

Two Regimes of Global Health

The movement for global health is an increasingly prominent rationale for action across a range of organizations, including philanthropic foundations, development agencies, and biomedical research institutes. Despite the appearance of a shared moral and technical project, however, global health is not a unified field. Even for many of the actors centrally involved in the movement, it is not clear precisely what the term entails and how global health projects should be distinguished from already established national and international public health efforts.¹ Indeed, different projects of global health imply starkly different understandings of the most salient threats facing global populations, of the relevant groups whose health should be protected, and of the appropriate justification for health interventions that transgress national sovereignty.

In what follows I describe two contemporary regimes for envisioning and intervening in the field of global health: *global health security* and *humanitarian biomedicine*. Each of these regimes combines normative and technical elements to provide a rationale for managing infectious disease on a global scale. They each envision a form of social life that requires the fulfillment of an innovative technological project. However, the two regimes rest on very different visions of both the social order that is at stake in global health and the most appropriate technical means of achieving it. While these two regimes by no means exhaust the expansive field of global health, their juxtaposition usefully highlights some of the tensions inherent in many contemporary global health initiatives.

Global health security focuses on “emerging infectious diseases”—whether naturally occurring or man-made—which are seen to threaten wealthy countries, and which typically (though not always) emanate from Asia, sub-Saharan Africa, or Latin America. Its exemplary pathogens include weaponized smallpox, SARS, and highly virulent influenza; but what is crucial is that this regime is oriented toward outbreaks that *have not yet occurred*—and may never occur. For this reason, it seeks to implement systems of preparedness for events whose likelihood is incalculable but whose political, economic, and health consequences could be catastrophic. Its ambitious sociotechnical agenda is to create a real-time, global disease surveillance system that can provide “early warning” of potential outbreaks in developing countries and link such early warning to immediate systems of response that will protect against their spread to the rest of the world. To achieve this, global health security initiatives draw together various organizations including multilateral health agencies, national disease control institutes, and collaborative reference laboratories and assemble diverse technical elements such as disease surveillance methods, emergency operations centers, and vaccine distribution systems.

Humanitarian biomedicine, in contrast, targets diseases that currently afflict the poorer nations of the world, such as malaria, tuberculosis, and HIV/AIDS. Its problematic is one of alleviating the suffering of individuals, regardless of national boundaries or social groupings. Such intervention is seen as necessary where public health infrastructure at the nation-state level is in poor condition or nonexistent. Humanitarian biomedicine tends to develop “apolitical” linkages—between nongovernmental organizations, activists, scientific researchers, and local health workers. Its target of intervention is not a collectivity conceived as a national population but rather individual human lives. As a sociotechnical project, this regime seeks to bring advanced diagnostic and pharmaceutical interventions to those in need; this involves both providing access to existing medical technologies and spurring the development of new medications addressed to “neglected diseases”—that is, diseases not currently targeted by the pharmaceutical and biotechnology industries. Whereas global health security develops prophylaxis against potential threats at home, humanitarian biomedicine invests resources to mitigate present suffering in other places.

Each regime is “global” in the sense that it strives to transcend certain limitations posed by the national governance of public health. Within each regime actors work to craft a space of the global that will be a site of knowledge and intervention.² However, the type of ethical relationship implied by a project of global health depends upon the regime in which the question is posed: the connection between health advocates and the afflicted (or potentially afflicted) can be one of either moral obligation to the other or protection against risk to the self. Global health is, in this sense, a contested ethical, political, and technical zone whose contours are still under construction.

Governing Pathogens

A recent case illustrates some of the tensions that can arise at the intersection of these two regimes. In an opinion piece published in the *Washington Post* in August 2008, the diplomat Richard Holbrooke and the science journalist Laurie Garrett mounted a sharp attack on what they called “viral sovereignty.” By this term, the authors referred to the “extremely dangerous” idea that sovereign states could exercise ownership rights over samples of viruses found in their territory. Specifically, Holbrooke and Garrett were incensed by the Indonesian government’s refusal to share samples of H₅N₁ avian influenza with the World Health Organization’s Global Influenza Surveillance Network (GISN). For over fifty years, this network had collected samples of flu viruses from around the world and used these samples to determine the composition of yearly flu vaccines. More recently, the network had tracked the transformations of avian influenza viruses as a means of assessing the risk of a deadly global pandemic.³ International health experts feared that the new strain of H₅N₁, which had already proven highly virulent, would mutate to become easily transmissible among humans—in which case a worldwide calamity could be at hand. GISN thus served as a global early warning system enabling experts to track genetic changes in the virus that could lead to a catastrophic disease event.

As the country where the most human cases of avian influenza had been reported, Indonesia was a potential epicenter of such an outbreak. For this reason, the country’s

decision to withhold samples of the virus undermined GISN's function as a global early warning system. From Holbrooke and Garrett's vantage, Indonesia's action posed a significant threat to global health. "In this age of globalization," they wrote, "failure to make viral samples open-source risks allowing the emergence of a new strain of influenza that could go unnoticed until it is capable of exacting the sort of toll taken by the pandemic that killed tens of millions in 1918." According to Garrett and Holbrooke, Indonesia had not only a moral but also a legal obligation to share its viruses with the World Health Organization. They argued that the country's action was a violation of the newly revised International Health Regulations (IHR), which held the status of an international treaty for WHO member states.

The opinion piece suggested that the rational and beneficent technocracy of the WHO was faced with antiscientific demagoguery that threatened the world's health. Holbrooke and Garrett painted a picture of the Indonesian health minister, Siti Fadilah Supari, as an irrational populist who sought to make domestic political gains through unfounded attacks on the United States and the international health community. Indonesia was apparently withholding these virus samples based on the "dangerous folly" that these materials should be protected through the same legal mechanism that the UN Food and Agriculture Organization used to guarantee poor countries' rights of ownership to indigenous agricultural resources—the Convention on Biological Diversity. Further, Holbrooke and Garrett rebuked Supari's "outlandish claims" that the U.S. government was planning to use Indonesia's H5N1 samples to design biological warfare agents—echoing U.S. secretary of defense Robert Gates's reaction upon hearing this accusation during a visit to Jakarta: "the nuttiest idea I've ever heard."⁴

The controversy over influenza virus-sharing was, it turned out, somewhat more complicated than Holbrooke and Garrett allowed. Beginning in late 2006, at Supari's behest, the Indonesian Health Ministry had stopped sharing isolates of H5N1 found in patients who had died of avian influenza with the Global Influenza Surveillance Network. The source of Supari's ire was the discovery that an Australian pharmaceutical company had developed a patented vaccine for avian flu using an Indonesian strain of the virus—a vaccine that would not be affordable for most Indonesians in the event of a deadly pandemic. More generally, given the limited number of vaccine doses that could be produced in time to manage such a pandemic—estimates were in the 500 million range—experts acknowledged that developing countries would have little access to such a vaccine. In other words, while Indonesia had been delivering virus samples to WHO as part of a collective early warning mechanism (i.e., GISN), its population would not be the beneficiary of the biomedical response apparatus that had been constructed to prepare for a deadly global outbreak. For the Indonesian health minister, this situation indicated a dark "conspiracy between superpower nations and global organizations."

While less suspicious of U.S. and WHO intentions than Supari, a number of Western journalists and scientists were sympathetic to the Indonesian position—on the grounds of equity in the global distribution of necessary medicines. A *Time* magazine article noted that "they had a point; poor developing nations are often priced out of needed medicines, and they're likely to be last in line for vaccine during

a pandemic.”⁵ An editorial in the *Lancet* argued that “to ensure global health security, countries have to protect the wellbeing not only of their own patients but also those of fellow nations.”⁶ Anxious to ensure the functioning of its surveillance apparatus, WHO was willing to strike a bargain: at a World Health Assembly meeting in 2007, members agreed to explore ways of helping poorer countries to build vaccine production capacity. But the financial and technical details of how such a system would function were opaque, and the issue remained unresolved. In October 2008, as Indonesia continued to withhold the vast majority of its virus samples from GISN, Agence France-Presse reported that “Supari does appear to be vindicated by a flood of patents being lodged on the samples of H₅N₁ that have made it out of Indonesia, with companies in developed countries claiming ownership over viral DNA taken from sick Indonesians.”⁷ The Australian drug company CSL acknowledged that it had used Indonesian bird flu strains to develop a trial vaccine but insisted that it had no obligation to compensate Indonesia or guarantee access to the vaccine.

A good deal more could be said about the controversy over Indonesia’s refusal to share its H₅N₁ samples, but I want to focus here on just one aspect of Holbrooke and Garrett’s attack: their accusation that Indonesia was in violation of the revised International Health Regulations (IHR). The IHR system, dating from the 1851 International Sanitary Law, defines states’ mutual obligations in the event of an outbreak of a dangerous communicable disease. Historically, its function has been to guarantee the continued flow of global commodities in the event of such outbreaks, ensuring that countries do not take overly restrictive measures in response to the threat of infection. The H₅N₁ virus-sharing controversy unfolded just after a major revision of these regulations. According to the legal scholar David Fidler, the 2005 IHR revision was “one of the most radical and far-reaching changes in international law on public health since the beginning of international health co-operation in the mid-nineteenth century.”⁸

For my purposes here, the revised IHR are best understood as a significant element in an emerging apparatus of global disease surveillance and response—what the World Health Organization called “global public health security.” The IHR instituted a new set of legal obligations for nation-states to accept global intervention in a world seen as under threat from ominous pathogens circulating ever more rapidly. A key provision expanded the list of the diseases that would be subject to international regulation and potential intervention beyond the classic infections of the nineteenth century—cholera, yellow fever, and plague. Now any disease outbreak that could be classified as a “public health emergency of international concern” (PHEIC)—such as SARS, or an easily transmissible form of H₅N₁—would be covered by the IHR regulations. International law experts saw the virus-sharing controversy as an early test of how well the revised IHR would function.

According to the new regulations, IHR signatories were required to provide WHO with “public health information about events that may constitute a PHEIC.”⁹ In the case of the virus-sharing controversy, the central legal question was whether biological materials constituted such “public health information.” Plausible arguments could be made on both sides. At the May 2007 meeting of the World Health Assembly, WHO director Margaret Chan claimed that “countries that did not share avian influenza

virus would fail the IHR.”¹⁰ The U.S. delegation agreed: “All nations have a responsibility under the revised IHRs to share data and virus samples on a timely basis and without preconditions.”¹¹ Thus, the United States argued, “Our view is that withholding influenza viruses from GISN greatly threatens global public health and will violate the legal obligations we have all agreed to undertake through our adherence to IHRs.” However, the relevance of the revised IHR to the specific issue of virus sharing was ambiguous: the new regulations explicitly referred only to a requirement to share public health *information*, such as case reports and fatality rates, and the case could be made that biological materials such as virus samples were distinct from such information.¹²

In any case, the Indonesian Health Ministry’s response came from outside the legal framework of IHR. Rather, Supari argued that the global virus sharing system was ethically compromised, and in need of reform. “We want to change the global virus-sharing mechanism to be fair, transparent and equitable,” Supari said in an interview defending the government’s decision to withhold the virus.¹³ “What we mean by fair is that any virus sharing should be accompanied by benefits derived from the shared virus, and these benefits should be coming from the vaccine-producing countries.” Supari was speaking from within a different technical and political problematic than that of the WHO’s framework of “global public health security,” the strategy that the revised IHR was designed to serve. In speaking of benefits sharing, Supari was invoking a mechanism intended to encourage development—the Convention on Biological Diversity—in order to ground a rhetoric of national sovereignty that ran counter to the transnational authority of the WHO. But her attack on the high price of patented vaccines also resonated with demands for equal access to life-saving medicines coming out of the humanitarian global health movement.

A technical and political system designed to prepare for potentially catastrophic disease outbreaks was facing a very different demand: a call for access to essential medicines based on a vision of global equity (see table 1). The potential for a deadly outbreak of avian influenza had led to an encounter between two different ways of conceptualizing the problem of global health—one that was taking place in the absence of an actual H₅N₁ pandemic. At stake was not only the issue of how best to respond to a global outbreak of H₅N₁ but, more broadly, how to define the political obligation to care for the population’s health in a globalizing world in which the capacity of national public health authorities to protect citizens’ well-being was increasingly in question.

Assembling Global Health

Each of these regimes can be seen as a response to a crisis of existing, nation-state-based systems of public health. From the vantage of global health security, this crisis comes from the recognition that existing national public health systems are inadequate to prepare for the potentially catastrophic threat of emerging and reemerging infectious diseases. Such diseases outstrip the capabilities of modern public health systems that were designed to manage known diseases that occur with regularity in a national population. For humanitarian biomedicine, in contrast, the crisis comes from the failure of development efforts to provide adequate health infrastructure to lessen the

Table 1: Regimes of Global Health

	<i>Global Health Security</i>	<i>Humanitarian Biomedicine</i>
Type of threat	Emerging infectious diseases that threaten wealthy countries	Neglected diseases that afflict poor countries
Source of pathogenicity	Social and ecological transformations linked to globalization	Failure of development; lack of access to health care
Organizations and actors	National and international health agencies; technocrats	NGOs, philanthropies, activists
Techno-political interventions	Global disease surveillance; building response capacity; rapidly develop biomedical interventions to manage novel pathogens	Provide access to essential medicines; drug and vaccine research and development for diseases of the poor
Target of Intervention	National public health infrastructures	Suffering individuals
Ethical stance	Self-protection	Common humanity

burden of treatable but still deadly maladies in poor countries: it is a political and technical failure rather than the result of disease emergence per se. For humanitarian biomedicine, especially in the context of “low capacity” states in which public health infrastructure has collapsed, human suffering demands urgent and immediate response outside the framework of state sovereignty. Despite their differences, each of these regimes of global health has borrowed certain aspects of earlier public health formations, adapting them for new uses in the post–Cold War era.

Public health systems in Europe and North America were initially built in the mid-to-late nineteenth century in response to pathologies linked to industrialization in urban centers.¹⁴ For these systems, the object of knowledge and intervention was the population: its rates of death and disease, cycles of scarcity, and endemic levels of mortality. Public health advocates uncovered patterns of disease incidence linked to living conditions that could be reduced through technical interventions.¹⁵ Statistical knowledge, generated in fields such as epidemiology and demography, made these collective regularities visible. This form of public health sought to know and to manage such regularities, to decrease mortality and increase longevity—to “optimize a state of life,” as Michel Foucault put it.¹⁶

For this early form of public health, the design of interventions required the analysis of historical patterns of disease in a given population. For example, as the historian George Rosen has shown, nineteenth-century British public health reformers carefully tracked the incidence of disease according to differential social locations to make the argument that “health was affected for better or worse by the state of the physical or social environment.”¹⁷ Such knowledge was cumulative and calculative. Reformers gathered and analyzed vital statistics—rates of birth, death, and illness among various classes—in order to demonstrate the economic rationality of disease-prevention measures such as the provision of clean water or the removal of waste from

streets.¹⁸ If this initial mode of public health intervention emphasized social conditions—sanitation, nutrition, the safety of factories—a next iteration of public health narrowed its focus to the level of the pathogen. The rise of bacteriology in the late nineteenth century led to the systematic practice of mass vaccination against infectious disease. But again, for these early forms of public health, making rational interventions required knowledge about the historical pattern of disease incidence in a specific population.¹⁹

Cold War–era international health efforts, as exemplified by the World Health Organization after its founding in 1948, sought to forge collaborations between existing national public health agencies.²⁰ International health in this period had two main currents: disease eradication and primary health care. The major international disease eradication efforts were the WHO-led malaria campaign beginning in 1955 (and abandoned by the early 1970s) and the more successful smallpox eradication campaign, again led by WHO and completed in 1977. Such initiatives were international—rather than “global”—in that they required coordination between WHO and national public health services. The other main current of Cold War–era international health, “primary health care,” articulated health as a basic human right linked to social and economic development. Again, this vision was international rather than global: a functioning nation-state apparatus was seen as central to the delivery of basic primary care and so development efforts were critical to the improvement of population health.

By the early 1990s the primary health care model linked to the developmental state was in crisis. Funding dried out for primary health schemes in the context of the influence of World Bank–led reforms of national health systems. The WHO shifted its energies toward vertically integrated public-private partnerships that focused on managing specific diseases—such as HIV/AIDS and TB—rather than on developing local health infrastructures. The emphasis was on targeting the “burden” of a given disease. As a group of public health historians has recently suggested, competition between the World Health Organization and the World Bank over the field of primary care was one motivation for WHO’s move toward such public-private global health initiatives.²¹ The Gates Foundation also played a key early role in this shift, funding \$1.7 billion worth of projects from 1998 to 2000. Gates was then joined in this type of disease-focused initiative by other donor-funded institutions, such as the UN Global Fund and the Clinton Global Initiative.

Contemporary regimes of global health take up aspects of earlier public health programs but adapt them to a different set of circumstances. Global health security seeks to direct certain elements of existing national health systems toward its goal of early detection of emerging infections. Since the focus of this regime is on *potential* disease events, whose likelihood cannot be calculated using statistical methods, it develops techniques of imaginative enactment that model the impact of an outbreak. Global health security demands compliance from national governments in developing preparedness measures against potential outbreaks that threaten global catastrophe. Like classical public health, humanitarian biomedicine is concerned with actually existing diseases, but it functions outside of a state apparatus; its object of concern is not the national population but rather suffering individuals irrespective of national

borders. If a major ethical imperative for classical public health efforts was one of social solidarity, that of humanitarian biomedicine is one of *common humanity*.

Humanitarian Biomedicine

By the term “humanitarian biomedicine,” I do not refer to a single, clearly articulated framework or tightly linked set of institutions; rather I mean to indicate a congeries of actors and organizations with diverse histories, missions, and technical approaches. They share what Peter Redfield calls “a secular commitment to the value of human life”—one that is practiced through medical intervention.²² This ethical commitment underlies a sense of urgency to provide care to suffering victims of violence, disease, and political instability. The structure of intervention is one in which medical organizations and philanthropies from advanced industrial countries engage in focused projects of saving lives in the developing world—and these efforts explicitly seek to avoid political involvement.²³

My goal here will not be to provide a thorough history of the field of humanitarian biomedicine but rather to point briefly to some of the salient points of juxtaposition with global health security.²⁴ We can take as exemplary instances of humanitarian biomedicine two prominent—though quite distinctive—organizations: Médecins sans frontières (MSF) and the Bill and Melinda Gates Foundation (BMGF). In her 1995 analysis of MSF, Renée Fox writes that the organization’s efforts are premised on the “conviction that the provision of medical care, service, and relief is a humane form of moral action”—that medical practice has the capacity to heal the body politic as well as the human body.²⁵ MSF has an actively “global” sense of its mission, challenging the “sacred principle” of the sovereignty of the state and claiming a new world order based on the Universal Declaration of Human Rights. Melinda Gates has articulated a similar ethical stance based on the equivalence of all lives in her recent call for a new initiative to eradicate malaria: “The first reason to work to eradicate malaria is an ethical reason—the simple cost. Every life has equal worth. Sickness and death in Africa are just as awful as sickness and death in America.”²⁶ It is worth contrasting this ethical rationale for malaria eradication—one grounded in common humanity, ostensibly outside politics—with the developmentalist agenda at the heart of Cold War international health efforts, in which improving the health of a given population was inextricably tied to economic and political modernization.²⁷

In a sense, the primary health movement’s stance of a “right to health for all” was carried into humanitarian biomedicine. But this right was no longer to be concretized by national governments, which were now seen as beset with corruption, incapable of reliably enacting programs. Thus global health initiatives to combat specific diseases such as AIDS in the developing world expressly detach aid from existing national health agencies, seeking to “govern through the nongovernmental.” As Manjari Mahajan puts it in her analysis of AIDS programs in India funded by Western donors, “That which was explicitly ‘nongovernmental’ was recruited to provide public health services that had traditionally been in the ambit of the government.”²⁸ In turn, in order to govern global health from outside the state, the knowledge practices that guide intervention—such as epidemiological modeling—must be transposable from

local contexts—a characteristic that, as we will see, also structures the governance of global health security.

Given the need to avoid political entanglement and to operate across multiple settings, humanitarian biomedicine tends to emphasize technical interventions such as drugs, vaccines, or bed nets. A prominent example is work by activist organizations as well as philanthropies and multilateral agencies to increase access to antiretroviral therapies,²⁹ as well as coordinated work to develop new treatments and protocols for treating “neglected” diseases such as malaria and tuberculosis in resource-poor settings.³⁰ In some cases, humanitarian biomedicine has moved toward ambitious biotechnical projects, as in the Gates Foundation’s funding of basic research in the genomics of drug resistant TB and malaria. Meanwhile, critics have argued that such an emphasis on technical approaches ignores the more fundamental sources of suffering in developing countries—the living conditions of the world’s poor. Thus Anne-Emanuelle Birn writes, “In calling on the world’s researchers to develop innovative solutions targeted to ‘the most critical scientific challenges in global health,’ the Gates Foundation has turned to a narrowly conceived understanding of health as a product of technical interventions divorced from economic, social, and political contexts.”³¹ In a similar vein, Redfield describes the limits of MSF’s campaign to provide chronic care for AIDS patients in Uganda: “In identifying structural deficits in the global supply of pharmaceuticals, MSF has recognized poverty as a condition for which it offers no cure.”³²

Global Health Security

A 2007 report from the World Health Organization articulated the objects and aims of global health security.³³ The report, titled “A Safer Future: Global Public Health Security in the 21st Century,” began by noting the success of traditional public health measures during the twentieth century in dealing with devastating infectious diseases such as cholera and smallpox. But in recent decades, it continued, there had been an alarming shift in the “delicate balance between humans and microbes.”³⁴ A series of factors—including demographic changes, economic development, global travel and commerce, and conflict—had “heightened the risk of disease outbreaks,” ranging from new infectious diseases such as HIV/AIDS and drug-resistant tuberculosis to food-borne pathogens and bioterrorist attacks.³⁵

The WHO report proposed a strategic framework for responding to this new landscape of threats, which it called “global public health security.” The framework emphasized a space of global health that was distinct from the predominantly national organization of traditional public health. “In the globalized world of the 21st century,” the report began, simply stopping disease at national borders was not adequate. Nor was it sufficient to respond to diseases after they had become established in a population. Rather, it was necessary to prepare for unknown outbreaks in advance, something that could be achieved only “if there is immediate alert and response to disease outbreaks and other incidents that could spark epidemics or spread globally and if there are national systems in place for detection and response should such events occur across international borders.”³⁶

The strategic framework of global health security was a culmination of two decades

of increasing concern over the problematic of “emerging infectious disease”—a category with an impressive capacity for expansion. This problematic was initially raised by a group of U.S.-based infectious disease experts in the late 1980s and early 1990s.³⁷ In 1989, the virologist Stephen Morse and the molecular biologist Joshua Lederberg hosted a conference on the topic, which led to the landmark volume *Emerging Viruses*.³⁸ Morse and Lederberg shared an ecological vision of disease emergence as the result of environmental transformation combined with increased global migration.³⁹ Participants in the conference warned of a dangerous intersection. On the one hand, there were a number of new disease threats, including novel viruses such as AIDS and Ebola as well as drug-resistant strains of diseases such as tuberculosis and malaria. On the other hand, public health systems worldwide had begun to decay, beginning in the late 1960s with the assumption that infectious disease had been conquered. Moreover, the emergence of new infectious diseases could be expected to continue, due to a number of global processes, such as increased travel, urbanization, civil wars and refugee crises, and environmental destruction. For these experts, the AIDS crisis heralded a dangerous future in which more deadly diseases were likely to emerge.

Over the ensuing years, alarm about emerging disease threats came from various quarters, including scientific reports by prominent organizations such as the Institute of Medicine, the reporting of journalists such as Laurie Garrett, and the dire scenarios of writers such as Richard Preston.⁴⁰ For many health experts, the emerging disease threat—particularly when combined with weakening national public health systems—marked a troublesome reversal in the history of public health. At just the moment when it seemed that infectious disease seemed about to be conquered, and that the critical health problems of the industrialized world now involved chronic disease, these experts warned, we were witnessing a “return of the microbe.”

It is worth emphasizing the generative character of the category of “emerging infectious disease.” The category made it possible to bring AIDS into relation with a range of other diseases, including viral hemorrhagic fevers, West Nile virus, dengue, and drug-resistant strains of malaria and tuberculosis. It also pointed toward the imperative to develop means of anticipatory response that could deal with a disparate set of disease threats. Initiatives that would later come to be associated with global health security were first proposed in response to this perceived need.

Practices of disease eradication that had been honed as part of Cold War international health were incorporated into proposed solutions to the problem of emerging disease. One contributor to *Emerging Viruses* was the epidemiologist D. A. Henderson, who had implemented techniques of disease surveillance in the 1960s and 1970s as director of the WHO Smallpox Eradication Program. For Henderson, the task was not one of prevention but of vigilant monitoring. He argued that novel pathogen emergence was inevitable—that “mutation and change are facts of nature, that the world is increasingly interdependent, and that human health and survival will be challenged, ad infinitum, by new and mutant microbes, with unpredictable pathophysiological manifestations.”⁴¹ As a result, “we are uncertain as to what we should keep under surveillance, or even what we should look for.” What we need, he continued, is a system that can detect novelty: in the case of AIDS, such a detection system could

have provided early warning of the new virus and made it possible to put in place measures to limit its spread. Henderson proposed a system of global disease surveillance units to be run by CDC and located in peri-urban areas in major cities in the tropics, which could provide a “window on events in surrounding areas.” Thus, tools of disease eradication that had been developed as part of Cold War international health—surveillance, outbreak investigation, and containment—were brought to bear to address the newly articulated problem of emerging infectious disease.

Over the following decade, the emerging disease problematic became a part of U.S. national security discussions. Security officials began to focus on bioterrorism as one of a number of “asymmetric threats” the nation faced in the wake of the Cold War. They hypothesized an association between rogue states, global terrorist organizations, and the proliferation of weapons of mass destruction.⁴² Reports during the 1990s about Soviet and Iraqi bioweapons programs, along with the Aum Shinrikyo subway attack in 1995, lent credibility to calls for biodefense measures focused on the threat of bioterrorism. Early advocates of such efforts, including infectious disease experts such as Henderson and national security officials such as Richard Clarke, argued that adequate preparation for a biological attack would require a massive infusion of resources into both biomedical research and public health response capacity.⁴³ More broadly, they maintained, it would be necessary to incorporate the agencies and institutions of the life sciences and public health into the national security establishment. In the 1990s, Henderson and others connected the interest in emerging diseases among international health specialists with national security officials’ concern about the rise of bioterrorism, suggesting that a global disease surveillance network could serve to address both problems.

Epidemic Intelligence

Henderson’s model of disease surveillance came out of his background at the Epidemic Intelligence Service (EIS) based at the Centers for Disease Control (CDC).⁴⁴ The EIS approach, developed in the 1950s, was one of “continued watchfulness over the distribution and trends of incidence through systematic consolidation and evaluation of morbidity and mortality data and other relevant data,” as his mentor Alexander Langmuir put it.⁴⁵ Henderson used this method in tracking the global incidence of smallpox as director of the WHO eradication program. His proposed global network of surveillance centers and reference laboratories extended this approach to as yet unknown diseases, providing early warning for response to outbreaks of any kind—whether natural or man-made. Stephen Morse summarized the justification for developing such a network: “A global capability for recognizing and responding to unexpected outbreaks of disease, by allowing the early identification and control of disease outbreaks, would simultaneously buttress defenses against both disease and CBTW [chemical, biological, and toxin warfare]. This argues for expanding permanent surveillance programs to detect outbreaks of disease.”⁴⁶

The “epidemic intelligence” approach to emerging infections was institutionalized at a global scale over the course of the 1990s as experts from CDC brought the methods of EIS into the World Health Organization. The career of the epidemiologist David Heymann is instructive. Heymann began his career in EIS and in the 1970s

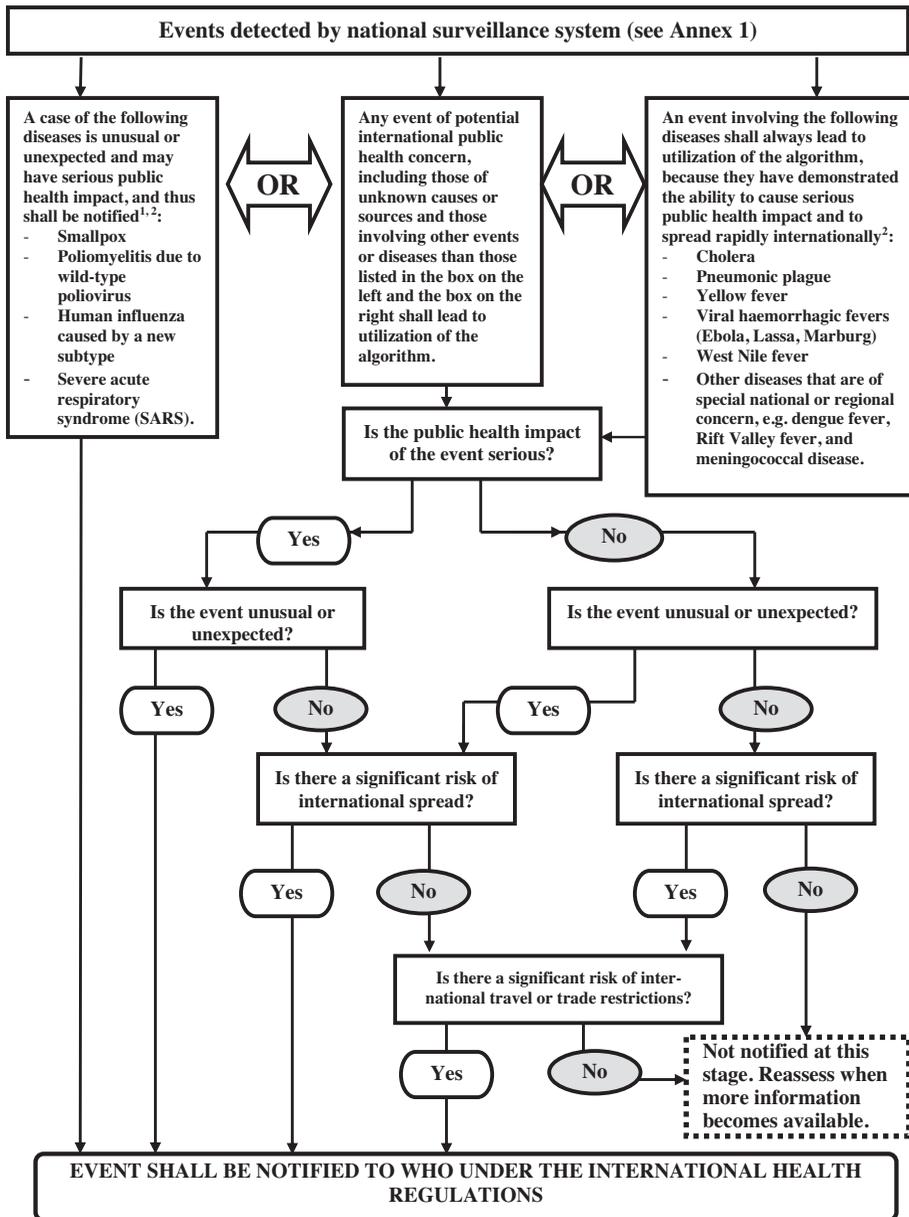
worked with CDC on disease outbreak containment in Africa and with WHO on the smallpox eradication program.⁴⁷ In the early years of the AIDS pandemic, he helped establish a WHO office to track the epidemiology of the disease in developing countries. He then returned to Africa in 1996 to lead the response to a widely publicized Ebola outbreak in Congo. After this he was asked by the Director of WHO to set up a program in emerging diseases. “At this time there was an imbalance in participation internationally in the control of emerging and re-emerging infectious diseases,” he later recalled, “the burden was falling mainly on the USA.”⁴⁸ At WHO, Heymann set up a global funding mechanism that increased the agency’s emerging disease surveillance and response capacities along the CDC model.

In the wake of the Ebola outbreak, as well as catastrophic outbreaks of cholera in Latin America and plague in India in the early 1990s, Heymann later reflected, a “need was identified” for stronger international coordination of response.⁴⁹ A major problem for outbreak investigators was that national governments often did not want to report the incidence of a disease that could harm tourism and international trade. The case of the plague outbreak in Surat in 1994, in which Indian officials suppressed international reporting of the event, was exemplary of the difficulty of forcing countries to publicly report epidemics.⁵⁰ Advocates of the emerging disease problematic suggested revision of the existing International Health Regulations as one potential solution to the problem of compliance. In the context of emerging diseases, the existing IHR had proven ineffectual in forcing disease notification for at least two reasons. For one, the limited list of reportable conditions—cholera, plague, and yellow fever—was of little relevance for the expansive category of emerging infections; second, there was no way to require countries to comply with IHR reporting requirements. Although, as Heymann put it, “in our emerging diseases program our idea was to change the culture so that countries could see the advantage of reporting,” a practical means of enforcing compliance was needed.

The revision of IHR became a vehicle for outbreak investigators to finally construct the functioning global disease surveillance system that had been proposed by Henderson and others. Health authorities proposed three key innovations to IHR that would make it possible for WHO to manage a range of potential disease emergencies. The first innovation (mentioned above in the context of the Indonesian virus-sharing controversy) responded to the problem of the narrow range of conditions to which the existing IHR could be applied. Through the invention of the concept of the “public health emergency of international concern” (PHEIC), the revised regulations vastly expanded the kinds of events to which the regulations might apply. Naturally occurring infectious diseases such as influenza and Ebola, intentional releases of deadly pathogens such as smallpox, or environmental catastrophes such as those that occurred at Bhopal in 1984 and Chernobyl in 1986 could, according to the new regulations, provoke the declaration of a PHEIC. The IHR “decision instrument” was an important tool for guiding states in determining what would constitute a public health emergency that required the notification of WHO (see figure 1). However, as we saw in the Indonesian H₅N₁ case, the pathway in the decision instrument defined as “any event of international public health concern” left considerable room for interpretation of the scope of the regulations.

ANNEX 2

DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN



¹ As per WHO case definitions.

² The disease list shall be used only for the purposes of these Regulations.

Figure 1: IHR Decision Instrument

The second major innovation in the revised IHR responded to the problem of the concentration of epidemiological knowledge in national public health agencies. The new regulations expanded the potential sources of reports of outbreaks: whereas the prior IHR had restricted official reporting to national governments, the revised IHR allowed WHO to recognize reports from nonstate sources such as digital and print media. In this way, state parties' unwillingness to report outbreaks would not impede the functioning of the system. The premise was that, given WHO's official recognition of nonstate monitors, reports of outbreaks could no longer be contained and so it would be in states' interest to allow international investigators into the country as soon as possible in order to undertake disease mitigation measures and to assure the public that responsible intervention was under way. Critical to making this possible was the creation during the 1990s of Internet-based reporting systems such as ProMED in the United States and GPHIN in Canada that scoured international media for stories about possible outbreaks. The development of these information networks meant that global public health surveillance no longer relied exclusively on state-based epidemiological methods such as the official case report.⁵¹ In 1997, WHO established GOARN (Global Outbreak Alert and Response Network), a system linking individual surveillance and response networks, which eventually had 120 partners. The potential for the rapid circulation of infectious disease information undermined national governments' traditional control of public health knowledge, making a global form of disease surveillance possible.

The third major innovation of the revised IHR addressed the problem of countries' ability to monitor outbreaks. It required that states build national capacity for infectious disease surveillance and response. The construction of these "national public health institutes" on the model of CDC would make possible a distributed global network that relied on the functioning of nodes in each country. Here again, it is worth noting the contrast with the developmentalist model of health infrastructure. IHR's reliance on national health systems did not necessarily imply strengthening governmental capacity to manage existing disease; rather, it sought to direct the development of outbreak detection systems according to the needs of global disease surveillance. As one document suggested: "It is proposed that the revised IHR define the capacities that a national disease surveillance system will require in order for such emergencies to be detected, evaluated and responded to in a timely manner."⁵² WHO gave countries until 2016 to fulfill this obligation. However, it was unclear where the resources would come from to make it possible to implement systems for detecting rare diseases in poor countries that already had trouble managing the most common ones.

Rolling Out the System: SARS

While the revised IHR were not officially approved by the World Health Assembly until 2005 and did not go into effect until June 2007, the SARS outbreak of early 2003 gave Heymann and his colleagues in WHO's Emerging Infections branch an early opportunity to roll out elements of the agency's new global surveillance and response system. As an outbreak of an unknown and unexpected but potentially catastrophic viral disease, SARS fit well into the existing category of "emerging infec-

tions.”⁵³ The Chinese government’s initial reluctance to fully report the outbreak led WHO to rely on its new capacity to use nonstate sources of information: SARS was the first time the GOARN network identified and publicized a rapidly spreading epidemic. As opposed to recalcitrant governments, Heymann noted, international scientists “are really willing to share information for the better public good.”⁵⁴ GOARN made it possible to electronically link leading laboratory scientists, clinicians, and epidemiologists around the world in a virtual network that rapidly generated and circulated knowledge about SARS. WHO tracked the spread of the illness closely and issued a series of recommendations on international travel restrictions. According to Heymann, who led the WHO response, this rapid reaction was key to the containment of the epidemic by July 2003—though he also acknowledged the good fortune that SARS had turned out not to be easily transmissible.

The lesson Heymann drew from SARS was that, in a closely interconnected and interdependent world, “inadequate surveillance and response capacity in a single country can endanger the public health security of national populations and in the rest of the world.”⁵⁵ This was the broad premise underlying the regime of global health security. Processes of globalization—including migration, ecological transformations, and massive international travel—had led to new biological, social, and political risks—risks that transcended national borders and therefore could not be ignored by wealthy countries. Only a global system of rapidly shared epidemiological information could provide adequate warning in order to mitigate such risks. National sovereignty must accede to the demands of global health security. This lesson was then applied to the next potential disease emergency, avian influenza. As Holbrooke and Garrett argued, in calling for Indonesia to comply with WHO’s influenza virus-sharing network, SARS had proven that “globally shared health risk demands absolute global transparency.”

Applying the New Regulations: XDR-TB

The first-ever application of the revised International Health Regulations came in an unexpected context: not the outbreak of a deadly new pathogen in a country of the developing world but rather the diagnosis of an American air traveler with a dangerous strain of tuberculosis.⁵⁶ In the spring of 2007 an Atlanta lawyer named Andrew Speaker was diagnosed with multi-drug-resistant tuberculosis just before leaving on his honeymoon to Europe. Speaker ignored a recommendation not to travel and flew to Europe with his wife. The CDC then informed him by phone that a follow-up test had indicated that he had extremely drug resistant TB (XDR-TB), a rare form of the disease that is very difficult to treat. The CDC told Speaker that he would either have to stay in Europe, quarantined in an Italian hospital, or pay his own way back to the United States on a private, medically secured jet—a prohibitively expensive alternative. Instead, Speaker bought a plane ticket to Montreal on the Internet and drove back into the United States via the Canadian border, even though he had been placed on a Department of Homeland Security watch list. The event briefly caused an international panic, as health officials worried that Speaker had exposed fellow passengers to the pathogen during the long transatlantic flight.

From the vantage of global health security, the Speaker case was a test of the new

health preparedness system. As a *New York Times* reporter wrote, “The bizarre case calls into question preparations to deal with medical crises like influenza pandemics and even bioterror attacks.”⁵⁷ Similarly, a *Los Angeles Times* editorial warned: “One day, a plane landing at LAX could carry a passenger infected with XXDR, a bioterror agent, Ebola or an emerging virus. Will we be ready?”⁵⁸ The Congressional Committee on Homeland Security Issued a report on the Speaker incident that linked XDR-TB to the broad problematic of emerging infectious disease, whose solution would require the integration of public health and security:

The twin specters of diseases that are increasingly resistant or completely without current treatments and antimicrobials, and the ability of diseases to spread more quickly than ever before due to rapid transit and other enablers, place public health concerns squarely on the homeland, national, and transnational security agendas. How we address these gaps now will serve as a direct predictor of how well we will handle future events, especially those involving emerging, reemerging, and pandemic infectious disease.⁵⁹

But the Speaker case was far from exemplary of the global problem of drug resistant TB. In fact, the disease is one of the central objects of attention for humanitarian biomedicine.⁶⁰ For advocates of humanitarian biomedicine, the case was useful in bringing attention to an underreported issue: the increasing incidence of multi- and extremely drug-resistant TB in parts of the world with poorly functioning public health systems, such as South Africa and the former Soviet bloc. As one humanitarian activist urged: “We need to wake up and pay attention to what’s happening with TB in other parts of the world. We need to start treating XDR-TB where it is, not just respond to one case of one American who will get the finest treatment.”⁶¹ For biomedical humanitarianism, the growing epidemic of drug-resistant TB pointed to structural inequality and to the failures of public health systems to adequately manage a treatable, existing condition among the world’s poor.⁶²

Thus, if the specter of an airplane passenger with XDR-TB was seen a practice run for a future bioterrorist attack, the questions—and answers—generated by the incident were quite different than if the passenger were seen as a sign of an already existing health emergency, but one taking place outside the networks and nodes of our own health and communications systems. The same disease could look quite different, and provoke quite different responses, depending on whether it was taken up within a regime of global health security or one of humanitarian biomedicine.

Conclusion

Whether the revised IHR would live up to its billing as a radical transformation of international public health in the direction of providing security against novel pathogens would depend at least in part on its capacity to force sovereign states to comply with the requirements of global health surveillance. The issue of intellectual property rights in the case of Indonesian flu viruses indicated that an alternative regime of global health—one focused on the problem of access to essential medicines in treating existing diseases—could well complicate such efforts. Global health security did not address the major existing infectious disease problems of the developing

world—which were linked to poverty and the lack of resources to devote to basic health infrastructure. As Fidler put it, “The strategy of global health security is essentially a defensive, reactive strategy because it seeks to ensure that States are prepared to detect and respond to public health threats and emergencies of international concern . . . The new IHR are rules for global triage rather than global disease prevention.”⁶³

The program of global health security was limited; it did not have any means to address, for example, the HIV/AIDS pandemic—and so did not attract the interest of global health advocates focused on existing health crises. It contained no provisions regarding medication access, prevention programs, or vaccine research and development for neglected diseases.⁶⁴ As the critic Philip Calain wrote, describing WHO-led projects such as GOARN, “There is no escaping from the conclusion that the harvest of outbreak intelligence overseas is essentially geared to benefit wealthy nations.”⁶⁵ Humanitarian biomedicine thus offered potential resources for the critique of what was left out of global health security. Nonetheless, each regime functioned relatively coherently on its own—leading to the question of whether, in fact, the two regimes might best be understood as complementary rather than inherently contradictory facets of contemporary global health governance. If so, humanitarian biomedicine could be seen as offering a philanthropic palliative to nation-states lacking public health infrastructure in exchange for the right of international health organizations to monitor their populations for outbreaks that might threaten wealthy nations.

NOTES

I would like to thank Carlo Caduff, Stephen Collier, Nils Gilman, Sam Moyn, Peter Redfield, and Miriam Ticktin for their helpful suggestions on earlier drafts of this essay.

1. A recent article notes: “Although frequently referenced, global health is rarely defined. When it is, the definition varies greatly and is often little more than a rephrasing of a common definition of public health or a politically correct updating of international health.” Jeffrey Koplan et al., “Toward a Common Definition of Global Health,” *The Lancet* 373 (June 6, 2009): 1993–95.

2. Stephen J. Collier and Aihwa Ong, “Global Assemblages, Anthropological Problems,” in *Global Assemblages: Ethics, Technology and Politics as Anthropological Problems*, ed. Aihwa Ong and Stephen J. Collier (New York: Blackwell, 2004).

3. The director of WHO’s Communicable Diseases Cluster, David Heymann, described the network as follows: GISN “identifies and tracks antigenic drift and shifts of influenza viruses to guide the annual composition of vaccines, and provides an early alert to variants that might signal the start of a pandemic.” Heymann, “The International Response to the Outbreak of SARS in 2003,” *Philosophical Transactions of the Royal Society of London B* 359 (2004): 1127–29. For an anthropological critique, see Carlo Caduff, “Anticipations of Biosecurity,” in *Biosecurity Interventions: Global Health and Security in Question*, ed. Andrew Lakoff and Stephen J. Collier (New York: Columbia University Press, 2008).

4. “Indonesia’s Bird Flu Warrior Takes on the World,” *Agence France-Presse*, October 12, 2008.

5. Bryan Walsh, “Indonesia’s Bird Flu Showdown,” *Time*, May 10, 2007.

6. Editorial: “International Health Regulations: The Challenges Ahead,” *The Lancet* 369 (May 26, 2007): 1763.

7. "Indonesia's Bird Flu Warrior Takes on the World."
8. David Fidler, "From International Sanitary Conventions to Global Health Security: The New International Health Regulations," *Chinese Journal of International Law* 4, no. 2 (2005): 326.
9. Citation in David P. Fidler, "Influenza Virus Samples, International Law, and Global Health Diplomacy," *Emerging Infectious Diseases* 14, no. 1 (January 2008): 88–94.
10. *Ibid.*
11. *Ibid.*
12. *Ibid.*
13. "Indonesia's Bird Flu Warrior Takes on the World."
14. Elizabeth Fee and Dorothy Porter, "Public Health, Preventive Medicine and Professionalization: England and America in the Nineteenth Century," in *Medicine in Society: Historical Essays*, ed. Andrew Wear (Cambridge: Cambridge University Press, 1992).
15. As Foucault noted, public health experts found "phenomena that are aleatory and unpredictable when taken in themselves or individually, but which, at the collective level, display constants that are easy, or at least possible, to establish." Michel Foucault, "*Society Must Be Defended*": *Lectures at the Collège de France, 1975–1976* (New York: Pantheon, 2003), 243.
16. *Ibid.*
17. George Rosen, *A History of Public Health* (Baltimore: Johns Hopkins University Press, 1993), 185. For the French case, see William Coleman, *Death Is a Social Disease: Public Health and Political Economy in Early Industrial France* (Madison: University of Wisconsin Press, 1982).
18. Thus, as Chadwick's famous 1842 *Inquiry* into living conditions among the working classes argued, "The expenditures necessary to the adoption and maintenance of measures of prevention would ultimately amount to less than the cost of disease now constantly expanded." Cited in Rosen, *A History of Public Health*, 187. Ian Hacking looks to this period to find the moment when the "laws of sickness" were discovered, in part through the use of benefit societies' actuarial tables. Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990).
19. For example, as Rosen notes, in designing New York City's vaccination campaign against diphtheria among schoolchildren in the 1920s, it was "necessary to know the natural history of diphtheria within the community: How many children of different ages had already acquired immunity, how many were well carriers, and what children were highly susceptible?" Rosen, *A History of Public Health*, 312. Such data were gathered in order to make decisions based on the balance between the expected costs and benefits of a given intervention.
20. While I am focusing here on two major strands of Cold War international health, there is a complex history of pre–World War II international health efforts ranging from the Rockefeller Foundation to the League of Nations that historians of public health have recently begun to unravel. See, for example, Alison Bashford, "Global Biopolitics and the History of World Health," *History of the Human Sciences* 19, no. 1 (2006): 67–88.
21. Theodore M. Brown, Marcos Cueto, and Elizabeth Fee, "The World Health Organization and the Transition from 'International' to 'Global' Health," *American Journal of Public Health* 96, no. 1 (January 2006): 62–72.
22. Peter Redfield, "Doctors Without Borders and the Moral Economy of Pharmaceuticals," in *Human Rights in Crisis*, ed. Alice Bullard (Aldershot, UK: Ashgate Press, 2008), 132.
23. Didier Fassin emphasizes the paradoxes involved in the effort by Médecins sans frontières to stage what he calls a "politics of life" that deals with passive victims rather than active citizens: "humanitarian testimony establishes two forms of humanity and two sorts of life in the public

space: there are those who can tell stories and those whose stories can be told only by others.”

Fassin, “Humanitarianism as a Politics of Life,” *Public Culture* 19, no. 3 (2007): 518.

24. A number of illuminating anthropological critiques of the field of humanitarian biomedicine have recently appeared. See Fassin, “Humanitarianism as a Politics of Life”; Miriam Ticktin, “Where Ethics and Politics Meet: The Violence of Humanitarianism in France,” *American Ethnologist* 33, no. 1 (February 2006): 33–49; and Peter Redfield, “A Less Modest Witness: Collective Advocacy and Motivated Truth in a Medical Humanitarian Movement,” *American Ethnologist* 33, no. 1 (February 2006): 3–26.

25. Renée Fox, “Medical Humanitarianism and Human Rights: Reflections on Doctors Without Borders and Doctors of the World,” *Social Science and Medicine* 41, no. 12: 1607–16.

26. Melinda Gates, “Malaria Forum Keynote Address,” October 17, 2007. Text available at: <http://www.gatesfoundation.org/speeches-commentary/Pages/melinda-french-gates-2007-malaria-forum.aspx> (accessed 2/1/2010).

27. For the history of modernization theory and its political context, see Nils Gilman, *Mandarins of the Future: Modernization Theory in Cold War America* (Baltimore: Johns Hopkins University Press, 2003).

28. Manjari Mahajan, “Designing Epidemics: Models, Policy-making, and Global Foreknowledge in India’s AIDS Epidemic,” *Science and Public Policy* 35, no. 8 (October 2008): 587.

29. Vinh-Kim Nguyen, “Antiretroviral Globalism, Biopolitics, and Therapeutic Citizenship,” in *Global Assemblages: Ethics, Technology and Politics as Anthropological Problems*, ed. Aihwa Ong and Stephen J. Collier (New York: Blackwell, 2004). Brazil’s efforts to increase ARV access serve as a model for many biomedical humanitarians. For a critique, see Joao Biehl, “Pharmaceutical Governance,” in *Global Pharmaceuticals: Ethics, Markets, Practices*, ed. Adriana Petryna, Andrew Lakoff, and Arthur Kleinman (Durham, N.C.: Duke University Press, 2006).

30. Erin Koch, “Disease as a Security Threat: Critical Reflections on the Global TB Emergency,” in *Biosecurity Interventions: Global Health and Security in Question*, ed. Andrew Lakoff and Stephen Collier (New York: Columbia University Press, 2008).

31. Anne-Emanuelle Birn, “Gates’ Grandest Challenge: Transcending Technology as Public Health Ideology,” *The Lancet* 366, no. 9484 (2005): 514–19.

32. Redfield, “Doctors Without Borders and the Moral Economy of Pharmaceuticals,” 140.

33. This section draws on portions of Stephen J. Collier and Andrew Lakoff, “The Problem of Securing Health,” in *Biosecurity Interventions*, ed. Lakoff and Collier.

34. World Health Organization, *The World Health Report 2007: A Safer Future: Global Public Health Security in the 21st Century* (Geneva: WHO, 2007).

35. Charles Rosenberg has contrasted this new form of “civilizational risk” with those that sparked early public health efforts, noting that anxieties about the risk of modern ways of life are here explained not in terms of the city as a pathogenic environment but in terms of evolutionary and global ecological realities. Rosenberg, “Pathologies of Progress: The Idea of Civilization as Risk,” *Bulletin of the History of Medicine* 72, no. 4 (1998): 714–30.

36. World Health Organization, *The World Health Report 2007*.

37. Nicholas King has analyzed the rise of the emerging disease framework in detail. See King, “Security, Disease, Commerce: Ideologies of Post-Colonial Global Health,” *Social Studies of Science* 32, no. 5/6 (2002): 763–89.

38. Stephen S. Morse, ed., *Emerging Viruses* (New York: Oxford University Press, 1993).

39. Warwick Anderson describes this vision as follows: “Evolutionary processes operating on

a global scale were responsible for the emergence of ‘new’ diseases. As environments changed, as urbanization, deforestation, and human mobility increased, so, too, did disease patterns alter, with natural selection promoting the proliferation of microbes in new niches.” Warwick Anderson, “Natural Histories of Infectious Disease: Ecological Vision in Twentieth Century Bioscience,” *Osiris* 19 (2004): 39–61.

40. Institute of Medicine, *Emerging Infections: Microbial Threats to Health in the United States* (Washington, D.C., National Academy Press, 1992); Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World out of Balance* (New York: Farrar, Straus and Giroux, 1994); Richard Preston, *The Cobra Event* (New York: Ballantine, 1998).

41. D. H. Henderson, “Surveillance Systems and Intergovernmental Cooperation,” in *Emerging Viruses*, ed. Stephen S. Morse (New York: Oxford University Press, 1993).

42. Susan Wright, “Terrorists and Biological Weapons,” *Politics and the Life Sciences* 25, no. 1 (2006): 57–115.

43. As Susan Wright (*ibid.*) argues, the very use of the term “weapons of mass destruction” to link nuclear weapons to biological weapons was a strategic act on the part of biodefense advocates.

44. The EIS was founded in 1951 by Alexander Langmuir. For Henderson’s recollections, see D. A. Henderson, *Smallpox: The Death of a Disease* (New York: Prometheus, 2009).

45. Alexander Langmuir, “The Surveillance of Communicable Diseases of National Importance,” *New England Journal of Medicine* 268, no. 4 (24 January 1963): 182–83. As Lyle Fearnley has described, Langmuir pioneered a method of epidemiological surveillance designed to track each instance of a disease within a given territory—one that would serve the needs of both public health and biodefense. Lyle Fearnley, “‘From Chaos to Controlled Disorder’: Syndromic Surveillance, Bioweapons, and the Pathological Future,” *ARC Working Paper #5* (2005), http://anthropos-lab.net/wp/publications/2007/08/workin_gpaperno5.pdf (accessed 2/2/2010).

46. Stephen S. Morse, “Epidemiologic Surveillance for Investigating Chemical or Biological Warfare and for Improving Human Health,” *Politics and the Life Sciences* 11, no. 1 (February 1992): 29.

47. Haroon Ashraf, “David Heymann—WHO’s Public Health Guru,” *The Lancet Infectious Diseases* 4, no. 12 (December 2004): 785–88.

48. *Ibid.*, 787

49. Heymann, “The International Response to the Outbreak of SARS in 2003,” 1127.

50. See Garrett, *The Coming Plague*.

51. Lorna Weir and Eric Mykhalovskiy, “The Geopolitics of Global Public Health Surveillance in the 21st Century,” in *Medicine at the Border: Disease, Globalization, and Security, 1850—Present*, ed. Alison Bashford (Basingstoke: Palgrave MacMillan, 2007): 240–63.

52. Fidler, “From International Sanitary Conventions,” 353.

53. Claire Hooker, “Drawing the Lines: Danger and Risk in the Age of SARS,” in *Medicine at the Border*, ed. Bashford.

54. Ashraf, “David Heymann,” 787.

55. Heymann, “International Response,” 1128.

56. Howard Markel, Lawrence O. Gostin, and David P. Fidler, “Extensively Drug-Resistant Tuberculosis: An Isolation Order, Public Health Powers, and Global Crisis,” *JAMA* 298, no. 1 (July 4, 2007): 83–86.

57. John Schwartz, "Tangle of Conflicting Accounts in TB Patient's Odyssey," *New York Times*, June 2, 2007.
58. "Editorial: TB Terror," *Los Angeles Times*, June 10, 2007.
59. Committee on Homeland Security, *The 2007 XDR-TB Incident: A Breakdown at the Intersection of Homeland Security and Public Health*, (Washington, D.C.: U.S. House of Representatives, 2007), 2.
60. As an example we can take the recent \$33 million initiative by the Gates Foundation, in collaboration with the Chinese Ministry of Health, to develop a quick diagnostic test for drug resistant TB. Sandi Doughton, "Gates Foundation Launches 3rd Initiative in China," *Seattle Times*, March 31, 2009.
61. John Donnelly, "Specialists say TB Case a Sign of Things to Come," *Boston Globe*, June 4, 2007.
62. See, for example, Paul Farmer, *Infections and Inequalities: The Modern Plagues* (Berkeley: University of California Press, 2001).
63. Fidler, "From International Sanitary Conventions," 389.
64. *Ibid.*, 391.
65. Philippe Calain, "From the Field Side of the Binoculars: A Different View on Global Public Health Surveillance," *Health Policy and Planning* 22, no. 1 (2007): 19.