colleagues in developed countries. See GARRETT, supra note 7, at 615-16 (describing achievements of SatelLife). For a skeptical view of the promise of cyberspace in infectious disease control strategies, see David P. Fidler, Mission Impossible? International Law and Infectious Diseases, 10 TEMP. INT'L & COMP. L.J. 493, 502 (arguing that "[w]hat should be remembered about the promise of cyberspace is that it only spreads information about the continuing ravages of infectious diseases more quickly").
2. Prevention and Control

Surveillance systems are designed to provide public health officials with sufficient information to prevent and control the spread of infectious diseases. The EID plans advocate strengthening the ability of public health authorities to prevent and control infectious diseases. According to the Institute of Medicine, successful intervention against EIDs "necessitates coordinated efforts by a variety of individuals, government agencies, and private organizations." Similar coordination is needed at the international level as well as among local physicians, different governments, and WHO.

As the United States illustrates, national public health systems are in bad shape and therefore weaken the ability of public health authorities to act effectively. One obstacle confronting U.S. efforts to improve prevention and control capabilities involves the federal system. Under the federal system, individual states have primary responsibility for infectious disease control, and the federal government's powers are limited. The CDC, for example, cannot respond to a disease outbreak unless it is invited to do so by state health authorities. In addition, the CDC has no regulatory powers to implement prevention and control measures outside the national quarantine system, as those powers reside with the states. The nature of the federal system and the division of public health powers provides an "increased likelihood of uncoordinated approaches" to multistate disease outbreaks. Thus, improved prevention and control of infectious diseases will require more national coordination and oversight to prevent jurisdictional divisions.

274. IOM REP., supra note 13, at 7.
275. See supra text accompanying note 100 (discussing diminished state and local support for disease surveillance systems in the United States).
276. See Stephen M. Ostroff, Law and Emerging and Re-Emerging Infectious Disease: A View from the CDC, Address Before ABA Panel on Law and Emerging and Re-Emerging Infectious Diseases), in PROGRAM MATERIALS, supra note 86, at 19.
277. See id. The Foreign Quarantine Regulations delegate to the CDC primary responsibility for administering the U.S. foreign quarantine system. See 42 C.F.R. § 71.31 (1995) (empowering Director of CDC to order inspection and detention of a carrier); id. § 71.32 (empowering CDC Director to detain, isolate, or place under surveillance any arriving person).
278. Ostroff, supra note 276, at 19.
from compromising public health reactions to infectious disease outbreaks. The importance of prevention and control measures in other countries to public health in the United States has led to proposals that Congress expand CDC's mandate to include authority to investigate and respond to disease epidemics in other countries. The call for such an expanded mandate for CDC is further evidence of the interdependent nature of public health in the contemporary international system. It is also evidence that any strategy for dealing with EIDs is likely to be expensive and complex as national public health authorities are forced to think and act globally.

The weaknesses at the national level complicate efforts by WHO to provide global leadership in preventing and controlling diseases. WHO responded to the growing EID threat by creating a new division—the Division of Emerging and Other Communicable Diseases Surveillance and Control (EMC)—to spearhead its strategy against EIDs. The EMC proposals to improve prevention and control capabilities cluster around (1) developing rapid response capacities at the national, regional, and international level so that resources can be mobilized swiftly when disease outbreaks occur; (2) formulating guidelines for communicable disease surveillance and control, handling new diseases, quality assurance and proficiency testing for laboratories, improving antimicrobial prescribing practices, stockpiling equipment and supplies for disease outbreaks, and

279. See Emerging Infections Hearings, supra note 1, at 35 (statement of Dr. Margaret A. Hamburg, Health Commissioner for New York City).

280. See CISET REP., supra note 28, at 19 (noting that the authority of the CDC does not cover international disease control and prevention); Addressing the Threat of Emerging Infectious Diseases, supra note 54, at 4 (proposing to include in CDC's mandate surveillance and response activities in connection with epidemics overseas).

281. See EMC Strategic Plan, supra note 89, at 2-3 (describing creation of EMC).

protocols for intra-epidemic research, and (3) providing training in basic epidemiology, training materials explaining new diseases, and advanced training in immunology, vaccinology, biotechnology, and biosafety.

3. Infrastructure Development

As discussed above, complacency and budget constraints have eroded public health systems all over the world. In response, the grand strategy calls for revitalized national and international public health infrastructures. Both surveillance and prevention and control capabilities depend on an adequate public health infrastructure, which in turn requires human and physical resources, cooperation, and leadership in making infectious disease a priority.

Reconstructing public health infrastructures to support surveillance, prevention, and control programs will be an expensive undertaking. The most glaring omission in the EID

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283. See EMC Strategic Plan, supra note 89, at 7-9 (discussing strategy for strengthening prevention and control capabilities).

284. See id. In the United States, the CDC operates an Epidemic Intelligence Service (EIS) that trains health professionals in public health epidemiology. See IOM REP., supra note 13, at 148 (describing operation of EIS program). EIS officers participate in the investigations of disease outbreaks in the United States. See id. The IOM and CDC have both asserted a need for additional support in training and investigation. See IOM REP., supra note 13, at 148 (recommending domestic and global expansion of EIS); CDC STRATEGY, supra note 26, at 19 (stating that the CDC must strengthen its field investigation program in response to emerging infectious disease threats).

285. See supra notes 79-82 and 98-100 and accompanying text (observing that complacency and financial constraints have eroded the quality of public health systems globally).

286. See IOM REP., supra note 13, at 7 (noting poor condition of U.S. public health system); CISET REP., supra note 28, at 27 (recommending that the U.S. public health infrastructure be rebuilt); CDC STRATEGY, supra note 26, at 33 (stating that a goal of CDC disease prevention strategy is to "[s]trengthen local, state, and federal public health infrastructures to support surveillance and implement prevention and control programs"); EMC Strategic Plan, supra note 89, at 2 (stating EMC's second goal is "to strengthen [the] national and international infrastructure necessary to recognize, report, and respond to emerging communicable diseases"); Addressing the Threat of Emerging Infectious Diseases, supra note 54, at 2 (stating goals of Clinton administration's policy to be the strengthening of federal and state laboratory, epidemiological, training, and technological resources).

287. See CISET REP., supra note 28, at 45 (stating that public health infrastructure includes a complex set of skills and resources already available in industrialized countries).

288. See Garrett, Infectious Disease, supra note 61, at 79 (quoting Nobel
plans is the absence of discussion about funding. The CDC estimates that full implementation of its strategy would cost $125 million annually, yet Congress only appropriated $7.7 million in 1995. The Clinton administration will ask Congress for $45 million to support the CDC's efforts under the new EID policy, which represents only 36% of estimated costs.

As difficult as adequate funding is to achieve in the United States, the financial problems in the developing world are of an entirely different magnitude. As the CISET Working Group noted, many of the resources needed to build a public health infrastructure are simply not available in developing countries. The poverty of developing states creates practical and political problems for strengthening public health infrastructures globally. The practical problem is the lack of money to pay for the building and maintenance of adequate public health care systems. The political problem looms in the possibility that developing countries use the inequality of wealth in the international system as an argument to complicate international cooperation on EIDs. No global strategy is likely to be successful if developed countries do not provide money to improve public health infrastructures in the developing world.

While the basic configuration of financial power has not changed in thirty years, the experiences of previous aid campaigns cast a dark shadow across the prospects of more money

Laureate Joshua Lederberg as stating that while the solutions to the EID threat are straightforward and common-sensical, "the bad news is they will cost money").

289. See Berkelman et al., supra note 96, at 315 (estimating costs for CDC prevention plan).

290. See id. (citing priority activities identified in CDC STRATEGY, supra note 26, at 5).

291. See McCleskey, supra note 53 (reporting that the Health and Human Services budget request will help the CDC respond to the threat of EIDs).

292. See CISET REP., supra note 28, at 43 (stating that "in many developing countries . . . health resources are extremely scarce").

293. See Fidler, supra note 8, at 81 (noting that wealth disparities have potential implications for treaty negotiations).

294. This reality was apparent nearly 30 years ago when the Deputy Director-General at WHO wrote the following:

Allow me, therefore, to conclude that, in this age of jet planes and soon of supersonic transport, the only way of preventing the old plagues, and some new ones, from spreading from continent to continent and from country to country is to help the poorest nations of the world to reach such a level of economic and technical development that it will be possible for them to combat the evil at its source.

Dorolle, supra note 109, at 111.
flowing from North to South. As Garrett writes, "[B]y 1990 the world's major donor institutions would be forced to conclude that modernization efforts seemed only to have worsened the plight of the average individual in the Third World, while enhancing the power, wealth, and corruption of national elites and foreign-owned institutions." Even if money were available in large quantities for public health infrastructure reconstruction in the developing world, the grand strategy is silent as to how aid funds would be used to avoid the tragic mistakes of past modernization efforts.

4. Research and Development

The final objective of the grand strategy is to reinvigorate research and development on infectious diseases. Noted earlier was the lack of new research and development by pharmaceutical companies on antimicrobial treatments, but the need extends beyond the creation of new drugs. The CDC proposes, for example, to expand epidemiologic and prevention effectiveness research, to improve laboratory and epidemiologic techniques for the rapid identification of new pathogens or syndromes, to develop diagnostic tests and reagents for diseases, and to develop vaccines and vaccine development programs. EMC wants to stimulate research on "new and more cost-effective disease surveillance and control strategies, including research on new epidemiological tools." The breadth of this research agenda indicates that national and international public health authorities are not depending solely upon

295. Garrett, supra note 7, at 8.
296. See IOM REP., supra note 13, at 8 (recommending expansion of research on EIDs); CISET REP., supra note 28, at 27, 53-55 (recommending the strengthening of the infectious disease research infrastructure in the United States); CDC STRATEGY, supra note 26, at 1 (listing applied research as major goal of infectious disease control strategy); EMC STRATEGIC PLAN, supra note 89, at 2 (listing support and promotion of research in communicable disease control as a major goal); Addressing the Threat of Emerging Infectious Diseases, supra note 54, at 3 (making enhancement of research efforts part of Clinton administration's EID policy).
297. See supra notes 72-77 and accompanying text (noting reluctance of pharmaceutical companies to invest in research and development of drugs to combat pathogenic microbes).
298. See CDC STRATEGY, supra note 26, at 25-29 (identifying strategies for integrating epidemiology and laboratory science techniques).
299. EMC STRATEGIC PLAN, supra note 89, at 9-10. Specific research areas include hepatitis C, hepatitis E, Ebola, and the new variant of Creutzfeldt-Jacob Disease. See id. at 10.
the development of antimicrobial drugs to combat EIDs. The research agenda could perhaps be expanded further to include investigations into how urbanization, poverty, and environmental degradation factor into the EID problem.

The key variable for better infectious disease research is money. Again, none of the EID plans confront the funding issue. Pharmaceutical companies cite lack of market incentives to develop antimicrobial products for use primarily in the developing world.\(^{300}\) Whether national governments in developed states prove any more willing to expend large sums of money on infectious disease research remains to be seen.

C. SUMMARY OF THE GRAND STRATEGY

The major EID plans proposed to date share four fundamental objectives. These common goals might make integration of national and global efforts easier because governments and international organizations will be working towards the same ends.\(^{301}\) The grand strategy suffers, however, from two serious problems. First, the plans noticeably avoid the financial concerns raised by their suggestions for creating better surveillance, prevention and control capabilities, public health infrastructures, and research and development. Second, the grand strategy does not address many of the factors shaping the EID threat, which suggests that these factors will continue to fuel EIDs and put pressure on public health resources nationally and internationally.

IV. INTERNATIONAL LAW ON INFECTIOUS DISEASE CONTROL: THE INTERNATIONAL HEALTH REGULATIONS

The global nature of the EID threat combined with the structure of the international system mean that international

\(^{300}\) See Garrett, *Infectious Disease*, supra note 61, at 68 (noting that “lack of profitability has stifled the development of drugs to combat organisms that are currently found predominantly in poor countries”).

\(^{301}\) For an example of an effort to promote integration of national and global efforts, see Division of Emerging and Other Communicable Diseases Surveillance and Control, World Health Organization, WHO Position Paper on Collaboration in Global Surveillance of Communicable Diseases: For Consideration Within the Framework of the EU-US Transatlantic Agreement on Communicable Diseases 8 (1996), in which WHO states its willingness to “make available its resources and long experience to assist” European Union-United States collaboration on infectious diseases.
law will have to play a prominent role in dealing with the threat. The need to utilize international law for international infectious disease control is, of course, not new. Since the first international public health conference in 1851, states have attempted to negotiate, and have negotiated, international treaties on infectious disease control. The EID problem most directly implicates the International Health Regulations (IHR), which constitute the "only international health agreement on communicable diseases that is binding on Member States." According to WHO, which administers the IHR, a fundamental purpose of the regulations is to provide a universal code for infectious disease control. This Article analyzes the IHR to determine how effectively these regulations currently address the threat posed by EIDs.

A. DEVELOPMENT OF THE IHR

The IHR are progeny of the long line of international efforts to formulate international rules on infectious disease control dating back to 1851. Before international efforts to develop international rules, infectious disease control was entirely within the power of each sovereign state. Quarantine measures dominated the national responses to the threat of infectious diseases spreading from other countries. This system of disparate quarantine measures eventually proved harmful because it disrupted expanding international travel and trade. The medical effectiveness of quarantine was,

302. See Fidler, supra note 8, at 79 (stating that international law is important to emerging infections control because states will have to agree on many issues and translate such agreement into rules or guidelines).

303. See generally Howard-Jones, supra note 93, at 1033-34 (providing a history of international negotiations on infectious disease control).

304. EMC Strategic Plan, supra note 89, at 10.


308. See id. (noting significant economic losses attendant to quarantine measures). Great Britain’s long-standing opposition to quarantine measures probably had at least as much to do with its status as a great maritime nation as it did with scientific or medical evidence about the ineffectiveness of quar-
however, questioned as early as 1866. However (exclusively European) thus had two incentives to engage in international negotiations on infectious disease control: quarantine measures were not effective, and they were costly to international trade.

From 1851 until 1944, many states participated in sixteen international conferences on infectious disease control and concluded thirteen conventions on the subject. Early conferences failed to produce conventions largely because scientific knowledge about infectious diseases was extremely limited. The breakthrough for international law came with the International Sanitary Conference of 1903, which updated four earlier, more limited treaties in light of scientific discoveries, established an international surveillance plan based on notifications of outbreaks of specified diseases, and required party states to refrain from enacting excessive measures against states that properly notified others of disease outbreaks. The International Sanitary Convention also called for the establishment of an international organization dedicated to international public health. Subsequent treaties addressing maritime traffic and aerial navigation were adopted and amended between 1903 and 1944.

Despite the plethora of treaties, international law on infectious disease control was confusing and unsatisfactory at the end of World War II. First, the different treaties created

antine laws. See Howard-Jones, supra note 93, at 1033-34 (observing that economic considerations compelled resistance to any limitation on shipping).

309. See Gutteridge, supra note 117, at 2 (citing delimitation of disease at source as preferable to alternative measures, including quarantine).

310. See Howard-Jones, supra note 93, at 1034 (providing history of international sanitary conferences and conventions).

311. See Allin, supra note 307, at 1048 & n.29 (observing that the large number of conventions produced confusion and an impetus for change).

312. See Howard-Jones, supra note 93, at 1034 (stating that "a complete lack of agreement on the mode by which cholera and other diseases were contracted entailed a corresponding lack of agreement on means of prevention").

313. See id. (noting that the 1903 Paris Conference unified the 1892, 1893, 1894, and 1897 conventions).

314. See Allin, supra note 307, at 1047-48 (summarizing results of conference).

315. See id. at 1048 (summarizing developments leading up to formation of WHO).

holes in the international regime for the control of infectious diseases because, as the U.S. Department of State argued in 1947, "There are states, including some which occupy key positions in the stream of international maritime and aerial commerce, bound only by the obsolete conventions of 1912, 1926, and 1933, or by no sanitary conventions at all."\(^{317}\) Second, the treaties overlapped, were not kept current as scientific knowledge developed, and were not designed to accommodate the increases in the speed, volume, and scope of international traffic.\(^{318}\) Third, international infectious disease control relied exclusively on the treaty. In the context of infectious disease control, the treaty process proved cumbersome, slow, and resistant to amendments required by changing scientific knowledge and/or patterns of international trade or commerce.\(^{319}\)

International cooperation on health became one of the objectives of the new United Nations,\(^{320}\) and WHO was the first specialized agency created under the United Nations system.\(^{321}\) Among WHO’s undertakings was an attempt to unify the international rules on controlling the spread of infectious diseases. Article 21 of the WHO Constitution gave WHO the authority to adopt regulations concerning, among other things, “sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease.”\(^{322}\) Pursuant to this authority, the World Health Assembly adopted the International Sanitary Regulations in 1951, which replaced the patchwork of conventions previously in force for WHO member states.\(^{323}\) The world finally had a unified set of international legal rules designed to control the spread of infectious diseases. In 1969, as part of a revision effort, the

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\(^{320}\) See U.N. CHARTER art. 55 (stating that the United Nations shall promote, among other things, solutions to international health problems).

\(^{321}\) See Sharp, supra note 207, at 509 (calling the establishment of WHO a “landmark” in the history of international cooperation on health and medicine).

\(^{322}\) WHO CONST. art. 21.

\(^{323}\) See INT’L HEALTH REG., supra note 89, art. 86(1), at 38-39 (listing treaties the IHR replaced).
World Health Assembly renamed the International Sanitary Regulations the International Health Regulations.

B. LEGAL BASIS OF THE IHR

At the time of adoption, the authority permitting the World Health Assembly to adopt regulations designed to prevent the international spread of disease was considered a significant advance over the treaty-based procedure. The authority to issue regulations supposedly gave WHO the ability to keep the IHR up-to-date regarding scientific advances without having to proceed through the cumbersome treaty process. In addition, Article 22 of the WHO Constitution adopted the "comparatively novel principle known as 'contracting out.'" Under Article 22, the IHR and any amendments are binding on all member states of WHO except for those member states that notify the Director-General of a rejection or reservations within a certain period of time. The American delegation pushed the "contracting out" provision specifically to allow WHO to apply new scientific techniques and knowledge in the IHR. The IHR also contain a provision that makes all reservations to the IHR subject to acceptance by the World Health Assembly. The quasi-legislative powers of Article 21, the "contracting out" technique of Article 22, and the procedure of subjecting all reservations to acceptance by the World Health Assembly in the IHR work together in theory to provide a robust regulatory process that is not weakened by states refusing to join the regime or by significant reservations.

Article 19 of the WHO Constitution also granted the World Health Assembly authority "to adopt conventions or agreements with respect to any matter within the competence of the Organization." This authority theoretically provided WHO

324. See Int'l Health Security in the Modern World, supra note 317, at 958 (stating that Articles 21 and 22 of the WHO constitution constitute a significant advance in the field of international health).

325. Sharp, supra note 207, at 525.

326. See WHO CONST. art. 22.

327. See Sharp, supra note 207, at 526 (quoting a report from the U.S. Delegation). Sharp also observed that Article 22 "was the subject of warm debate" as states worried about its effect on sovereignty. Id. at 525.

328. See INT'L HEALTH REG., supra note 89, art. 88(1), at 39-40.

329. WHO CONST. art. 19.
with further power to help member states prevent the international spread of disease.\textsuperscript{330}

The promise of energetic and effective use of international law by WHO has yet to achieve its objective: "[T]he attainment by all peoples of the highest possible level of health."\textsuperscript{331} WHO has been reluctant to use international law to advance any of its initiatives on world health.\textsuperscript{332} For instance, WHO has never adopted a convention under its Article 19 powers.\textsuperscript{333} The power to issue binding regulations has only been exercised twice, once with respect to the IHR and once on nomenclature issues. Moreover, Article 21 powers are limited in comparison to Article 19 powers because Article 21 lists only five areas in which regulations may be adopted while Article 19 refers to any matter within WHO's competence.\textsuperscript{334} Article 21 thus has circumscribed ability to support a broad attack against infectious diseases. The authority to adopt regulations on the international spread of disease also is not as innovative as it might first appear because efforts to control such spread had a long history and thus had already settled into patterns of regulation found

\textsuperscript{330} One commentator thought in 1947 that WHO's power to adopt conventions was important and far-reaching "for the development of an effective international health code" and for "strengthening the provisions of world health law." Sharp, supra note 207, at 524-25.

\textsuperscript{331} WHO CONST. art. 1.

\textsuperscript{332} See Taylor, supra note 206, at 577 (emphasizing that "WHO has not adequately promoted or encouraged the development of national and international law... with respect to the right to health").


\textsuperscript{334} See WHO CONST. arts. 19, 21; Fluss, supra note 318, at 5 (contrasting WHO's authority to adopt regulations and agreements under Articles 19 and 21).
in the previous treaties. Rather than utilizing its power to make international law, WHO prefers to issue nonbinding recommendations under Article 23 of the WHO Constitution.

In summary, the IHR are based on authority in the WHO Constitution that contains fundamental tensions. The regulatory technique theoretically represents an advance over the treaty process, but the "contracting out" procedure creates a deterrent effect against innovative and swift change because of concerns about sovereignty. In other words, states may be unwilling to impose on themselves substantial international legal obligations under Article 22 because of the "contracting out" mechanism. The result has been the opposite of quick revisions to update the IHR that the regulatory authority in the WHO Constitution was designed to accomplish. In 1988, the Legal Counsel of WHO observed that the "real difficulty" under Articles 21 and 22 "is that measures cannot be adopted quickly enough to meet the health requirements of the moment." This situation does not bode well for the current WHO's desire to revise the IHR.

C. OBJECTIVES OF THE IHR

The express purpose of the IHR "is to ensure the maximum security against the international spread of diseases with a minimum interference with world traffic." The following section examines these two objectives to determine how the IHR are structured to achieve them.

335. *See* Fluss, *supra* note 318, at 5 (explaining that traditional treaty-making has "severely circumscribed" any endeavors to reform treaty-making under Article 21).

336. *See* WHO CONST. art. 23 (granting the World Health Assembly the "authority to make recommendations to Members with respect to any matter within the competence of the Organization"). WHO has addressed, among other things, food safety, breast-milk substitutes, and human organ transplants through Article 23 recommendations. *See* Fluss, *supra* note 318, at 19, 21 (discussing WHO recommendations with respect to these health concerns).

337. *See* Fidler, *supra* note 8, at 81 (commenting that "Article 22 relates to the sovereignty problem and may deter WHO member states from agreeing to serious revisions of the regulations").


339. *INT'L HEALTH REG.*, *supra* note 89, at 5.
1. Maximum Security Against International Disease Spread

The IHR do not define "maximum security against the international spread of diseases."\(^{340}\) In essence, though, the regulations seek to provide member states of WHO with maximum protection against the importation of infectious diseases from other countries. To achieve this objective, the regulations establish a global surveillance system for the diseases subject to the IHR,\(^{341}\) require certain types of health-related capabilities at ports and airports,\(^{342}\) and set out disease-specific provisions for the covered diseases.\(^{343}\)

a. Surveillance

The IHR require member states of WHO to report information to WHO about the three diseases subject to the IHR—yellow fever, plague, and cholera.\(^{344}\) Notification duties exist for all three diseases that occur indigenously in a country,\(^{345}\) that are imported or transferred into a non-infected area within a country,\(^{346}\) and that arrive by ship or aircraft.\(^{347}\) Article 6 of the IHR lays out notification requirements in epidemic situations.\(^{348}\) Member states also have weekly and annual no-

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340. Id. art. 1, at 7 (listing definitions); see E. Roelsgaard, Health Regulations and International Travel, 28 WHO CHRON. 265, 267 (1974) (discussing IHR objectives). Roelsgaard has argued that this concept "defies clear definition," because "maximum security" cannot be quantified. Id.

341. See INT'L HEALTH REG., supra note 89, arts. 2-13, at 10-15.


343. See id. arts. 50-75, at 26-33.

344. See id. art. 3, at 10 (setting out the requirement); id. art. 1, at 8 (defining diseases subject to the IHR as cholera, plague, and yellow fever). The original International Sanitary Regulations made six diseases subject to the Regulations: plague, cholera, yellow fever, smallpox, louse-borne typhus, and louse-borne relapsing fever. See Roelsgaard, supra note 340, at 267. WHO dropped the two louse-borne diseases in the 1969 revisions while smallpox was taken off the list in 1981 after its worldwide eradication. See INT'L HEALTH REG., supra note 89, at 5 (discussing amendment of IHR excluding smallpox); Roelsgaard, supra note 340, at 267 (explaining that the louse-borne diseases do not cause problems for international travel).

345. See INT'L HEALTH REG., supra note 89, art. 3(1), at 10-11.

346. See id. art. 3(2), at 11.

347. See id. Member states must also notify WHO of the presence of the yellow fever virus in humans and other vertebrates, and the plague bacillus in any part of the country. See id. art. 4(1), at 11. Member states must supplement notified cases with further epidemiological information as it becomes available. See id. art. 4(1), at 11.

348. See id. art. 6, at 12.
tification responsibilities under the IHR. WHO then transmits disease notifications and epidemiological information it has received to all member states. Surveillance is critical to the control of infectious diseases, and the IHR notification duties play an important role in WHO's global surveillance strategy and thus in the strategy to provide maximum security against the international spread of disease.

b. Health Organizations

Another key element of the maximum security goal is the IHR's requirements that member states maintain certain types of health resources, programs, and organizations. For example, the maintenance of adequate health facilities at ports of entry in member states of WHO limits the spread of infectious diseases by eliminating conditions conducive to pathogenic microbes (e.g., poor sanitation). It also provides resources for earlier detection of, and intervention against, infectious diseases. Such health organizations are supposed to work in tandem with surveillance operations to provide maximum security against the international spread of disease.

c. Handling Specific Diseases

The provisions relating to the diseases subject to the IHR also contribute to the maximum security objective. Part V of the IHR contains various provisions creating specific duties in relation to plague, cholera, and yellow fever. For example,

349. See id. arts. 9 & 13, at 13-14.
350. See id. art. 11(1), at 14.
351. See supra note 257 and accompanying text (discussing importance of disease surveillance).
352. For example, every port and airport must provide safe drinking water, food, and disposal of excrement, refuse, waste water, and other things dangerous to health. See INT'L HEALTH REG., supra note 89, art. 14, at 15. As many ports and airports as practicable within a member state must have health services, equipment, and services for isolating infected persons, disinfecting, disinsecting, and deratting ships and aircraft. See id. arts. 15 & 18, at 15-16. They must also have disease investigation and collection capabilities. Id. Special requirements exist for rodent and mosquito control at ports and airports. See id. arts. 16-20, at 16-17. WHO has the power to certify, at the request of a member state, that airports in that member state meet the sanitary requirements of the IHR. See id. art. 21, at 17. Similar sanitary, health service, and vector control measures shall be applied at points where inland travel and/or navigation across frontiers reaches sufficient volume and epidemiological conditions require such application. See id. art. 22, at 18.
353. See id. arts. 50-75, at 26-33.
Article 52(1) states that each member state "shall employ all means in its power to diminish the danger from the spread of plague by rodents and their ectoparasites." If a cholera case is discovered on the arrival of any carrier, then the member state may apply surveillance or isolation against the individual for a period not to exceed the incubation period of cholera from the date of disembarkation. Member states may require the vaccination of any person leaving a yellow fever infected area for an international voyage. Part V contains other provisions allowing member states to take certain actions against plague, cholera, and yellow fever that also supposedly prevent or minimize the international spread of disease.

2. Minimum Interference with World Traffic

The IHR attempt to achieve maximum security against the international disease spread with minimum interference with world traffic by setting out the most restrictive health measures that a member state may take to protect its territory against the diseases subject to the IHR. The IHR prescribe limits for procedures that may be taken generally against diseases subject to the regulations. They also have provisions that prevent the departure of any infected person or means of transportation, and that limit actions taken against ships and aircraft in route between ports of departure and arrival against persons and means of transport upon arrival, and against cargo, goods, baggage, and mail moving in international transport. The surveillance provisions in Part II create a deterrent effect by requiring member states to notify WHO of all measures applied to arrivals from an infected

354. Id. art. 52(1), at 26.
355. See id. art. 62(1), at 30.
356. See id. art. 66(1), at 30.
357. See id. art. 23, at 18 (prohibiting states from requiring more stringent health measures).
358. See id. arts. 22-29, at 18-19.
359. See id. art. 30, at 20.
360. See id. arts. 31-34, at 20-21.
361. See id. arts. 35-45, at 22-25.
362. See id. arts. 46-49, at 25-26. Provisions restricting the measures member states may take against diseases subject to the IHR also appear in other sections of the IHR, such as Part V on the special provisions relating to the diseases subject to the IHR. Article 51 states, for example, that "[v]accination against plague shall not be required as a condition of admission of any person to a territory." Id. art. 51, at 26. In relation to cholera, "[n]o person shall be required to submit to rectal swabbing." Id. art. 64(1), at 30.
The IHR also regulate what health documents member states may require from international travelers and carriers and what health charges member states may assess against international travelers and carriers.

All health measures authorized under the IHR "must be initiated forthwith, completed without delay, and immediately followed by the granting of free pratique; in other words, the old concept of 'quarantine' is abolished for good." Thus, surveillance or isolation of persons infected with a disease subject to the IHR may only last as long as the incubation period for the relevant disease calculated from the date of last exposure or the date of arrival. Epidemiology, rather than politics or irrational fears, drives the authorized restrictive measures in the IHR.

The IHR also restrict government interference regarding diseases not subject to the IHR. First, if a ship or aircraft is infected or suspected of being infected with a disease not subject to the IHR, a member state of WHO cannot refuse such ship or aircraft free pratique, nor can it prevent such carrier from discharging or loading cargo or stores or taking on fuel and water except in case of an emergency constituting a grave danger to public health. The WHO Committee on International Surveillance of Communicable Diseases "has always given a very restrictive interpretation" to the "grave danger" exception in Article 28, thus limiting the potential the proviso might oth-

363. See id. art. 8(1), at 13.
364. See id. arts. 76-81, at 33-35.
365. See id. art. 82, at 35-36.
366. DELON, supra note 90, at 13. "Free pratique" is defined as "permission for a ship to enter a port, disembark and commence operation, or for an aircraft, after landing, to disembark and commence operation." INT'L HEALTH REG., supra note 89, art. 1, at 8.
367. See, e.g., INT'L HEALTH REG., supra note 89, art. 57(1), at 28 (outlining surveillance for plague); id. art. 57(2), at 28 (providing isolation for pulmonary plague), id. art. 62(1), at 30 (outlining surveillance or isolation for cholera); id. arts. 68 & 71, at 31-32 (regarding handling of yellow fever cases).
368. One area where member states of WHO can implement more restrictive measures than are generally allowed by the IHR is in connection with "[m]igrants, nomads, seasonal workers or persons taking part in periodic mass congregations" who "may be subjected to additional health measures conforming with the laws and regulations of each State concerned." Id. art. 84(1), at 37-38.
369. See id. art. 28, at 19.
370. DELON, supra note 90, at 13; see also Edelman, supra note 115, at 39 (noting that, according to the Committee on International Quarantine under the original International Sanitary Regulations, such Regulations expressly
erwise have for interference with world traffic. Second, Article 81 of the IHR states that no health document other than those listed in the IHR shall be required for international traffic.\footnote{See Intl Health Reg., supra note 89, art. 81, at 35. The health documents required under the IHR are a Maritime Declaration of Health from the master of a ship making an international voyage, see id. art. 77, app. 3, at 33, 46-47, the Health Part of the Aircraft General Declaration, see id. art. 78, app. 4, at 34, 48, a Deratting Certificate, see id. art. 79, app. 1, at 34, 42-43, and an International Certificate of Vaccination or Revaccination Against Yellow Fever, see id. art. 79, app. 2, at 34, 44-45.} Article 81 thus requires that "member nations must refrain from requiring health certificates for non-Regulation diseases."\footnote{Allin, supra note 307, at 1050.}

The IHR regulate restrictive measures in part to prevent member states from overreacting when one of their members notify WHO of a disease outbreak.\footnote{See id. (noting that the IHR contains these provisions to prevent countries from overreacting and to ensure accurate reporting of diseases by member states).} Minimum interference is thus both a counterweight and a compliment to the surveillance mechanism established by the IHR. In theory, then, the principles of maximum security against the international spread of disease and of minimum interference with world traffic are integrated to form the overall international legal regime on infectious disease control.

\section{Effectiveness of the IHR}

Both WHO officials and international legal scholars agree that the IHR have failed to ensure the maximum security against the international spread of diseases with minimum interference with world traffic. While laudatory comments about the IHR and their contributions to international infectious disease control are made periodically, the IHR have not achieved their fundamental purpose. WHO officials acknowledged this failure long before the current crisis over EIDs erupted,\footnote{See Dorolle, supra note 109, at 109 (noting the inadequacies of the International Sanitary Regulations in 1968 by the Deputy Director-General of WHO); Roelsgaard, supra note 340, at 266-67 (discussing the failure of IHR to provide maximum security with minimum interference by Chief of WHO's Epidemiological Surveillance of Communicable Diseases, in 1974); see also Boris Velimirovic, Do We Still Need International Health Regulations?, 133 J. Infectious Disease 478, 478 (1976) (arguing in 1976 that WHO, many governments, epidemiologists, and shipping and air-traffic promoters understood refer to the quarantinable diseases "and limit the sanitary measures to be taken in respect of other infectious diseases").} but
the EID problem has placed the ineffectiveness of the IHR in stark relief and created the impetus for their revision.

1. Breakdown in Surveillance

The surveillance system constructed through the notification duties in the IHR has broken down because member states regularly fail to notify WHO of outbreaks of diseases subject to the IHR. Three reasons stand out for this failure to notify. First, poor national surveillance systems in many member states often mean that member states do not recognize an outbreak of a disease subject to the IHR for a long time or even at all. Here the deterioration of public health systems worldwide undermines the effectiveness of existing international law. Second, many WHO member states do not report for domestic political reasons, either out of a concern for national honor or prestige or a "lack of sincerity on the part of national health administrations." Finally, many member states fail to notify WHO because they fear excessive reactions from other states that will produce losses in trade and tourism.

Even if WHO member states fulfilled their notification duties under the IHR, the surveillance system in the IHR remains flawed because it applies to only three diseases. Commenting on the diseases subject to the IHR in 1974—plague, cholera, yellow fever, and smallpox—Roelsgaard argued that these diseases are subject to the IHR largely for historical reasons: "they are the pestilential diseases of the past." As early as 1968, experts observed that the IHR did not address many other infectious diseases that pose equivalent risks of

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that "[t]he IHR have become a glorious monument and a self-serving ritual as much as a measure of protection, collective or individual").

375. See DELON, supra note 90, at 24 (noting unsatisfactory functioning of notification system); CISET REP., supra note 28, at 4 (noting reluctance of states to share surveillance information); Dorolle, supra note 109, at 104 (noting breakdown in systems of notification); Garrett, Infectious Disease, supra note 61, at 74 (discussing reluctance of many nations in reporting infectious diseases); Heymann, supra note 92, at 12 (noting failure of states to notify WHO).

376. See DELON, supra note 90, at 24; Dorolle, supra note 109, at 104.

377. See DELON, supra note 90, at 24; CISET REP., supra note 28, at 4.


379. See DELON, supra note 90, at 24; CISET REP., supra note 28, at 4; Dorolle, supra note 109, at 104-05; Heymann, supra note 92, at 12.

spreading internationally.\textsuperscript{381} With EIDs, the inadequacy of the IHR's requirements for only three infectious diseases has been repeatedly noted.\textsuperscript{382} In relation to one of the biggest infectious disease crises of this century—the AIDS pandemic—the IHR surveillance system has been irrelevant because HIV/AIDS was not, and has not subsequently been made, a disease subject to the IHR.\textsuperscript{383} WHO proposes to expand the coverage of the IHR in its planned revision,\textsuperscript{384} but it is troubling that in 1989 the Legal Counsel of WHO argued that "no one today seems to seriously contemplate increasing the number of 'diseases subject to the Regulations.'"\textsuperscript{385} This sentiment not only directly attacks the proposed WHO revision of the IHR but also calls into question any effort to use international law to create a global surveillance system capable of handling the enormous challenge of EIDs.

2. Ineffectiveness of Protection Measures

The objective of maximum security against the international spread of disease might be fulfilled despite the breakdown of the IHR surveillance system if WHO member states' attempts to prevent infectious disease spread were successful. The historical record amply demonstrates, however, that those actions, whether or not authorized by the IHR, have failed to prevent the international spread of infectious diseases. In 1968, the Deputy Director-General of WHO observed that the International Sanitary Regulations had failed to contain the international spread of cholera and smallpox—two of the dis-

\textsuperscript{381} See Dorolle, supra note 109, at 109 (commenting in 1968 on lack of coverage in International Sanitary Regulations of many diseases, such as tuberculosis, poliomyelitis, brucellosis and others, posing risks of international spread).

\textsuperscript{382} See, e.g., Heymann, supra note 92, at 12 (noting that new and reemerging infectious disease have the same potential for international spread as the diseases subject to the IHR); Martinez & Alary, supra note 305, at 3 (stating that the IHR fail to address new and reemerging infectious diseases).

\textsuperscript{383} See Fidler, supra note 8, at 80.

\textsuperscript{384} See infra note 419 and accompanying text (discussing proposed changes to the IHR in which reporting of the three specified diseases would be replaced by reporting of defined syndromes that correspond to occurrence of diseases of urgent international importance).

\textsuperscript{385} Vignes, supra note 338, at 18. Vignes expressed this view because he believed that the attempt to increase the use of binding rules by increasing the number of duties under the IHR would not be an effective way to deal with infectious disease control. See id.
The inability to stem the international spread of cholera in particular has received considerable attention. While some success has been claimed for the IHR in relation to controlling the international spread of the plague, Roelsgaard, WHO's Chief of Epidemiological Surveillance of Communicable Diseases, argued that the extent of the contribution from the IHR is "highly questionable" because ships and ports have ample economic incentive to control rodent populations without the IHR's requirements. The ineffectiveness or questionable effectiveness of measures taken against the international spread of the diseases subject to the IHR is only compounded by the fact that the IHR do not address many other infectious diseases of international importance and in fact expressly prohibit states from taking protective actions against other diseases except in situations of grave danger.

3. Excessive Measures

The IHR's practical effect is equally disappointing regarding the objective of minimum interference with world traffic. The IHR's attempt to regulate what actions WHO member states may take in response to infectious disease outbreaks has been generally ignored. WHO member states have regularly applied measures far more restrictive than those permitted under the IHR. Like the difficulty of achieving maximum security against the international spread of disease, the troubles

386. See Dorolle, supra note 109, at 105-06.
387. See DAVID LEIVE, I INTERNATIONAL REGULATORY REGIMES 89-99 (1976) (examining IHR's functioning under impact of a cholera epidemic); Heymann, supra note 92, at 12 (noting misapplication of IHR in connection with cholera spreading into Latin America); Roelsgaard, supra note 340, at 267 (stating that "[t]he provisions of the Regulations for preventing the international spread of cholera have not been effective").
388. See, e.g., Roelsgaard, supra note 340, at 267 (commenting that spread of diseases would have been arguably "far greater" without the IHR); Report of a WHO Informal Consultation, supra note 121, at 13 (noting that the IHR played a role in limiting the international spread of yellow fever and plague).
389. See Roelsgaard, supra note 340, at 267. The IHR have been praised for controlling the spread of yellow fever through the vaccination requirement. See id. (acknowledging the efficacy of yellow fever vaccination); Report of a WHO Informal Consultation, supra note 121, at 13 (acknowledging the role of the IHR in preventing the international spread of yellow fever); see also INT'L HEALTH REG., supra note 89, art. 66, at 30 (outlining the yellow fever vaccination requirement). Nevertheless, whether the control of yellow fever "is due to the effective vaccination of travelers leaving infected areas is debatable." Roelsgaard, supra note 340, at 267.
besetting the minimum interference principle were recognized long before the EID problem surfaced. In 1968, the Deputy Director of WHO stated that the objective of avoiding "excessive and unnecessary quarantine measures" has failed. In 1974, the Chief of WHO's Epidemiological Surveillance of Communicable Diseases said that the value of the IHR in ensuring minimum interference with world traffic may be "seriously questioned." In 1975, P.J. Delon, author of WHO's Practical Guide to the IHR, stated that "instances of excessive and useless measures have been numerous in the history of the application of the Regulations since 1951." With EIDs, the problem of excessive measures has been exacerbated. One of the most famous examples involving excessive measures violating the IHR occurred when many WHO member states applied travel restrictions to travelers with or suspected of having HIV/AIDS or who simply traveled from a country with reported AIDS cases.

As noted earlier, the breakdown in surveillance fuels WHO member states' enactment of excessive and unauthorized health measures, and their excessive reaction to disease outbreaks chills any incentive to notify WHO. When either of the objectives of maximum security or minimum interference fails, effectuating the purpose of the IHR becomes an impossible mission.

4. Enforcement of the IHR

The almost wholesale lack of compliance with the IHR raises the question whether WHO has any enforcement powers

390. Dorolle, supra note 109, at 105.
392. DELON, supra note 90, at 24.
393. See Heymann, supra note 92, at 12-13 (noting recent episodes of excessive measures unduly interfering with world traffic).
395. See supra note 262 and accompanying text (discussing how a breakdown in surveillance produces excessive reactions in other states).
396. WHO Deputy Director Dorolle observed in 1968 that "with regard both to notification and to maximum permissible measures the regulations are very often a dead letter." Dorolle, supra note 109, at 105.
that could have been or could be used to improve the member states' performance under the IHR. The WHO Constitution does not provide for any sanction against a member state that fails to comply with a binding regulation enacted under Article 21. Similarly, nothing in the IHR gives any international organization enforcement powers in connection with the duties created in the IHR. The regulations do set up a dispute settlement procedure that could be used to draw attention to the lack of notifications or the use of excessive measures. This procedure has been used very seldomly.

WHO's decision to issue nonbinding recommendations rather than enforceable legal rules has made the organization's lack of formal enforcement powers less significant. The reluctance WHO has exhibited toward using international law means, however, that "many legally binding Regulations tend to be treated in practice almost as recommendations." In the IHR context, for example, the lack of enforcement powers and the preference for WHO to operate through nonbinding recommendations and persuasion have seriously undermined the authority of the regulations. Without formal enforcement powers, however, WHO may have no alternative to this nonlegal approach. Some experts have rejected proposals to endow WHO with greater power as incompatible with the public health context in which WHO administers the IHR. A former WHO Legal Counsel called the use of binding provisions in international health law "unrealistic" because binding regulations "cannot be adopted quickly enough to meet the health re-

397. One commentator asked, "[I]s there much sense in the maintenance of rules if they are not observed—if they are disregarded or more or less systematically broken—without any consequences for those who deviate?" Velimirovic, supra note 374, at 481.

398. See Sharp, supra note 207, at 526-27. The only sanction power in the WHO Constitution resides in the World Health Assembly, which may suspend the voting privileges and services to a member state that fails to meet its financial obligations to WHO. WHO Const. art. 7.

399. See Heymann, supra note 92, at 12 (stating that no international body has the mandate to enforce IHR reporting).

400. See Int'l Health Reg., supra note 89, art. 93, at 41.

401. See Roelsgaard, supra note 340, at 266 (noting the procedure was used once between 1954 and 1974). The author could find no reference to, or record of, the use of the dispute settlement procedure since 1974.

402. Leive, supra note 387, at 46 (discussing the status of WHO resolutions in international law).
quirements of the moment." He observed that WHO has effectively fought AIDS through nonbinding recommendations rather than binding AIDS regulations through the IHR or otherwise under Article 21 of the WHO Constitution.

This assessment also suggests that the sovereignty concerns of member states often force WHO to work through non-binding advice. This question of whether public health authorities should coerce through law or persuade through education arises at every level of public health policy: local, national, and international. WHO apparently has long believed that persuasion is more productive than legal coercion. Given the general lack of enforcement mechanisms throughout international law, WHO's choice to persuade rather than compel does not seem naive. In truth, however, WHO's persuasive efforts with member states have failed, and future prospects for improved binding international law or expert guidance and persuasion do not gleam brightly on the horizon.

5. Epidemiology as the Answer

Analyses of the IHR done in the late 1960s and early 1970s by WHO officials share many important conclusions with the fundamental elements of the current grand strategy to deal with EIDs. In both cases, the experts have recognized that the presence of adequate systems of public health to detect, identify, control, and prevent infectious diseases in every country is vital to controlling the spread of infectious diseases internationally. The notion that improved national public health

403. Vignes, supra note 338, at 18 (analyzing the future of international health law).
404. See id.
405. See O'Brien, supra note 86, at 25 (noting that disease prevention strategies cannot rely on legal coercion alone but must include cooperation and voluntary compliance).
406. See Fidler, supra note 8, at 80 (noting problem of lack of effective enforcement of international law).
407. See DELON, supra note 90, at 7 (arguing that "only an increase in the efficiency of national systems of epidemiological surveillance and prevention" can achieve maximum security with minimum interference); Dorolle, supra note 109, at 111 (arguing that the "only solution is a system of detection and surveillance at the source . . . in the countries where the diseases that constitute a threat are endemic"); Gutteridge, supra note 117, at 13-14 (commenting in 1983 that there is "no escape" from the conclusion that WHO's health objectives depend on the creation and maintenance of proper public health systems at the local and national levels); Roelsgaard, supra note 340, at 268 (arguing that "strengthening the national surveillance of communicable dis-
capabilities provide the best answer to the international spread of disease actually pre-dates the WHO analyses of the late 1960s and early 1970s.\textsuperscript{408} Despite a history of calls for reform, the International Sanitary Regulations did not address the need for "sound epidemiological services with reliable disease surveillance" in WHO member states\textsuperscript{409} and successive amendments producing the IHR have not done so either. The director of WHO's health legislation program has argued that improving national public health infrastructures, identified for years as the best path to infectious disease control, "is a solution which cannot be obtained by an international instrument but only by the improvement of the health conditions of the peoples of WHO's member states."\textsuperscript{410} Under this view, international law has little to offer in fashioning a strategy for the essentially domestic challenge of EIDs.

The forces of globalization, however, have blurred traditional distinctions between domestic and international health. The challenge of improving national public health systems now clearly belongs in the realm of international law because health conditions in one country can have a significant impact on health throughout the world. Public health experts have recognized for decades that, without financial assistance from developed states, poverty in developing countries will keep a final solution to the international spread of disease beyond reach.\textsuperscript{411} All factors indicate that any serious strategy for infectious disease control must include an agreement between

\textsuperscript{408} Public health experts advocated a strategy of developing national public health systems immediately after the adoption of the International Sanitary Regulations in 1951, \textit{see} Roelsgaard, \textit{supra} note 340, at 268, after World War I, and as early as 1866. \textit{See} Nelson, \textit{supra} note 394, at 233-34 (citing views from after World War I and in 1866).

\textsuperscript{409} Fluss, \textit{supra} note 318, at 15.

\textsuperscript{410} \textit{Id}.

\textsuperscript{411} \textit{See} Dorolle, \textit{supra} note 109, at 111 (commenting in 1968 that with underdeveloped states "there is no hope that, with their limited means, they can in the foreseeable future afford an efficient epidemiological service"); Roelsgaard, \textit{supra} note 340, at 267 (commenting in 1974 that international cholera control "requires a massive financial investment in relatively poor countries").
developed and developing states consummated through international law. As mentioned earlier, the grand strategy conspicuously avoids this thorny issue, but the proposed WHO revision of the IHR offers another opportunity to grasp the nettle.

V. AMENDING THE INTERNATIONAL HEALTH REGULATIONS: AN ANALYSIS OF WHO'S PROPOSED REVISION

In December 1995, WHO held the Informal Consultation to Review the International Response to Epidemics and Application of the International Health Regulations (Informal Consultation). WHO convened the Informal Consultation in response to the World Health Assembly's call for a revision of the IHR. According to the Director of EMC, the findings of the Informal Consultation will serve as the basis for the revision of the IHR. The Informal Consultation recommended that the revised IHR continue to promote maximum security against the international spread of diseases with minimum interference with world traffic and trade. The Informal Consultation concluded that the IHR "have served an invaluable purpose" and "continue to serve the principles under which they were conceived." These conclusions ring hollow, though, in light of the failure of the IHR to uphold either the maximum security or minimum interference principle analyzed above.

A. RECOMMENDATIONS AFFECTING THE MAXIMUM SECURITY PRINCIPLE

1. Syndrome Reporting

The Informal Consultation offers several recommendations that address the principle of maximum security against the international spread of disease. Several of these recommenda-
tions concern the IHR's surveillance system. First, "[t]he current practice of immediate reporting of only three specified diseases should be replaced by the immediate reporting to WHO" of "defined syndromes corresponding to the occurrence of diseases of urgent international importance." This recommendation responds directly to the criticism that the IHR do not address many infectious diseases with the potential for international spread.

Rather than increasing the number of diseases subject to the IHR, the Informal Consultation recommends a two-stage reporting procedure: immediate reporting of disease syndromes, followed by disease-specific reporting once the disease is identified. Requiring the reporting of syndromes would trigger earlier notification of disease-related events, allowing WHO and the national health authority to combine their resources to pin down the infectious agent causing the syndromes. Syndrome notification would thus facilitate greater cooperation between WHO and other member states on infectious disease surveillance. In addition, WHO experts might dissuade member states from taking excessive and irrational action in response to early reports of syndrome and disease information. Syndrome reporting might also encourage needed collaboration between other national and international authorities.

Syndrome reporting would also allow the revised IHR to include new diseases within its scope, unlike the rigid, disease-specific approach of the current IHR. The revised requirements could potentially catch novel pathogens, keeping the IHR relevant as the microbial world evolves and surprises. In addition, the detection and reporting of syndromes places less of a burden on the public health capabilities of developing countries than the current requirement to identify specific diseases. Syndrome reporting eliminates the futility of asking that developing states have the expertise and technology to identify a long list of infectious diseases with risks of international spread.

Syndrome reporting obligations might not, however, contribute to an improvement in the IHR's surveillance capabilities. First, member states have no greater incentive to notify

420. See id.
421. See id. at 8.
WHO of syndromes than of specific diseases as long as the revised IHR do not take a harder line on excessive measures. Second, confusion might arise in reporting syndromes. Member states may not know exactly what diseases the syndromes represent, potentially encouraging WHO member states to enact excessive measures. Third, the Informal Consultation did not indicate how developing states would develop the capabilities to identify and notify disease syndromes in a timely manner. Even if syndrome reporting requires less epidemiological prowess, many developing states have "extremely scarce" health resources. The Informal Consultation recommends expanding notification responsibilities under the IHR without confronting the fundamental financial dilemma. Inadequate syndrome reporting might fuel excessive measures by other member states, which will likely discourage syndrome reporting, and history will have repeated itself.

2. Greater Information Flows

Another set of recommendations designed to support the maximum security principle involves increasing the flow of information to and from WHO. The Informal Consultation recommends that the IHR allow notification and reporting by any national authority, not just the public health administration. The Informal Consultation also recommends a revision of Article 3(1) of the IHR to encourage the notification of imported and transferred disease cases.

These proposals, however, will likely have little impact. Expressly including all parts of the government of a member state in the notification duties is cosmetic rather than substantive; it is doubtful whether the reporting problem rests with an obstructionist health administration silencing other parts of the government from communicating with WHO. Decisions not to report are probably made at very high levels, thus applying to all parts of the government.

422. See CISET REP., supra note 28, at 43 (comparing public health infrastructures in developing countries).
424. See id. The Informal Consultation did, however, recommend eliminating the weekly and annual notification requirements now found in Articles 9 and 13 of the IHR, respectively. See id. at 10. The Informal Consultation offered no explanation for these recommendations, but presumably it believed that such periodic notifications yield little benefit for a global surveillance system.
Removing the restriction in Article 3(1) that exempts imported and transferred cases from disease notification merely collapses Article 3(1) with Article 3(2), which requires the reporting of imported and transferred cases.\footnote{425} Revising Article 3(1) would provide the limited benefit of requiring member states to notify WHO of cases imported or transferred into indigenously infected areas.\footnote{426} This technical gap, however, does not cause the significant problems besetting the IHR.

The Informal Consultation also proposes increasing the flow of information from WHO to member states and to other audiences. The recommendations would allow WHO to disseminate information obtained from member states and other WHO surveillance sources, as well as from agencies and nongovernmental organizations,\footnote{427} in order to make the widest possible stream of epidemiological information available to member states. A closer reading of this recommendation suggests that WHO will be able to provide information on disease outbreaks to member states even if the affected member state has refused to notify.

The Informal Consultation relies on the perceived power of modern telecommunications technology to support its position that, “in this age of wide media coverage, nothing can be hidden.”\footnote{428} Such a position encourages WHO to undermine the sovereign prerogative to notify by utilizing global communications to bypass national reporting decisions. The Informal Consultation proposal advocates that the concept of “national” epidemiological information has no place in today's world.

Yet member states may well become very uncomfortable with such a radical expansion of WHO’s ability to notify member states about epidemiological events. At the very least, WHO will need to set forth guidelines as to what other sources

\footnote{425} See INT'L HEALTH REG., supra note 89, art. 3(2), at 11. 
\footnote{426} Article 3(1) requires notification of nonimported and nontransferred cases. See id. art. 3(1), at 10-11. Article 3(2)(a) requires notification of cases imported or transferred into a noninfected area. See id. art. 3(2)(a), at 11. Neither provision regulates the notification of cases imported or transferred into infected areas. The Informal Consultation's recommendation on Article 3(1) would close this gap. 
\footnote{427} See Report of a WHO Informal Consultation, supra note 121, at 9-10, 15. Currently, WHO can disseminate information received only from member states. See INT'L HEALTH REG., supra note 89, art. 11(1), at 14 (permitting WHO to pass along only that information obtained through its surveillance program). 
\footnote{428} Report of a WHO Informal Consultation, supra note 121, at 10.
offer authoritative, and thus notifiable, information under revised IHR. Drafting such guidelines could be far more than a technical challenge as some member states will be anxious to limit the information stream to WHO for fear of reactions from other states. A limited list of authoritative sources might, however, prompt restrictive actions by states because they will have access to information from other sources about disease outbreaks regardless of whether WHO notifies them. Finding the right balance in such guidelines might prove controversial. The worst possible reaction would be for member states to reduce the opportunities for nongovernmental organizations to provide health services for fear that they will report information to WHO. Public health in these states would suffer, and other states would be tempted to overreact to disease information about such member states, thereby jeopardizing the fundamental purpose of the revised IHR.

The Informal Consultation recommends that WHO continue to publish information on diseases at periodic intervals but that such publication be optional so that WHO publishes “data on infected areas when this is epidemiologically relevant to the international transmission of disease.” This recommendation gives WHO discretion to disseminate information, and it does not affect a member state’s legal duty to report. The proposal fails to advance the principle of maximum security, however, because it removes the requirement to publish. It leaves open the possibility that politics and bureaucratic battles rather than epidemiology will determine whether information relates to the international transmission of disease.

Finally, the goal of increasing the flow of epidemiological information from WHO to member states does not address the reality that many member states do not have a public health system that can make effective use of such epidemiological information. No amount of timely information will aid a member state that has neither adequate facilities nor personnel to use it. Here again, the condition of public health systems in the developing world limits the effectiveness of an overarching international strategy.

3. Application and Education

The Informal Consultation also attempts to bolster the maximum security principle by proposing that WHO educate

429. Id. at 14.
member states on the application of the revised IHR. The Informal Consultation recommends integrating the revised IHR with all disease prevention, control, and research activities at the national, regional, and global levels. Unfortunately, it offers no specifics as to how to achieve this integration, nor does it suggest that the revised IHR should mandate such integration. Presumably the Informal Consultation seeks to prevent the revised IHR from becoming essentially irrelevant to infectious disease control and prevention activities around the world as had the current IHR. The efficacy of integrating the revised IHR will depend, however, on whether member states have anything in which to integrate it—the public health infrastructure dilemma again.

The Informal Consultation proposes a number of educational measures. First, it recommends that WHO provide member states with guidelines for management of infectious diseases spread through international traffic. Member states would find such guidelines particularly important when faced with an unusual or unanticipated infectious disease threat. Guidelines on handling internationally transmitted diseases might help member states take epidemiologically effective steps to prevent and control disease outbreaks. Without adequate facilities and personnel, though, member states cannot implement and maintain epidemiologically-effective guidelines.

The Informal Consultation also recommends that WHO issue a “practical handbook” with the revised IHR “to facilitate the appreciation and use of the IHR.” On the one hand, a practical handbook might help member states adjust to a new set of rules, thus easing a potentially difficult transition. On the other hand, the problems that beset the current IHR have little to do with member states not understanding them. After all, WHO published a Practical Guide to the IHR in 1975 without demonstrable improvement in their application. The prac-

430. See id.
431. See id.
432. See id.
433. Id.
434. See H.S. Gear & Z. Deutschman, Disease Control and International Travel: A Review of the International Sanitary Regulations, 10 CHRON. OF THE WHO 273, 326-28 (1956) (describing some of the difficulties member states had adjusting to the International Sanitary Regulations during their first four years of application).
tical handbook proposal assumes the existence of a public health audience that can effectively use the handbook, an assumption simply not credible given the condition of public health systems around the world.

4. Health Organization Requirements

The Informal Consultation recommends removing many of the provisions laying down requirements for health organization and capabilities at ports and airports from the IHR and replacing them with references to other international agreements that have the same or similar requirements.\(^{435}\) This change presumably seeks to avoid redundancy in member states’ international legal obligations. It suggests retaining only those provisions regarding health care services for managing arriving sick persons and those regarding equipment necessary for disinfection, disinsection, and control of animal-borne diseases.\(^{436}\)

The recommendation to rely on other international agreements is questionable because these other agreements may have objectives beyond, or even in opposition to, the maximum security principle of the IHR. If the full set of health organization requirements currently in the IHR still further the maximum security principle, then the IHR should retain them in full as binding obligations, regardless of whether international agreements also have similar requirements. Moreover, the practice of states under other international agreements concerning such requirements might not have the control of infectious diseases as the top priority, making such practice less than helpful to the maximum security principle. The maximum security principle should not be weakened merely to reduce the number of provisions in the IHR.

B. RECOMMENDATIONS AFFECTING THE MINIMUM INTERFERENCE PRINCIPLE

The Informal Consultation also made recommendations to strengthen the principle of minimum interference with world traffic. The change to syndrome reporting, as the Informal Consultation points out, would significantly affect many aspects of the current IHR that seek to limit interference with international travel and trade. As a result, those parts of the

\(^{435}\) See Report of a WHO Informal Consultation, supra note 121, at 10.

\(^{436}\) See id.
An immediate question arises as to whether syndrome reporting complicates the achievement of minimum interference with world traffic. Presumably, the revised IHR will authorize member states to take specified actions in connection with a large number of syndromes. Perhaps more interference is inevitable given the EID threat. To minimize interference under current circumstances, the revised IHR will need to confront directly the tendency of member states to take excessive measures when disease outbreaks occur in other states. The Informal Consultation's report contains a number of recommendations addressing the problem of excessive measures.

1. Defining "Excessive Measures"

The Informal Consultation recommends including in the revised IHR "descriptions of inappropriate or unnecessary interventions, with clear indications why these actions are not required." Such descriptions of excessive measures may not represent a substantive change from the current situation. The footnote to Article 8 of the current IHR states that WHO already has the authority to publish measures it finds excessive. Moreover, the frequency of the application of excessive measures by member states does not seem driven by a lack of understanding about what the IHR authorizes. Including descriptions of excessive measures in the revised IHR might deter resort to such measures, but this recommendation really offers a technical rather than substantive solution, because member states apparently understand the definition of excessive measure under the current IHR.

2. Limitations on Member States

The Informal Consultation makes some recommendations that seek to reinforce limitations on member states in taking actions beyond those authorized by the IHR. First, it recom-
mends deleting Article 28, which allows member states to take measures in excess of those permitted by the IHR in situations of grave danger to public health.\textsuperscript{440} The deletion of Article 28 would bolster Article 23’s mandate that the measures permitted by the IHR are the maximum measures that can be applied.\textsuperscript{441} Anticipating that deleting the Article 28 escape clause might prove too controversial with member states, the Informal Consultation advises that, if retained, Article 28 should include a clear definition of what constitutes “grave danger.”\textsuperscript{442}

In theory, the removal of Article 28 would represent a radical revision of the IHR, because it would eliminate the flexibility Article 28 gave to the exercise of sovereignty in taking health measures against the international spread of infectious diseases. In practice, however, neither deleting Article 28 nor clearly defining “grave danger” would have a radical impact because WHO has long interpreted “grave danger” restrictively with little effect on member states.\textsuperscript{443} The lack of sanctions in the IHR, and the absence of any recommendations from the Informal Consultation on enforcement, make violating the current Article 23 or a reinforced Article 23 painless for a member state of WHO. Member states would likely continue to view a revised Article 23 as a recommendation rather than a legally-binding requirement.

The Informal Consultation also proposes that the revised IHR restrict the application of measures on departing individuals “to those persons who are clearly ill and who present one or more of the symptoms or syndromes that will be adopted in the modified Regulations.”\textsuperscript{444} This recommendation reduces the discretion now available to national health authorities to take health measures on departure under Article 30. From the perspective of the maximum security principle, reducing the discretion in Article 30 might seem dubious because extra measures on departure might help prevent and control international disease spread. Retaining Article 30’s allowance for discretion would serve the epidemiological preference for stopping diseases at their source. Member states are unlikely to

\textsuperscript{440} See Report of a WHO Informal Consultation, supra note 121, at 11.
\textsuperscript{441} See id.
\textsuperscript{442} See id.
\textsuperscript{443} See DELON, supra note 90, at 13 (noting in 1975 that WHO’s Committee on International Surveillance of Communicable Diseases “has always given a very restrictive interpretation” to Article 28).
\textsuperscript{444} Report of a WHO Informal Consultation, supra note 121, at 11.
abuse this discretion because international travel and trade by
their nationals produce economic benefits for their countries,
therefore providing incentives to keep departure measures
minimal. The Informal Consultation's proposal, therefore, does
not significantly alter the standard for departure measures be-
cause of the existing economic incentives to keep such meas-
ures to a minimum. Thus, the proposal contributes little to the
minimum interference principle while removing discretion that
might in certain circumstances work in favor of the maximum
security principle.

The Informal Consultation additionally recommends
making Article 34, which limits the application of health
measures to passengers and carriers in transit, "more positive
in order that health administrations be made responsible for
extending health services to passengers in transit, sometimes
for long periods." Apparently, the Informal Consultation be-
lieves the duties of member states under the current IHR to
care for passengers in transit who manifest symptoms of infec-
tious diseases are inadequate. Requiring member states to
provide health care to infected passengers would serve as a
prudent epidemiological control and prevention measure. This
proposal ignores, however, three problems: (1) many member
states could not provide the required adequate care; (2) many
passengers might resist compelled treatment in some public
health care systems as more dangerous than completing the
journey or returning home immediately; and (3) member states
might oppose the inclusion of such explicitly positive obliga-
tions in the revised IHR because of the costs they might have
to bear to fulfill them.

Finally, the Informal Consultation recommends reinforc-
ing Article 81, which prohibits member states from requiring
any health document in international traffic beyond those
provided for in the IHR. The AIDS crisis saw many member
states openly violate Article 81 by requiring AIDS-free certifi-
cates or similar health documents; Article 81 thus plays an im-
portant role in support of the minimum interference principle.
The Informal Consultation does not, however, say how Article

445. Id. This recommendation suggests that the revised IHR should im-
pose affirmative duties on member states to provide health services to pas-
sengers in transit.

446. See id. at 12.

447. See INT'L HEALTH REG., supra note 89, art. 81, at 35 (preventing
member states from exceeding the documentation provisions of the IHR).

3. More Power for WHO

In one of the more radical proposals relating to the minimum interference principle, the Informal Consultation recommends additional power for WHO. The Informal Consultation urges that the revised IHR include a graduated series of health responses for member states to follow that would be proportionate to the assessed risk posed by the syndrome or disease in question.\textsuperscript{448} This series would take the form of a response ladder with five rungs, starting at Grade 0 and culminating at Grade 4.\textsuperscript{449} A Grade 0 event involves no risk of international transmission of disease,\textsuperscript{450} while a Grade 4 event presents risks "of such global health importance that severe measures, including modifications to international travel, may be considered."\textsuperscript{451} The Informal Consultation further recommends that WHO have the power to prohibit member states from applying health measures in response to Grade 3 or 4 events "until such measures are approved by a specific expert group convened at extremely short notice under the auspices of WHO."\textsuperscript{452}

This proposal to give WHO veto power over national health measures to be enacted in response to the most serious disease outbreak events is the most radical suggestion of the entire Informal Consultation report. It is a bold attempt to deal with the recurrent problem of member states taking excessive actions in response to serious disease outbreaks. The fact that the Informal Consultation would even consider such a dramatic change in the IHR is evidence of how seriously excessive measures by member states have undermined the IHR. The veto power suggestion also contains a realistic outlook in ex-

\textsuperscript{448} See Report of a WHO Informal Consultation, supra note 121, at 10.
\textsuperscript{449} See id.
\textsuperscript{450} See id. (describing a Grade 0 event as "an event of significance for public health practices which requires immediate action by other health administrations").
\textsuperscript{451} Id. at 10-11.
\textsuperscript{452} Id. at 11.
pecting member states to continue to overreact in the future. The proposal is at odds with WHO's historical ethos and approach to the IHR that has stressed moral persuasion over legal coercion. The recommendation to subject acts of member states to a procedure approximating review by a supranational body is perhaps unprecedented in WHO's existence.

The radical nature of this recommendation is also its greatest liability because member states will certainly eye with skepticism such a limitation on sovereignty. Even if member states agreed to the restriction, the proposal has no enforcement procedures or sanctions if a member state decides to ignore the decision of the WHO expert group. Nothing in WHO's history suggests that it is prepared to go head-to-head with recalcitrant member states.453

C. SUMMARY OF THE INFORMAL CONSULTATION'S REPORT

The recommendations of the Informal Consultation as a whole do not promise to invigorate the IHR substantially. Many of the proposals, such as the move from reporting only three diseases to a wider range of disease syndromes, are needed, but do not address the underlying problem that public health infrastructures in most member states are not equipped to undertake expanded responsibilities. Some Informal Consultation recommendations contain radical changes, like the ability of WHO to use global telecommunications to inform member states of epidemiological events, and the proposal to give WHO veto power of certain national health measures. These proposals will be controversial, and may force a compromised, watered-down version in a revised set of IHR. Quite a few of the proposals represent only cosmetic or technical changes, such as the recommendations to describe excessive

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453. A second occasion where the Informal Consultation recommends giving WHO more power appears in its discussion of revising Article 36, which addresses medical examinations on arrival. The Informal Consultation recommends that medical assessments of arriving passengers be conducted according to procedures approved by WHO. See id. at 11. Again, this recommendation suggests that the Informal Consultation seek to subject the authority of member states to binding procedures for certain health measures. The radical potential of this recommendation is lessened, however, when the Informal Consultation adds that medical assessment procedures for arriving passengers should be available as guidelines rather than binding rules. See id. This attitude is more consistent with the traditional ethos of WHO than the veto power recommendation, and thus offers as much hope as can be derived from the history of member states heeding the advice of WHO and its experts.
measures and define "grave danger" more clearly. Finally, some of the recommendations represent little more than reheated old ideas, like the "practical handbook" suggestion, or contain no specifics to indicate how a change can be made, as with the absence of details on how to reinforce Article 81.

Readers should not view the critical analysis of the work of the Informal Consultation presented in this Part V as a disparagement of the efforts of WHO experts. Rather, the analysis points to the difficulty WHO faces in trying to devise an international legal strategy for the EID problem. Reconciling the dynamics of the international system, the epidemiological and scientific requirements for infectious disease control and prevention, the need for a balance between binding rules and persuasion in public health endeavors, and the challenges amassed by the myriad causes behind EIDs is a most daunting task.

Likewise, in this critical analysis of the Informal Consultation's work, readers should not lose sight of the fact that such work addresses only the IHR, which forms only part of a larger grand strategy for addressing the EID threat. An analysis of recommendations to revise the IHR represents only a small portion of the entire challenge to international law posed by EIDs. The many difficulties to confront in revising the IHR may be minuscule compared to figuring out how to use international law to address civil war, environmental degradation, urbanization, poverty, and the deterioration of public health infrastructures—some of the best allies of pestilence.

VI. BRIEF SKETCH OF AN ALTERNATIVE INTERNATIONAL LEGAL STRATEGY

An international legal strategy composed only of limited amendments to the IHR will not produce long-run progress in the struggle against infectious diseases. Revising the IHR should be accompanied by an effort to initiate global cooperation in rebuilding national public health systems, which remain the best weapon in the fight against infectious disease. The Informal Consultation's recommendations for amending the IHR do not address reconstruction of public health infra-

454. See Fidler, supra note 8, at 83 (arguing that "[r]elying on the International Health Regulations as the centerpiece of international law on emerging-disease control may not be the most effective international legal strategy").
structures, but such an objective forms a fundamental part of the grand strategy contained in the international EID plans. This Article briefly sketches an alternative international legal strategy to mere revision of the IHR in order to stimulate more thought about the international legal aspect of the overall strategy designed to deal with EIDs.\footnote{455}

WHO member states should adopt a framework treaty on international control and prevention of infectious diseases under the authority in Article 19 of the WHO Constitution.\footnote{456} Such a treaty could (1) lay out the objective of achieving the prevention and control of infectious diseases that pose risks of spreading internationally; (2) set forth the principles that would guide states in achieving the treaty’s objective; and (3) establish commitments for states to undertake that will gradually bring the objective closer to fulfillment. An infectious disease framework treaty would, thus, resemble framework treaties used in connection with environmental protection.\footnote{457}

An important element of an infectious diseases framework treaty would be commitments by party states to improve their national public health systems. Given the financial problems confronting many developing states, the framework treaty should include a financial mechanism through which developed states and WHO will provide funding for public health system improvements in the developing world. Precedents for such a financial mechanism also exist in treaties on environmental protection.\footnote{458}

\footnote{455. See id. at 81 (highlighting “the importance of thinking through the international legal aspects of a global emerging disease plan carefully”).}


\footnote{458. See, e.g., United Nations Framework Convention on Climate Change, supra note 457, art. 11, at 864-65 (establishing a means of granting financial assistance to countries implementing projects in conformity with the Convention); Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1550, 1557 [hereinafter Montreal Protocol] (Article 10, as amended by the London Amendments to the Montreal Protocol in 1990 (UNEP/Oz.L.Pro.2/3 (Annex II)), providing technical assistance for developing countries implementing the Protocol).}
The framework treaty should make funding available to developing states after they have satisfied conditions, such as WHO approval of proposed improvements to public health capabilities and full implementation of the revised IHR. This provision would link improvements in national public health systems to the harmonization of infectious disease prevention and control regulations through revised IHR. The revised IHR would, thus, function as a mandatory side agreement to the framework treaty. Parties to the framework treaty would risk losing financial benefits if they fail to notify disease events as required or take excessive measures in response to a disease outbreak. Cutting off such funds might provide a measure of enforcement for the revised IHR. It may also be effective to make financial benefits under the framework treaty conditional upon recipient nations implementing WHO recommendations and guidelines on infectious disease control and prevention. As a result, WHO could continue to respond flexibly to public health issues through nonbinding recommendations and guidelines; the link to the framework treaty might ensure more widespread adoption of WHO's advice.

An additional feature of the framework treaty should be the opportunity for states to adopt protocols that address existing or new diseases (e.g., tuberculosis, malaria, or dengue) or functional areas (e.g., antimicrobial resistance, epidemiological training, or epidemiological telecommunications systems). An obvious subject for a protocol is detailed principles and commitments on improving national public health systems. Such a protocol would function as well as a mandatory side agreement because of a requirement to adopt it as a condition of funding under the financial mechanism of the framework treaty. Further, WHO, through its Article 19 power, could be the source of on-going development of the international infectious disease legal regime through protocol adoption. To the extent that a protocol tapped into the financial mechanism of the framework treaty, the conditions for funding would remain the same, unless the context required otherwise.

459. Some environmental protection treaties create opportunities for the later adoption of protocols. See, e.g., Vienna Convention for the Protection of the Ozone Layer, supra note 457, art. 2, at 1529-30 (encouraging cooperation for the adoption of international protocols to protect the ozone layer); Montreal Protocol, supra note 458, at 1550 (adopting the Protocol as Parties to the Vienna Convention); United Nations Framework Convention on Climate Change, supra note 457, art. 17, at 869 (allowing Parties to the Conference to adopt protocols).
The framework treaty should also give WHO authority to monitor the implementation of the treaty, revised IHR, and protocols by each state party and to publish the results of its watch-dog activities. The monitoring power should include periodic audits of state performance as well as the authority to investigate individual episodes of problematic state behavior. Such authority would likely enhance state compliance with the treaty, revised IHR, protocols, and recommendations and guidelines.\textsuperscript{460}

The alternative international legal strategy briefly sketched above attempts to confront directly the major problems of national public health infrastructure reconstruction, lack of financial resources in developing countries for such reconstruction, the need for revised IHR, the need to have better implementation of the IHR and WHO recommendations, the need to balance WHO’s work binding rules and flexibility for persuasion and timely expert guidance, with the need for the entire infectious disease control effort to be integrated and evolutionary. It is more forthright and ambitious than the Informal Consultation’s work on revising the IHR and thus more closely reflects the scope of the grand strategy taking shape on infectious diseases. In addition, rather than remaining within the traditional confines of international law on infectious disease control, this alternative strategy looks at precedent from other areas of international law, namely environmental protection, where similar needs for domestic reform, financial support for developing nations, and global cooperation exist.\textsuperscript{461}

The proposal outlined above would certainly face substantial criticisms. Requiring developed states to provide financial resources for the financial mechanism may be politically impossible to achieve. Requiring developing states to take financial aid through the financial mechanism with many strings attached may be politically unacceptable as well. Further, the enforcement powers in the proposal principally affect developing nations, leaving developed nations to enact excessive measures against a developing country suffering a serious dis-

\textsuperscript{460} See, e.g., Allyn L. Taylor, Controlling the Global Spread of Infectious Diseases: Toward a Reinforced Role for the International Health Regulations, 32 HOUSTON L. REV. (forthcoming 1997) (advocating the inclusion in the revised IHR of an effective supervisory institution to promote national compliance).

\textsuperscript{461} See Fidler, supra note 8, at 83 (discussing the relevance of efforts in international environmental law to international legal efforts in connection with the EID threat).
ease outbreak with impunity. The alternative strategy requires WHO to play a more active role monitoring implementation of binding rules and nonbinding recommendations—a requirement that WHO may be unwilling or unable to undertake. Finally, the ambition in the strategy—one of its strengths—may also be a great weakness because it advocates the negotiation and adoption of a framework treaty, revised IHR, and protocols, all of which would involve tremendous efforts by WHO and its member states and face all the tensions that accompany great multilateral legal endeavors.462

In short, this proposal may be realistic in addressing the key problems and innovative in its use of international legal methods but unrealistic from a political perspective.463 Nevertheless, it will hopefully invigorate discourse and deliberation on the international legal aspects of the growing efforts to construct global plans to deal with EIDs. It builds on the useful work of the Informal Consultation and invites the scrutiny and creativity of international public health and legal experts.

CONCLUSION

In less than three decades, scientific, medical, public health, and political authorities around the world have gone from proclaiming victory over infectious diseases to a full-scale retreat in the face of EIDs. This Article has analyzed the growth of the awareness of the EID problem as well as the sobering list of factors behind EIDs. It has examined why EIDs constitute a major problem for international relations and how public health authorities and political leaders are devising strategies to deal with the global crisis. Finally, this Article has looked at the role international law has played and might play in the global effort to turn the current retreat into a future counter-attack.

Permeating attitudes towards the global EID crisis is a tension between the realization that the crisis represents a horrible collection of forces causing great misery, and the de-

462. See Bruce Jay Plotkin, Mission Possible: The Future of the International Health Regulations, 10 Temp. Int'l & Comp. L.J. 503, 515 (criticizing my framework-protocol alternative as unrealistic because of the time it would take to negotiate it).

463. See, e.g., David P. Fidler, Mission Impossible? International Law and Infectious Diseases, 10 Temp. Int'l & Comp. L.J. 493, 499-501 (arguing that a radical revision of the IHR may not be feasible because political circumstances militate against it).
termination to do something in the face of such a challenge. This tension echoes Stanley Hoffmann’s description of the “stateman’s difficulty”: he or she must be realistic about, and act according to, the real nature of international relations but not lose sight of the possibility for a better world.464 The magnitude of the EID problem shatters all illusions that humankind will ever be able to declare victory over infectious diseases again. This struggle is perpetual. This conclusion heightens the determination to do something about the return of the fourth horseman of the apocalypse. Acting on this determination forces us to confront the limitations of society and human institutions, such as the decentralized and anarchic nature of international relations. There is dark irony, too, in that many of the best allies of pestilence arise from a lack of determination to confront poverty, urbanization, environmental degradation, the collapse of public health systems, and other man-made causes of infectious diseases. Perhaps this irony reveals the tragic flaw in the human protagonist in the infectious disease drama.

History demonstrates that the phenomena contributing to EIDs will continue, to steal a phrase from Camus, to rouse up their infectious agents and send them forth to kill in a happy city.465 Neither the grand strategy nor various international legal strategies offer any prospect of breaking or even challenging the root causes of infectious diseases and their global spread. EIDs may, as a result, become for the physician, public health official, political leader, and international lawyer what the plague in Oren was for Dr. Rieux: “a never ending defeat.”466 Perhaps those who do battle with infectious diseases now and in the future can find strength in Dr. Rieux’s example: in his suffering the “never ending defeat” with stamina, skill, and compassion, the potential for humanity’s integrity and decency are revealed. The challenges posed by the emergence and reemergence of infectious diseases will require the constant reaffirmation of such potential.


465. See ALBERT CAMUS, THE PLAGUE 278 (Stuart Gilbert trans., 1948) (“[Dr. Rieux knew] that the plague bacillus never dies or disappears for good . . . and that perhaps the day [will] come when . . . it would rouse up its rats again and send them forth to die in a happy city.”).

466. Id. at 118.