



# Epidemics for all? Governing Health in a Global Age

Sarah Dry

# Epidemics

A large, abstract graphic consisting of several thick, overlapping, curved lines in various shades of green and grey, filling the lower half of the cover. The lines are layered, creating a sense of depth and movement.

## Epidemics for all? Governing Health in a Global Age

Current global health policy is dominated by a preoccupation with infectious diseases and in particular with emerging or re-emerging infectious diseases that threaten to 'break out' of established patterns of prevalence or virulence into new areas and new victims. This paper seeks to link a set of dominant narratives about epidemics and infectious disease with what is often called the architecture, or organizational landscape, of global health policy.

A series of dichotomies helps to distinguish and valorise epidemics policies. Fast- versus slow-twitch models of disease, global versus local models of culture, and official versus unofficial models of knowledge provide categories according to which policies can be evaluated, designed and implemented. As a result, policy on the global scale has tended to be oriented towards addressing highly time-focussed outbreaks that threaten to cross international boundaries rather than longer-term endemic problems that affect the most vulnerable people. Failure to address such long-term changes may make the whole global system itself more vulnerable over time. Recent changes in the organizational landscape of global health have created new power relations, as well as uncertainty about which organizations, if any, are 'in control' of global health policy. In addition, the WHO's revised International Health Regulations, fully implemented in 2007, entail significant changes for way epidemics are governed at a global scale, embracing unofficial sources of information for the first time. Issues of coordination, integration and harmonization have accordingly come to the fore.

This paper will analyze how this new organizational landscape and the framing of epidemic disease interact. Centrally, it will explore what effect that interaction has on the ability of the global health community to respond to disease threats of all kinds. It will argue that neither organizational complexity or 'openness' nor rigid lines of command-and-control can ensure resilience in the face of unpredictable risks. Instead, methods are needed to encourage feedback and integration between competing narratives of health and disease.

### About the Author

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# **Epidemics for all? Governing Health in a Global Age**

**Sarah Dry**

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## INTRODUCTION

Current global health policy is dominated by a preoccupation with infectious diseases and in particular with new (i.e. emerging or re-emerging) infectious diseases that threaten to 'break out' of established patterns of prevalence or virulence into new areas and new victims (Kickbusch 2003, Knobler et al 2006; Foresight 2007). Such episodes are variously described as outbreaks, epidemics, or pandemics depending on their severity, temporal or geographic reach, or their ability to capture our attention (or frighten us). Of the many risks currently facing the international community, the 'most feared security threat' is that avian influenza will mutate into a highly infectious and virulent form of human influenza, causing a global pandemic potentially worse than the Spanish 'flu epidemic that killed tens of millions in 1918-1919 (WHO 2007, 45). But the complete list of significant global health risks that have the potential to become epidemic is long and includes HIV/AIDS, multi-drug resistant tuberculosis, malaria, newly emerging and highly infectious viral diseases such as Ebola and Marburg, and a growing worldwide resistance to frontline antibiotics. Addressing such diseases ranks high on almost any league-table of global health policy (Saker et al 2004; Lee 2000; Lee 2003).

Narrowly focussed in time, with the potential for bursting from a confined area onto the world stage, epidemics demonstrate precisely the kind of combustible unpredictability that fuels fears of systemic, global risks. Alongside fears of climate change and terrorism, epidemics capture the contemporary awareness of the earth as interconnected—and therefore vulnerable—as never before. As the World Health Organization (WHO) puts it: 'Today's highly mobile, interdependent and interconnected world provides myriad opportunities for the rapid spread of infectious diseases' (WHO 2007).

Epidemics force us to examine our most basic assumptions about health and disease, about what is natural and what is unnatural. In so doing, they help set the borders between the everyday and the exceptional. In biological terms, an epidemic is defined as an outbreak of a disease that spreads more quickly and intensively than is normal. Epidemic diseases can be infectious (spread directly from person to person), communicable (spread via a disease vector, such as a mosquito, rat or bird), or non-communicable (such as cancer, heart disease or obesity). The word is used very broadly, to describe everything from outbreaks of virulent hemorrhagic fevers, to the global incidence of HIV/AIDS, and rising rates of obesity, as well as bursts in knife crime, drug use or suicide. In social terms, an epidemic is a series of communal responses to an ongoing event, from initial awareness to analysis, response and recovery. The collective experience of epidemics has a ritual quality. The process of boundary-drawing unfolds through time; it can be described as a kind of collective narrative whose structure and sequence determines the identity of an epidemic (Rosenberg 1992). Popular books, movies and news accounts contribute to a shared public discourse in which what Rosenberg has called the 'dramaturgic' qualities of epidemics are enacted. Such collective responses to extraordinary disease events are not new by any means. But while it is possible to identify archetypal responses to the basic narrative structure of an epidemic, each community must re-invent the story-lines that it tells about why epidemics arise, what causes them, how they must be addressed and how normalcy can be re-attained.

There are two good reasons for our present concern with epidemics. One is that current global burden of infectious disease is enormous: roughly one-quarter of annual global deaths can be attributed to infectious diseases (WHO 2004; Morens et al 2004). A disproportionate amount of

this burden sits squarely on the shoulders of the world's poorest people, as would any future burden associated with emerging infectious diseases. This is no coincidence. The conditions of poverty, such as over-crowding, lack of sanitation, and forced migration, are precisely those that encourage the persistence of infectious disease. The second good reason for this concern is that infectious diseases are emerging or re-emerging at historically unprecedented rates. Even making generous allowances for our increased understanding and thus identification of new diseases over the past century, the number of infectious diseases has risen at dramatic and historically unprecedented rates over the past 60 years. During the 1940s, for example, roughly twenty new infectious diseases emerged, while during the 1980s (at the peak of the HIV/AIDS epidemic), more than ninety emerged (Jones et al, 2008; Woolhouse 2008). This surge in new infectious diseases has been labeled a third epidemiological transition (Barrett et al 1998).<sup>1</sup> Recent research reveals multiple causes for this rise, including increased human population and migration, increased human/animal encounters, habitat disturbance, climate change, deforestation, wars, loss of social cohesion and natural disasters (Morens et al 2004).

The combination of the massive current burden of infectious disease with the possibility of more bad news ahead (with the added potential for climate change to worsen the global health situation) has mobilized the global health community (Haines et al 2006; WHO 2008). In recent years, an infusion of new cash and new initiatives—such as the Global Fund to Fight AIDS, TB and Malaria, the Bill and Melinda Gates Foundation global health program, the Millennium Development Goals (especially 4, 5, and 6), and the recent revisions in the WHO's International Health Regulations—has transformed the global health policy landscape. The result is that infectious diseases, and the epidemics they can cause, are at the top of the global health agenda.

On the surface, then, the situation is thus: an empirically real threat is being addressed by the concerted effort of a mobilized and focused global health policy community working on the basis that we are all in this together. As the WHO puts it: 'vulnerability is universal' (WHO 2007: vi). However, the appearance of consensus hides a set of assumptions—about the nature of the threat and the best way to address it—which may be counter-productive to the goal both of reducing the global burden of infectious disease (in epidemic and endemic forms) and, more broadly, to the goal of creating a more equitable and just world for the long-term. In particular, the discourse of global risk, which has brought outbreaks of infectious diseases to the fore in global health policy, hides a couple of very deep tensions.

What follows is an attempt to make explicit some of the implicit assumptions—about complexity and entanglement, sustainability, history and risk—that shape our policy responses to epidemics, and global health more generally, today. It is helpful to think about these policies in terms of contending accounts, or narratives, about how epidemics begin, how they travel, and how they should be addressed. Uncovering such assumptions helps reveal the relationship between categories of knowledge and power. How an epidemic is defined, in space and time, in terms of populations, institutions and interventions, depends on who gets to do the defining. There is always more than one way to tell a story, or 'frame' a particular issue. But while asensitivity to narrative reveals a diversity of such framings, it also demonstrates their relative authority or dominance. In this sense, not all stories are created equal.

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<sup>1</sup> The first such transition, according to this model, occurred when hunter-gatherers started to grow crops and settle down. Exposure to livestock and more crowded living conditions led to an increase in infectious disease. The second transition represents the successful control of many of these infectious diseases in developed countries and a consequent shift towards chronic disease.

This paper seeks to link a set of dominant narratives about epidemics and infectious disease with what is often called the architecture, or organizational landscape, of global health policy. This dominant narrative frames epidemics as novel, as global, and as fast-moving, while de-emphasizing underlying, often long-term changes (such as changing patterns of migration or livestock management) that may help account for the growth in emerging infectious diseases. The term 'global health architecture' refers to a diverse network of national, international and non-governmental organizations that contribute to health policy at the global scale. Prominent among them are agencies such as the WHO, partnerships such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and philanthropic organizations such as the Rockefeller and Gates Foundations. Recent changes in the organizational landscape of global health have created new power relations, as well as uncertainty about which organizations, if any, are 'in control' of global health policy. Issues of coordination, integration and harmonization have accordingly come to the fore. This paper will analyze how this new organizational landscape and the framing of epidemic disease interact. Centrally, it will explore what effect that interaction has on the ability of the global health community to respond to disease threats of all kinds. This has two analytic dividends. On the one hand, uncovering the relationships between our ways of knowing about, and classifying, epidemics, and the complex organizational structures of global health reveals how alternative ideas of disease and health become neglected, or invisible, with potentially dangerous consequences for the reliability or effectiveness of our approach to global health. On the other hand, by joining an analysis of narratives with one of organizational structures, this paper seeks to demonstrate what practical methods might be used to address organizational and conceptual blind spots simultaneously, by paying attention to the key role of organizational routines and structures.

## **GLOBALIZATION AND INFECTIOUS DISEASE POLICY**

Globalization is the most dominant strand of the epidemic narrative, so ubiquitous a language to describe contemporary events that it has slipped into cliché and near-invisibility. In the field of global health, sensitivity to global relations has come to be labelled with a strikingly ambiguous phrase: global health security (McInness and Lee 2006, Chen et al 2003, Heymann 2005). Referring both to the health and well-being of individuals and the protection of states from both economic and social disorder, policy responses informed by concerns about global health security are characterized by an extreme sensitivity to the flow of disease across national borders. But while phrases such as 'disease knows no borders' are routinely used to justify policy responses, the mobility of certain disease organisms lies in stark contrast to the entrenched poverty, inequality and political instability that are ultimately responsible for most of the global burden of disease. This troubling tension runs through the heart of globalization discourse more generally. Much talk of globalization, with its metaphors of interconnectedness and assumptions about the fast and efficient transfer of goods, capital and people, obscures the fact that while some things travel quickly and easily, others, to put it crudely, do not. To be sure, ever-steeper gradients of inequality are a well-recognized feature of globalization, but the inherent tensions in the discourse of globalization—between an interconnected world and one of sharp divisions in wealth and health—are not always made clear. Frequently, the language of change and networks, of flow, speed and connectivity, trumps the language of structures, of rootedness, embeddedness, entrenchment. While the former discourse points to unity, the latter draws our



attention, ultimately, to inequality. Both discourses—of flow and rootedness— capture certain aspects of the phenomenon of globalization. But these aspects, or realities, are experienced by sharply divided sets of people.

Epidemics are increasingly seen to be a symptom of globalization in its guise of interconnectivity, while critics of global health policy often point to long-term, structural causes of inequality (Kim et al 2005, Farmer 1999). By paying attention to the so-called 'global' risks of epidemics, such critics suggest, we may turn to certain kinds of interventions that are not those best suited to addressing the root (as opposed to the intermediate) causes of the problem. By focussing on such shared 'global' risks as pandemic flu, global health policies run the risk of neglecting the underlying structural deficiencies that produce the conditions from which epidemics emerge.

The current dominant narrative around global health security and 'shared' global risks has narrowed the set of policy options that are considered appropriate, while alternative visions of global health have been sidelined. As a result, supposedly 'broad' or 'comprehensive' approaches to the global risk of epidemics are, paradoxically, often more narrowly conceived than are many projects oriented to local, or regional contexts and concerns. Another way to put this is in terms of time: global health policy around epidemics privileges acute outbreak events that occur on a daily or weekly basis as opposed to chronic factors, such as changes in land use and host and vector population, which occur over years or decades, and which account for broader trends. In a sense, this difference in temporal frame reflects different modes of causal explanation. An acute model might explain the appearance of a cluster of new cases of extensively drug-resistant tuberculosis (XDR-TB) with a narrative about a person with tuberculosis who is unsuccessfully treated with antibiotics and develops a drug-resistant strain of the bacillus, sickens further, and exposes others in a matter of weeks, if not days. Chronic accounts might explain an epidemic (still XDR-TB, for example) in terms of an increase, over months or years, in the population of the overcrowded slums of a major metropolis, where clean water and sanitation are lacking, broad-spectrum antibiotics may be purchased informally, and a large percentage of the population is immuno-suppressed because they are also suffering from HIV/AIDS. Currently, the emphasis is on short-term factors, with long-term indicators often left out of policy decision-making altogether. What is really needed are analytic and policy tools for combining both types of factor into a shared model of disease and health, in order to get beyond simplistic and often ideologically-freighted debates about primary health versus disease-specific programming.

Indeed, how we speak of (and understand) the global risk of epidemics today testifies to a history of encounters between the powerful and the vulnerable that stretches back centuries (King 2002). Neither epidemics, nor our understanding of them as presenting novel risks, nor the tendency to divide factors into sharply opposing dyads, are new. What I have described as opposing discourses of global public health—acute versus chronic—can also be understood as twin strands in the history of 19<sup>th</sup> and 20<sup>th</sup> century medicine and public health. What used to be called sanitary hygiene is the 19<sup>th</sup> century progenitor of public health initiatives that take into account factors such as the environment, housing and poverty. The social reformers of Victorian Britain fought to improve the living and working conditions of the urban poor as a way of curtailing the spread of epidemic diseases such as cholera, typhoid and typhus. On the other hand and in the same time period, proponents of the germ theory of disease pictured microbes travelling with alarming speed and specificity. They argued that targeted interventions into acute disease outbreaks, based on vaccination and control of pathogens, rather than social and environmental changes were the key to addressing epidemic disease (Lewis 1993, Porter and

Porter 1988). With the development of the professional discipline of tropical medicine in the late 19<sup>th</sup> century, these divisions became more sharply defined and became associated, in Britain, with the Liverpool and London Schools of Tropical Medicine respectively. Activity in Liverpool focussed on prevention (largely sanitary measures and the elimination of disease vectors such as mosquitoes, flies and rats), while in London the focus was on creating a new scientific sub-discipline at the confluence of medicine and parasitology. Work in the field would be based on reductionist research, with the goal of discovering vaccine and drug-based cures to epidemic diseases (Chernin 1988). Today's vocabulary of acute versus chronic, vertical versus horizontal, and community health versus disease-specific interventions draws on, rather than replaces, these older categories. Recognizing this does more than simply remind us that history may repeat itself; rather it can help us to recognize the long-lasting effects of previous actions and beliefs, which have repercussions that affect us today.

Both broad formulations of disease explain some aspects of an epidemic—neither is fully 'right' nor 'wrong'. But the formulation of epidemics policy on the global scale, using global language, has largely adopted a 'fast-twitch' approach to a problem that most agree has plenty of 'slow-twitch' causes: epidemics-oriented policy has become a policy of rapid response rather than long-term commitment. It often takes the form of highly focussed emergency programmes (eradication efforts and national immunity days are a classic example) dependent on sensitive surveillance systems that are 'tuned' to daily, or weekly events, rather than long-term programmes that respond to longer-wave feedback about environmental and social factors and may be more sustainable. Such changes include transformations in agriculture and land use brought about both by social and natural factors (population growth, migration, and urbanization; climate change, deforestation); poor population health (caused by malnutrition and existing diseases such as HIV and TB); the evolution of pathogens; international trade; contamination of water and food sources; and hospitals and medical treatment (antibiotic resistance) (Morse 1995; Weiss and McMichael 2004). There's a deeper irony here because 'fast-twitch' information may be the best way to learn about long-wave change. Rapidly evolving infectious agents are like canaries in a coal mine or polar bears on melting ice caps: changes in their behaviour reflect a range of more complex and long-term changes in the environment and in the behaviour of their human hosts (Morens et al 2004).

Recent scholarship spanning a range of fields, including ecology and management studies, has emphasized the complexity of dynamic systems, which operate in nonlinear, inherently uncertain ways with which purely quantitative risk management tools may be unable to cope (Scoones et al 2007; Jasanoff 2005). When such tools are nonetheless still retained and applied, the result can be a dangerous rigidity. Such an unwillingness to recognize the limits to knowledge or to entertain alternative ways of understanding precludes the discovery of alternate means of understanding, and thus managing, the system. Only by 'opening up' such processes of knowledge-making, and revealing the deep uncertainties and complexities inherent to the system itself can policies be formulated that respond realistically to a dynamic system as it undergoes dramatic changes. In tandem with the recognition of the internal uncertainty of the system, such a process also recognizes the diversity of social perspectives, or framings, of that system. As a result, an iterative process of deliberation and learning can be built into policy processes. This provides a means of responding to uncertain systems as they change over time, rather than pursuing an unachievable ideal equilibrium state. The challenge is to develop methods for constant re-evaluation and reflection which themselves do not become routinised and narrow.

These ideas about dynamic systems can be usefully applied to global health, which has become increasingly complex, in social, environmental, biological and technological terms. As already mentioned, in recent years the world of global health policy has changed dramatically, with an influx of new money and an efflorescence of new partnerships. This change has engendered what Kickbusch has dubbed a 'policy paradox': at the same time that global public health policy frame has narrowed to focus on infectious disease, the political response has widened outwards from WHO to encompass a new and far more complex political 'ecosystem' populated by a diverse range of actors, including health activists, NGOs, global philanthropists, and the private sector (Kickbusch 2003). What was formerly known as 'international' health governance, coordinated centrally by international bodies like the WHO at the nation-state level, has been replaced by a networked and 'global' health governance, characterized by mixed networks and coalitions of actors than include NGOs, activists, philanthropists and new multi-partner initiatives like the Global Fund (Brown et al 2006).

The big story then is not just emerging infectious disease but emerging policy actors and networks that are transforming the health policy world. How are these two phenomena—the changing landscape of global health governance and the changing landscape of infectious disease—interacting? Some argue that Kickbusch's policy paradox may not be so paradoxical after all—that it is precisely the 'unstructured plurality' of the new global health governance that has allowed global health to become so prominent on the world stage. Global public health has risen in importance, they argue, *because* of the lack of central governance in this field, not in spite of it (Fidler 2007; Bartlett et al 2006).

But a further set of questions must be asked: how have these changes in governance affected not just the focus of health policy on infectious diseases but the *kind* of infectious disease policy that has been emerging? And what is the effect of an epidemics-dominated health policy on the health, livelihoods and well-being of the world's poorest and most vulnerable people? In contrast to those who identify an increasing decentralization in global health governance, some analysts claim that the WHO is increasingly powerful. Davies, for example, identifies an increase in the mediating power of the WHO but argues that this rise in influence is only possible because of support from Western states. Such states see the WHO as a politically convenient proxy, enabling them to forward policies it would not be seemly for individual states to promote. Under the banner of 'global' health, argues Davies, essentially protectionist policies aimed at keeping pathogens out of Western states can be safely labelled 'shared' objectives (Davies 2008).

Having just noted the profusion of policy makers and the complex relations between such actors, what does it mean to speak of a 'dominant' policy framework? The profusion of actors makes certain kinds of interventions much harder to achieve and others more likely to be attempted. In such a situation, focussed programmes, which are ideally disease-specific, time-limited and have narrowly defined and easily measurable outcomes, get prioritised. One-off disease eradication programmes, versus on-going disease control, become the implicit model for, and often explicit aim of, health interventions.

Both the fragmentation (or, to use a positive term, networked aspects) of global health governance and the novel dangers of infectious diseases are 'caused' by globalization, which creates new networks and connections at the same time as it (necessarily) destroys old structures. This circular relationship between the production and management of risks is what theorists have identified as 'reflexive modernity' (Beck, Giddens and Lash 1994). In the case of the pathogen environment, pre-existing relationships between humans, animals, infectious agents and the natural world have been destroyed as populations become increasingly mobile,

occupying new social and ecological niches, and thus creating more opportunities for new pathogens to emerge, or for existing pathogens to advance. In the case of the policy world, the vision of a simple command-and-control structure of international health (whether it ever existed in reality is a separate question) has been replaced by a floating assemblage of incompletely networked policy actors. At the same time, health has become explicitly geopolitical: the governance of health has become a concern not simply for individual states but for international relations.

Globalization in the guise of global health security has, to a certain extent, engendered the new networked architecture of global health policy (Fidler 2007). This isn't necessarily a bad thing. It might result in a useful redundancy or plurality at the level of policy which is a form of insurance against the unpredictable system shocks that we fear. Fragmentary systems may also be resilient systems. It becomes important to ask, therefore, how policymakers might encourage 'useful' chaos at the level of policy while avoiding both wasteful redundancies and a kind of passive 'groupthink'. This is an especially salient question because the decentralization in the field of global health governance has led to calls for integration, harmonization and coordination (Lee and Fidler 2007; Muraskin 2004). New alliances that seek to join a diverse set of actors into a unified approach, such as the Global Alliance for Vaccines and Immunization (GAVI), and the Global Fund to Fight AIDS, TB and Malaria are all responses to the perceived need to coordinate action in order to avoid redundancy, wastefulness or conflict. The language of integration, like that of globalisation, assumes an equal sharing of both the risks and benefits of such harmonization. But integration is never neutral. The people who set the terms of such efforts determine how success is measured in a way that may not be that different from those who would design stand-alone interventions.

This is not to say that the best hope for equity or resilience lies simply in an unregulated 'free market' policy landscape. An uncoordinated policy landscape is not necessarily a diverse policy landscape. For many reasons, multiple actors may behave in very similar ways when faced with a chaotic and uncoordinated environment. As Davies suggests, for example, Western governments may support the WHO in its 'securitization' of infectious disease policy for reasons of national self-interest that nonetheless take the guise of global responsibility (Davies 2008). The struggle to 'succeed' in a disordered environment may force organizations, or states, to adopt very similar strategies—highly focussed, time-limited interventions with easily measurable outcomes—in order to reduce their risk of failure. To what extent then, is the networked architecture of policy made up of qualitatively different approaches to health issues? Or is there actually a relatively homogeneous set of approaches which are undertaken separately by different institutions which nonetheless operate under a shared set of assumptions and with very similar survival strategies?

## **SURVEILLANCE AND THE NEW INTERNATIONAL HEALTH REGULATIONS**

Epidemic surveillance systems provide a good case study with which to try to answer these questions. Such systems provide a semblance of global control in light of fragmented on-the-ground programmes, and seek to 'fill the gap' created by the various paradoxes of globalization. For while global systems create opportunities for productive linkages, this interconnectivity also

creates opportunities for systemic melt-down, such as pandemic flu. Similarly, the new decentralized systems of global health governance create the risk of both resource-draining redundancy in programmes as well as unseen gaps in interventions that may leave key areas unaddressed. By looking at surveillance systems, we can get a sense of how coordinated (or uncoordinated) responses are, and how diverse.

Surveillance has always been central to attempts to control epidemic disease. In recent years, however, this historical commitment to detection and monitoring has taken on a new aspect. Surveillance has received renewed and enthusiastic attention from a range of actors who argue that it is precisely because national health systems are failing that we need a better global surveillance network. In 2005, a dramatic shift in the way epidemic surveillance is conceived at a global level occurred with the revisions of the WHO's International Health Regulations (IHR) (Baker and Fidler 2006; Fidler 2005; World Health Assembly 2005). When they were first introduced in 1969, the IHRs were intended to stop epidemic disease from spreading beyond national borders. Six diseases—cholera, plague, relapsing fever, smallpox, typhus and yellow fever—were designated legally notifiable under the regulations. WHO member States did not uniformly comply with these regulations, nor were they given any guidelines or funding to aid them in doing so. From 1996 to 2005, the regulations were revised and the resulting new regulations, IHR 2005, were implemented in June 2007. These new regulations make surveillance the centrepiece of what the WHO calls 'global public health security.' As the WHO explains:

A more secure world that is ready and prepared to respond collectively in the face of threats to global health security requires global partnerships that bring together all countries and stakeholders in all relevant sectors, gather the best technical support and mobilize the necessary resources for effective and timely implementation of IHR (2005). This calls for national core capacity in disease detection and international collaboration for public health emergencies of international concern. While many of these partnerships are already in place, there are serious gaps, particularly in the health systems of many countries, which weaken the consistency of global health collaboration. In order to compensate for these gaps, an effective global system of epidemic alert and response was initiated by WHO in 1996 (WHO 2007, xii-xiii).

This new focus on surveillance has the goal of implementing rapid responses to episodes at their sources. The fixation, under IHR 1969, on international borders and a limited set of diseases has given way to a concern to pinpoint at their source "all events which may constitute a public health emergency of international concern" (or PHEIC) within 24 hours of detection (World Health Assembly 2005, Article 6.1). Such events are not limited to naturally-arising infectious diseases, and may include both deliberate and accidental releases of hazardous materials, including biological, chemical and radioactive materials. Under earlier IHR, the focus of concern—halting the spread of infection at the border—was oriented to space. Under IHR 2005, the focus—pinpointing events within 24 hours of detection—has shifted to one of time. This has resulted in a redefinition of surveillance on the world stage. Surveillance, which can include long-term demographic measurements and community-led programmes, has instead come to mean rapid-response-oriented early warning systems that feed into a global network of laboratories and control centres overseen by the WHO.

This narrowed definition of surveillance has significant ramifications both for the ability of local administrators and health personnel to gain valuable knowledge about health and disease as well as for our ability to respond to fast-changing global health needs in the face of highly

complex and unpredictable dynamics. Attempts to separate acute from chronic conditions—and manage them differently—may in fact compound problems of both type. One example can be found in the recent rise in co-infection of patients with HIV and XDR-TB. In response to the identification of an outbreak of XDR-TB in 2005-2006 among a group of patients in the KwaZulu-Natal province of South Africa, the WHO instituted a Global Task Force on XDR-TB to determine whether the event should count as a PHEIC under the new IHR. The Task Force ruled that because the epidemic did not pose an immediate threat of international spread and, more significantly, because the IHR 'are really intended for outbreaks of acute disease, rather than the "acute-on-chronic" situation of MDR-TB and XDR-TB' (WHO 2007a) that the outbreak did not qualify as a PHEIC. This interpretation of the IHR has been contested by scholars who claim it misrepresents the content of the regulations (Calain and Fidler 2007). The episode nonetheless reveals how embedded assumptions about 'acute' versus 'chronic' or even 'acute-on-chronic' events may lead to dangerous sidelining of threats which are urgent and potentially wide-reaching.

The language of integration and harmonization is often used to counter-claims of lack of coordination or wasteful redundancy, but recognizing the limited definition of epidemic surveillance today demonstrates how much more substantial such calls for integration could be. To be sure, integrating existing infectious disease surveillance systems that are oriented to identifying rapidly developing outbreaks with the potential for wide geographical spread is essential. But integration can go further. For example, registration systems, which keep track of births, deaths and marriages, are essential both for managing infectious diseases prone to epidemic outbreaks and in creating the conditions necessary for improved primary health (Abou Zahr et al, 2007, Mahapatra et al 2007, Setal et al 2007, Szreter 2006, Szreter and Woolcock 2004). A proposed programme labelled 'surveillance for equity' aims to harness the technology and infrastructure of health surveillance and vital statistics to enable people on the ground to identify where interventions are most needed, in local terms, and act accordingly (Taylor 1992).

Both proposals recognize and make explicit the link between knowledge about a population (its vital and epidemiological statistics) and the rights and status afforded to individuals within that community. The intended beneficiaries of such statistical reform extend far beyond centralized bastions of control and associated 'technocratic' interventions. Ideally, they are created 'principally for the liberty and the use of private individuals, and not to serve the purposes of commercial organizations or states' (Szreter 2006). But while such projects can be tools for local empowerment, they also broaden our knowledge of how social and natural factors conspire to create the conditions from which epidemics arise, making them critical elements of a global health programme. Such research impels us to ask, more broadly than the work on integration mentioned above, what impact do global systems of surveillance have on global inequality? What are the politics of surveillance? And what is the relationship between systems of representation, governance and commerce?

## **UNOFFICIAL INFORMATION AND FORMAL DECISION-MAKING**

At the same time that the revised IHR have helped to define epidemic surveillance in terms of rapid-response early-warning systems, they have also led to a sea-change in the way that official and unofficial sources of information are treated by the WHO. A key element of the new IHR and,

by the WHO's own account, a 'revolutionary departure' from previous international regulations, is the acknowledgement that 'non-state sources of information about outbreaks will often preempt official notifications.' In this way, an emphasis on identifying (and thus possibly preventing the spread of) outbreaks as quickly as possible is linked with a project to extend surveillance across a much broader field (WHO 2007) This 'revolutionary departure' formally acknowledges the fact that electronic communication via the Internet and cell phones renders hopeless any attempt to conceal outbreaks. It also represents a sea change in the agency's attitude towards surveillance, indicating a new desire to cast a much wider net to gather 'infectious disease intelligence' (Heymann and Rodier 2001).<sup>2</sup> Such a change has been welcomed by some analysts. Fidler argues that 'new information technology and their global dissemination,' such as GOARN, have 'transformed not only the technological context but also the political and economic realities of infectious disease reporting,' making it more 'dynamic, flexible and forward-looking' by empowering non-State actors to contribute on a more equal footing (Fidler 2005, 362). By all accounts, the new regulations have already led to substantial changes in the make-up of infectious disease reporting. Initial reports indicate that over two-thirds of the information on outbreaks that reaches the WHO outbreak verification team is based on unofficial information provided by nongovernmental organizations, health professionals and the general public, with only one-third coming from WHO and national health agencies (Grein et al 2000). This has ramifications both for how much control local populations have over disease information and responses as well as how the global system operates which may not be clearcut. And, as is the case with the rapid-response element of the IHR, the new approach to unofficial information may have a negative bearing on the overall ability of the system to respond to unexpected events.

As the WHO acknowledges, both the changing reality of communication and the resulting shift in the official stance on notification have significant ramifications for how global public health is managed. (Heymann and Rodier, 1998; Heymann and Rodier 2001; Grein et al 2000). As information about disease outbreaks travels both more quickly and more freely, mechanisms for evaluating the nature and significance of such information must also change. One important challenge is that of distinguishing 'real' events from the surrounding noise of random variation, error, rumour and possible deliberate obfuscation. Such 'noise' or 'chatter' has always mattered to epidemiological surveillance. What's new is the changed stance of the WHO, and other international health organizations in relation to that noise. In the past, a formal distinction between 'official' and 'unofficial' channels of information provided a means of triaging information. While superficially crude—only official information was officially acknowledged—such a procedure may in practice have allowed for a surprising degree of subtlety and flexibility. In any case, it kept attention focussed on creating and maintaining channels of official information that were as robust and reliable as possible. The downside of such a focus is a dangerous rigidity; the upside is trustworthiness and stability.

To adapt to the new IHR, the WHO has developed another formal process for evaluating the significance of outbreak information from both formal and informal sources. This process occurs under the rubric of the Global Outbreak Alert and Response Network (GOARN), launched in 2000 (Heymann and Rodier 2001; Grein et al 2000). GOARN represents a formalisation of a set of

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<sup>2</sup> From July 1, 1997 to July 1, 1999, a total of 246 events of international public health importance were identified by the WHO outbreak verification team and disseminated on the Outbreak Verification list. Seventy-one percent of those events were based on reports from informal or unofficial sources (including the web, list-servs and NGOs—a varied lot), and only twenty-nine percent the official WHO network or national health ministries of member countries.

procedures spanning detection, verification, alert and response that have long formed the basis of any global response to an outbreak. Central to this process is an Outbreak Verification team based on Geneva. This team meets regularly to evaluate outbreak reports culled from a variety of official and unofficial sources, which include national institutes of public health, WHO offices and other agencies in the UN system; nongovernmental organizations; newspapers, television, and radio; and electronic discussion groups and internet postings. Most of the latter are identified in the first instance by the Global Public Health Information Network (GPHIN), an on-line trawling programme that tracks over 600 published information sources, including major newspapers, wire services and biomedical journals. If a given outbreak report has the potential to be a PHEIC, the outbreak verification team contacts people in the relevant WHO regional offices, who themselves then attempt to confirm reports from health authorities on the ground in the affected location. On the basis of initial reports of possible PHEICs, an email is sent directly to partners and with a wider audience via the Outbreak Verification List, a weekly email letter distributed to 800 subscribers, which include WHO staff worldwide, other UN agencies, national health authorities, and nongovernmental programmes. The Outbreak Verification List includes information on unconfirmed reports and is limited to subscribers. Once an outbreak report has been verified by communication with those in the field, verified outbreak reports are often also posted on the WHO Disease Outbreak News portion of the WHO website but only after they have been officially confirmed.

During this process, the boundaries between public and private are routinely crossed but they are not permeable in all directions. Outbreak verification depends on the *input* of outbreak reports from a wide and unregulated public sphere. Like other user-generated content, such as Wikipedia and the blogosphere, this is part of its strength. But those reports are still verified largely by using the WHO formal channels of governance, through regional offices and country health authorities. Similarly, though nongovernmental organizations may also be contacted at this point, there is no official procedure for attempting to use wiki-like tools, such as citizen or volunteer assessment of outbreak reports, to verify outbreaks. More significantly, there is no attempt to provide local communities with epidemiological information for their own use in managing public health on a daily basis, in the absence of a confirmed outbreak. In other words, there is no attempt to make the wealth of information collected under the auspices of GOARN work for local communities during the vast majority of the time when the locale is not subject to emergency control actions.

Instead, the Outbreak Verification team is responsible for transforming 'raw intelligence gleaned from all formal and informal sources . . . into meaningful intelligence' (Heymann and Rodier 2001). The dissemination of outbreak reports *outwards* occurs along carefully delineated lines. Only 800 subscribers get the Outbreak Verification report, which thus remains more or less private until a report is 'officially confirmed' at which point it is spread widely via the WHO Outbreak News (the most frequently consulted portion of the WHO's website) and the Weekly Epidemiological Record. Of course, one of the key reasons why the dissemination of outbreak reports must be carried out carefully is that the WHO must avoid the danger of spreading mass panic or, alternately, of becoming a 'boy who cried wolf', with a subsequent public failure to respond in the event of a real emergency. Nonetheless, the imbalance in the openness of the inputs versus the closedness of the outputs of this system reflects assumptions about who should rightly govern responses to epidemics. The result is a shift towards official centralized control and away from locally-managed processes. In a sense, this is unavoidable. The WHO, and its associated programmes, are by definition, institutions of focussed control. What is instructive is the agency's stance towards the relative authority of different kinds of knowledge within the official system. In this respect, the title of a WHO-authored paper on GOARN is instructive.



'Rumours of disease in the global village' seeks to frame the WHO's programme as simply an exceptional (for which read 'global') version of 'local' and 'traditional' responses to disease (Grein et al 2000). But is this simply pandering or does it represent a serious attempt by the WHO to revise its own self-understanding?

The WHO's shift, as codified in IHR 2005, reflects a desire to adapt both to changes in information and communications technology, as well as changes in the nature and patterns of infectious disease. But while the shift may be necessary, it raises an important epistemological question: how can non-official sources of information be evaluated by an official system? While official systems are always dealing with unofficial information, they don't always acknowledge it. What sort of effects might the WHO's official stance on unofficial knowledge have? If information is truly informal, it may prove very difficult to classify. As the WHO acknowledges, the mobility of information makes procedures of classification, by reputation, trustworthiness and reliability, more important than ever before. The WHO frames this in terms of public opinion; 'At a time when information is shared at the click of a button, reputable sources of information are critical in maintaining public awareness and support of prevention and control measures.' (WHO 2007) In fact, the issue is more fundamental. As sources of information proliferate, the need for robust classification procedures increases. But the WHO's new emphasis on unofficial information has not been accompanied by a concomitant concern with protecting the autonomy, privacy and rights of those whom it is asking to provide such data. Humanitarian organizations, for example, may find themselves faced with a conundrum when being seen to report a disease event to the WHO may compromise their neutrality or authority with respect to local populations.

As this description reveals, with the opening up, under IHR 2005, of new kinds of global health surveillance, the distinction between unofficial and official sources of information has not fallen out of global health surveillance under the WHO but rather become more delicate and more involved. Much rhetoric about the irrelevance of national boundaries to disease pathogens notwithstanding, national boundaries may become more, rather than less, important with respect to both surveillance and response. Today national boundaries may be less important geographically as points of epidemiological control (as they were under the old IHR 1969), but nations, and their sovereignty, have become arguably more important as infectious diseases continue to worsen (Fidler 1996, Fidler 1997, Heymann and Rodier 2004; Bashford 2006; Weir and Mykhalovskiy 2006, Mack 2006, Davies 2008). China's failure to disclose the initial SARS cases on its soil is one example of how national sovereignty issues remain of primary importance in planning for effective global health policies. Indonesia has consistently refused to share samples of the H5N1 virus. Since the country has been hit hard by avian influenza, its cooperation in tracking and studying the disease is critical. Citing the newfound concept of viral sovereignty, the Indonesian government has alleged collusion on the part of Western governments and pharmaceutical companies to steal such samples and create patentable vaccines from them which will be too costly for Indonesian citizens to buy (Fidler 2008; Holbrooke and Garrett 2008). Indonesian ministers have explicitly linked demands for the equitable provision of vaccines by private companies to compliance with international sample sharing protocols. Such tensions reveal the inherent weakness of the IHR. The WHO has no tools for enforcement and must rely on convention and peer pressure to encourage the compliance of member states.

## THE 'PROBLEM' OF LOCAL KNOWLEDGE

New sources of information require new methods for processing that information, and such methods rely on norms and values that are different in official and unofficial contexts. Some responses, such as the Global Public Health Information Network, the ProMed email distribution list and a more recently established HealthMap project designed to provide real-time information to a range of end users (Brownstein et al 2008), use the power of the web to identify possible outbreaks. Others have suggested that syndromic reporting, based on clinical symptoms easily identified even by non-medical personnel, would capture more relevant disease events in a surveillance system (Buehler et al 2004; Reingold 2003; Calain 2007b).

In other cases, the turn to the informal may in fact elicit a greater formalization of decision-making elsewhere. For example, one response to the growth of information on outbreaks from unofficial sources has been a move towards a greater formalization of decision-making practices, based on risk-assessment techniques. In order to assist member countries in determining if an event counts as a PHEIC, the WHO has introduced a formal decision-making instrument based on risk-assessment techniques. In addition to these formal decision-making tools, a national IHR focal point in each country is intended to serve as a node in an international surveillance network. Thus the expansion of unofficial events included within surveillance has predicated a need for formal risk-assessment tools (Baker and Fidler 2006). But the introduction of such formal risk regimes may mean that flexibility is sacrificed precisely when it is needed most, at the time when resilience and responsiveness are increasingly considered essential for responding to new dangers.

While 'old-fashioned' surveillance systems relied on a faulty system of command-and-control for both generating and communicating outbreak information, such systems may, in fact, have enabled a certain amount of trust to be built up between people, who could thus make their own judgements about what counted as a significant event. On the other hand, in creating an appearance of chaos, or unregulated information, the WHO's new 'open' surveillance system may elicit such potentially unhelpful responses as 'formal' risk management practices that serve to stiffen the overall system. The emphasis under the new IHR on the inclusion of both state and non-state actors may not mean more diversity of response. Alternatively, can resilience be programmed into formal risk-assessment techniques? Or is it (just a little) oxymoronic to consider 'rules' for a flexible organization? Is it possible that open surveillance systems, of the kind promoted by the new IHR, may lead to less, rather than more, transparency?

Analysts of resilient or high reliability organizations have suggested that the organizations and individuals that most successfully respond to unexpected shocks are those that can determine when to discard inappropriate rules and hierarchies in the face of a dramatically altered reality (Weick 1993; Hamel and Välikangas 2003). The ability to wrest sense from crisis depends to a certain extent on a balance between structure and chaos, between how much emphasis the organization places on training and hierarchy, and how much it gives to trust, communication and individual initiative. The structure of an organization determines the kind of story it can collectively construct about a fast-changing or unpredictable situation (Brown and Eisenhardt 1997; Weick et al 1999). Taking it further, the existence of multiple kinds of story-telling in an institution (which may take the form of simulations, vicarious experiences, and other ways of imagining the diverse pathways leading to a catastrophic event) is itself a form of insurance against rigidity and narrow-mindedness: 'a system which values stories, storytellers, and

storytelling will be more reliable than a system which derogates these substitutes for trial and error' (Weick 1987). By the time an epidemic is upon us, it is too late to test the system. Storytelling, Weick suggests, is a good proxy.

Questions about the ability of a system or organization to incorporate alternate forms of knowledge (or sensemaking, in Weick's terminology) have, in a variety of forms, animated medical anthropology, sociology of medicine, and participation studies more broadly in both STS and development studies (Leach et al 2007). Within this literature, the question is often posed in the following terms: how can tacit, informal or local knowledge be included in formal knowledge systems? Within the history of science and science and technology studies, scholars have since the 1980s sought to demonstrate that tacit, informal or lay knowledge is neither separable from science (Sibum 1998; Warwick 1995; Mackenzie and Spinardi 1995) nor should it be considered inferior to expert knowledge when it comes to democratic governance and policy-making (for an historical review of this literature, see Lengwiler 2008). A variety of alternatives to traditional expert-led governance of science and technology have been proposed that emphasize deliberation and reflexivity. Understanding how an issue is differently understood, or 'framed' by different knowledge-holders, thus becomes a part of the process of determining an acceptable solution (Smith and Stirling 2006). By learning to see and accept that knowledge is necessarily and always imperfect, such approaches seek to build into decision-making an awareness of the inevitability of unintended consequences and, it is hoped, a corresponding humility that will make it easier to respond to such consequences when and if it becomes necessary. Complexity, ambiguity, contingency, plurality and on-going re-evaluation are emphasized over simplicity, certainty, resolve, unity and finality.

The 'problem' of local knowledge is ever-present in development studies. Despite a significant literature on participation and citizenship that seeks to enhance democracy and governance in developing countries (Chambers et al 1989; Warren et al 1989; Warren 1990; Cornwall 2006, Gaventa 2006), 'social', 'local,' or 'cultural' factors are still often blamed for the failure of a given intervention. Critics have pointed out that the reification of 'traditional' factors, even when done with the putative aim of 'including' such people or knowledge in health initiatives, often has the net result of reducing complex concerns to simple categories, like 'tradition' or 'culture' that ultimately prioritize the aims of wider development community above those of the local community (Scoones and Thompson 1994; Cooke and Kothari 2001; Pigg 1997; Pigg 1995, Taylor 2007; Pillsbury 1982). This attitude towards local knowledge, which treats all non-Western or non-scientific ways of knowing as functionally equivalent 'traditional' knowledge that can be slotted into interventions at the appropriate place, extends deep into the structure of much global health policy.

A key transition occurred in the late 1970s. At the same time that the much-vaunted 'Health for All' policies emerged from the WHO's Alma Ata conference, the agency was implementing plans to involve so-called 'traditional medical practitioners and 'traditional birth attendants' in its programmes (Pigg 1997). The subsequent struggle to variously understand, evaluate and govern such 'traditional' practitioners (and their 'traditional' patients) in relation to such 'global' undertakings as WHO programmes has kept anthropology and development (and a third, especially problematic category of applied anthropology) locked in a contentious love-hate relationship for decades (Ferguson 1997). Answers to the 'problem' of local knowledge have accordingly ranged widely, from suggestions that traditional healers be trained to become nodes in a formal surveillance network (Groce and Reeve 1996) to calls for finding 'conceptual links' between 'traditional' or 'folk' views of sickness and disease and Western biomedicine (Leach and Fairhead 2007; Scoones and Wolmer 2006).

Often, appeals to heed the significance of local knowledge are imbued with an anti-metropolitan politics which sees the 'local', the 'informal' and the 'traditional' as being vulnerable, isolated and marginalized. But such stances may also fail to consider how local actors themselves act on a global stage. Consider the boycott of polio vaccines in northern Nigerian undertaken by local Muslim leaders who suspected the injections of being part of an American-led plot to spread AIDS and infertility in Muslim Africa (Yahya 2006). Similarly, the government of Indonesia refused to share samples of avian influenza that occurred within its borders, on the grounds that any vaccine developed by Western pharmaceutical companies from that strain would not be affordable to its citizens (Fidler 2008). In both these cases, supposedly 'local' concerns can only be understood in terms of a global discourse about the war on terror and free trade, respectively.

These questions are directly related to the framing of epidemics as acute events. Embedded in that definition is the potential for international spread, for the transformation of a local concern into a global one. Policing the border between the local and the global, in semantic, political and epidemiological terms, becomes ever more important. Rather than borders dropping out of such approaches, they become definitional. Though the language of global and local has been used by many scholars seeking to redress the power imbalances that bedevil development policy, the terminology itself is problematic. The distinction between global and local is ultimately a false one. Every place is local, including such global paragons as the WHO and the UN, and, as the examples above suggest, 'local' places increasingly contribute to global dialogues (Kickbusch 1999). This insight applies equally to the distinction between national versus global health policy; globalization has not elided this distinction but created new fault lines between shared global goods and questions of national sovereignty and security. Rather than more anthropology of non-Western peoples, then, perhaps what is really needed is a fuller understanding of knowledge circulates at multiple levels and in multiple forms (for one example of such a project, see the Pro-Poor HPAI Risk Reduction study, <http://www.hpai-research.net>). By revealing how variegated the global actually is, such studies will further demonstrate the discursive power of 'global' language to summon into existence an imaginary consensus on health policy (on the fragmentary nature of one WHO-led intervention, see Bhattacharya 2006; on the 'tacit globalism' of contemporary vaccine policy, see Blume and Zanders 2006).

## **CAN NATIONAL HEALTH SYSTEMS AND GLOBAL SURVEILLANCE BE COMPATIBLE?**

Developed countries with highly functioning health infrastructures stand to gain much from global surveillance efforts that may help them to protect themselves from the spread of infectious and communicable diseases. But if national health systems of developing countries are seen to be irrelevant to this global project, critics argue that there is a risk that funding and commitment to those systems will decline as the cart of global health surveillance gets put before the horse of robust national health infrastructures (Calain 2007a). Indeed, the increasing willingness of the WHO to incorporate informal data into surveillance systems has been taken by some as an indication of how global surveillance initiatives and health system infrastructures are 'drifting apart' on the international agency. The danger is that rather than funding much-needed national health infrastructure, monies from WHO and other key public health organizations will be spent on surveillance that is of most benefit to countries with robust infrastructures, leaving

poor nations out in the cold. 'If the main legacy of global surveillance policies consists merely of a summons to plug into a virtual 'network of networks', and to welcome foreign investigators donning bio-protective equipment,' writes Calain, for example, 'we will fail in our duty to protect the most vulnerable populations during a pandemic of some magnitude'(Calain 2007b).

WHO has made few provisions for the funding the official surveillance and reporting systems within resource-poor member countries. 'Core capacity requirements' establish minimum requirements for surveillance and reporting systems within all countries. Substantial resources are needed to meet the requirements, but while WHO is obligated to 'assist' member countries in meeting their surveillance system obligations, there is no provision for WHO funding to enable member countries to comply with the regulations. Many developing countries simply do not have the capacity to comply with IHR 2005. They do not have well enough developed health infrastructures to contribute meaningfully to a global surveillance and response system. There is an analogy at the national level here with Paul Farmer's insight into individual compliance with medical treatment: 'Those least likely to comply are those least able to comply' (Farmer 1999, 255). Without a radical change in the way funds are distributed, some have argued, the WHO surveillance system will be little more than a faulty early warning system of benefit only to developed countries who invest their money in stockpiling vaccines rather than improving the health systems of developing countries (PLoS Medicine Editors 2007; US Dept Health and Human Services 2006).<sup>3</sup> Similarly, the real cost of global surveillance systems to developing countries maybe considerable, with overlapping systems draining scare human resources.

A key question raised by the changes in WHO IHR regulations and by the critical literature is, therefore, whether surveillance systems and national healthcare infrastructures can be made compatible, if not actually mutually beneficial? One way of answering this question is to advocate surveillance systems that are 'holistic' or integrated and able to meet multiple kinds of information needs with one infrastructure (Perry et al 2007, WHO 2000). With an eye towards the anticipated completion of the Global Polio Eradication Initiative (GPEI), the WHO has introduced an integrated surveillance programme that is meant to 'mainstream' the Initiative's extensive system of trained personnel, facilities and management structures (WHO 2004a; Heymann et al 2004). The impact of such top-down 'mainstreaming' on local communities is uncertain. Limited research on successful integrated regional surveillance systems emphasize the importance of simplicity of reporting procedure, low costs, personal rapport between organizers and people in the network, and regular feedback of information (John et al 1998; John et al 2004; Calain 2007b). As already indicated, the language of integration, as presently used, may not go far enough in guaranteeing national or local self-determination in matters of health policy.

## **LOOKING TO THE FUTURE**

As organizing narratives, globalization and surveillance cannot easily be separated. As the previous pages have demonstrated, the logic and assumptions of each contribute to a shared master narrative about infectious disease outbreaks that organizes much global health policy today. A series of dichotomies helps to distinguish and valorise interventions. Fast- versus slow-

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<sup>3</sup> In December 2005, the US Congress allocated \$3.8 billion to pandemic preparedness. \$3.3 billion of this went to the Department of Health and Human Services, of which three-quarters is devoted to stockpiling antiviral drugs and vaccines for use in the US, and only 3.8% is committed to 'international activities.'

twitch models of disease, global versus local models of culture, and official versus unofficial models of knowledge provide categories according to which policies can be evaluated, designed and implemented. As a result, policy on the global scale has tended to be oriented towards addressing highly time-focussed outbreaks that threaten to cross international boundaries rather than longer-term endemic problems that affect the most vulnerable people. Failure to address such long-term changes (what might be called stresses to the system, rather than shocks) may make the whole global system itself more vulnerable over time.

How best can resilience be fostered in relation to global health policy in a way that is sustainable for the communities most at risk? One answer is to provide ways in which these competing models can feed into each other: fast-twitch problems help signal slow-twitch transformations; local knowledge is seen to be a form of global knowledge; official knowledge systems feed unofficial ones. Such feedback loops are another way of introducing reflexivity into policy-making. Or, to use Weick's language again, this provides a wider set of stories which the collective global health community can tell itself about what might happen. The results aren't simply discursive (though they are importantly that): they also include changes in what is seen to be the purpose and aim of global health policy. In other words, giving local people control over epidemiological information, or defining infectious disease events in terms of environmental change or migration patterns that occur over years (and decades), will change the overall contents of the box labelled 'global health policy'.

Making such changes will require us to take account of the complexity of the new global architecture of health policy without attempting to maintain rigid lines of control or allow wasteful redundancy. Recognizing that organizational complexity does not necessarily entail conceptual complexity is essential. Just because there is a multiplicity of global health actors does not mean that there is a multiplicity of narratives about global health. A more nuanced description of the nature of the redundancy, chaos and/or lack of harmonization that characterizes this policy environment will require comparative studies of the political economy of health policy in diverse contexts. Orienting this analysis to the end-users of health policy, rather than the designers, will help reveal a truer global map of health and disease.

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