The uses of disorder in negotiated information orders: information leveraging and changing norms in global public health governance

Carol A. Heimer

Abstract

The SARS epidemic that broke out in late 2002 in China’s Guangdong Province highlighted the difficulties of reliance on state-provided information when states have incentives to conceal discrediting information about public health threats. Using SARS and the International Health Regulations (IHR) as a starting point, this article examines negotiated information orders in global public health governance and the irregularities in the supply of data that underlie them. Negotiated information orders within and among the organizations in a field (here, e.g., the World Health Organization, member states, government agencies, and international non-governmental organizations) spell out relationships among different categories of knowledge and non-knowledge – what is known, acknowledged to be known, and available for use in decision making versus what might be known but cannot be acknowledged or officially used. Through information leveraging, technically sufficient information then becomes socially sufficient information. Thus it is especially information initially categorized as non-knowledge – including suppressed data, rumour, unverified evidence, and unofficial information – that creates pressure for the renegotiation of information orders. The argument and evidence of the article also address broader issues about how international law and global norms are realigned, how global norms change, and how social groups manage risk.

Keywords: Negotiated information orders; global public health governance; ignorance; SARS; international health regulations; norm change

Introduction: taking account of ignorance

In the world of infectious diseases, four months is a frighteningly long time. In late 2002 and early 2003, an outbreak of a mysterious flu-like disease occurred in Guangdong Province in China. The first deaths occurred in November, yet China did not transmit information about the outbreak of ‘atypical pneumonia’
until February. The World Health Organization (WHO), the body responsible
for protecting global public health, issued the first of a series of alerts, adviso-
ries, and updates on 12 March 2003, four months after the disease first appeared.
By the time of WHO’s first announcement, though, the virus had spread well
beyond China’s borders. Three days later, the WHO took the unusual step of
advising travellers to avoid all but essential travel to Hong Kong and Guangdong
Province. This second announcement also brought the unwelcome news that
‘atypical pneumonia’ was an entirely new disease, to which WHO assigned the
name SARS (Severe Acute Respiratory Syndrome), rather than a fresh out-
break of an existing disease. In 96 updates published between mid-March and
July, the WHO tracked the disease, worked to determine its cause and create
tests and treatments, issued new travel advisories and updated existing ones,
and announced procedures to prevent transmission, more or less as would be
expected in response to a serious international public health emergency. On 5
July 2003, the WHO announced that the epidemic was over. SARS had ulti-
mately spread to 30 countries, infected over 8,400 people and killed about 10 per
cent of them.2

Global public health governance has a storied history that long predates
SARS. Attempts to induce timely transmission of reliable information ulti-
mately led to a global treaty, the International Sanitary Regulations of 1951,
subsequently replaced by the 1969 International Health Regulations, the core
instantiation of the negotiated information order of global public health gov-
ernance at the time of the 2002–3 SARS epidemic. The SARS response can be
read as a stunning global public health governance success: very shortly after
receiving reports of the disease, the WHO proactively sought out additional
information, developed definitions to guide identification of cases, helped
orchestrate the laboratory work that quickly identified the new coronavirus,
and determined how best to interrupt transmission and halt the epidemic.
But SARS also can be read as a tragic failure of the International Health
Regulations (IHR) and global public health governance: had information been
transmitted up the chain more quickly and more honestly or had the WHO
made more effective use of the information that it acquired through unoffi-
cial channels, SARS might not have spread beyond China, transmission chains
could have been interrupted sooner, and mortality and morbidity correspond-
ingly reduced. What the WHO did not know – or did not know definitively –
was deeply consequential.

As the 2002–3 SARS epidemic illustrates, social life is as much shaped by what
we do not or cannot know as by what we believe we know. Yet scholars, including
psychologists, sociologists, organization theorists, and economists have focused
disproportionately on knowledge and information rather than on ignorance, an
oversight whose importance has been articulated in a compelling body of work on
various forms of ignorance, including secrecy and non-knowledge, usually taken
to mean well-defined ignorance (Gross and McGoey 2015: 4) or a type of knowledge about the unknown (Gross 2007: 746). To be sure, influential research has considered such important matters as the distinctions between levels and kinds of ignorance, uncertainty, and risk, strategies for handling asymmetric information, and procedures for coping with dishonesty and duplicity (see, e.g., Ackerlof 1970; Arrow 1963; Cook 2001; Ericson and Doyle 2004; Goffman 1969; Granovetter 1985; Heimer 1985b; Knight 1971[1921]; Shapiro 2005; Williamson 1975). What is missing, though, is a thorough incorporation of various forms of ignorance, such as non-knowledge, into existing theories of how people, groups, and organizations seek, assign meaning to, and use information (Gross and McGoey 2015; Heimer 2012; McGoey 2014). Researchers need to consider how exactly non-knowledge fits into the negotiated information orders that anchor organizational and inter-organizational action.

Using SARS as an example, this article examines negotiated information orders in global public health governance and the irregularities in the supply of the data that underlie them. Information may be in short supply because it is suppressed, and it may also be of uncertain quality because it is incomplete or purposefully misleading. In effect, the SARS case suggests, whether information is acquired from legitimate sources shapes not only the nature and quality of the information itself but also the uses to which it can be put. In addition to seeking information, then, actors strategically seek information from particular sources and deploy the information they have in hand to pressure others to augment or confirm existing information. Through information leveraging, technically sufficient information becomes socially sufficient information. In this way, the article shows what a negotiated information order might look like when we more fully incorporate the social uses of non-knowledge and other forms of ignorance into our analysis. In particular, the article suggests that it is especially information categorized initially as non-knowledge – including suppressed data, rumour, unverified evidence, and unofficial information – that creates pressure for the renegotiation of information orders.

**Ignorance and non-knowledge in negotiated information orders**

Although it is a truism that information is needed before rational decisions can be made, the importance of information for organizational decision making is often overestimated. Since the pioneering work of Herbert Simon (March and Simon 1958; Simon 1947), organization theorists have understood that the model of rational decision making was a poor description of reality and did not capture how information is actually used by organizations. Because of limited cognitive and computational capacities, theorists suggest, organizations are only boundedly rational, accepting satisfactory solutions rather than continuing decision-making processes until they find optimal ones.
Besides using less information than might be expected, organizations also use it on a different timetable and for different purposes. For instance, information intensive solutions often are produced somewhat independently of the problems with which they are eventually matched (Feldman 1989). Employing the metaphor of a garbage can, other scholars suggest that organizational decision making is not linear, but instead depends on how the semi-autonomous streams of choice points, problems, solutions, and participants come together (Cohen et al. 1972; Heimer and Stinchcombe 1999). Moreover, information has symbolic as well as instrumental uses, often serving to legitimate decisions even when it plays little role in identifying problems and selecting or crafting solutions (Feldman and March 1981).

Decision making is a quintessentially social matter. Decisions may depend less on whether decision makers have enough high-quality information than on whether they agree that the available information meets a variety of normatively or even legally established criteria. That is, whether or not information is technically sufficient, it must also be socially sufficient to be usable in decision making (Heimer 1985a). Information is technically sufficient if it can be used to answer key questions confronting an organization and if it can be used, perhaps with some modification, in an organization’s decision-making algorithms. If decision makers cannot cite data of the sort conventionally used or recognized by their organizational field as sufficient for decision making, their decisions may be subject to challenge. A negotiated information order emerges when consensus is reached within or between organizations in a field regarding the criteria for socially sufficient information – about the type of information usable in decision making, the priority given to different types of information, and allocation of responsibility for gathering and interpreting that information (Heimer 1985a: 397).

As these conceptual distinctions suggest, the symbolic nature of information penetrates even more deeply into organizational decision making than previous research might lead us to expect (Feldman and March 1981; Meyer and Rowan 1977). In particular, such symbolic considerations shape assessments of both decision-making processes and the information on which they are based. To work its symbolic magic, information must be seen as legitimate, and organizational actors will spar over whose data passes that test. But, crucially, such tests are layered. Socially sufficient information is thus information that is widely agreed to be adequate to its intended purposes. Technically sufficient information is more contested, with some actors touting its virtues and others casting doubt. Technical sufficiency can therefore be a way-station along the path to social sufficiency or an intermediate category that permits some uses of information while prohibiting others. Although participants experience these discussions as realist, social scientists would be quick to point out the deeply constructionist character of claims about the quality and veracity of information. The lines dividing categories of information are necessarily fluid,
with discoveries shoring up some claims while undermining others and regularly adding to the stores of both knowledge and ignorance. As we will see, it is especially the boundary between knowledge and non-knowledge where contests are focused, because crossing that boundary makes otherwise prohibited actions possible. Transposed into an organizational register, the dividing line between knowledge and non-knowledge takes the form of a distinction between technically and socially sufficient information.

To say that the acceptability of information depends on a negotiated information order says only that the meaning of information is not given a priori but must be worked out collectively. Norms about the sufficiency of information may be grounded in rules or laws. Or they may reflect a broad, but informal consensus. What consensus is ultimately reached will depend on such factors as power differences, inter-organizational dependencies, and pre-existing loyalties. The preferences of powerful actors who have a vested interest in perpetuating practices associated with traditional types of information may have an outsized influence on the norms that emerge. Previous agreements about the acceptability of various kinds and quantities of information provide important starting points, but will be less influential when decision makers face situations that seem unprecedented. Thus negotiated information orders can be destabilized by modifications in technology, by the arrival of new problems or opportunities, or by changes in relationships among parties.

Three examples illustrate the importance of negotiated information orders in assigning meaning and determining how information is interpreted and used. Clarke’s *Mission Improbable* (1999) shows how information orders negotiated by powerful actors can exclude other voices that might challenge the meaning assigned to information. Analysing organizations’ plans to avert, control or cope with disasters, Clarke considered the ‘fantasy plans’ created to clean up oil spills in open waters, evacuate Long Island in the event of a nuclear power plant accident, and protect the population during and after a nuclear war. In each case, rather than frankly acknowledging the impossibility of averting, controlling or mitigating disaster, key actors developed elaborate analogies and conducted careful simulations to convince themselves and others of the truth of essentially untenable propositions.

The problem, of course, is that such analogies and simulations rarely work – nuclear meltdown is not much like an ice storm, a major oil spill in open waters cannot be simulated by scooping up oranges from calm seas, and the evacuation of Long Island because of a nuclear accident cannot in good conscience be equated with the flow of people during rush hour. But when discussion is confined to a circle of experts, others may be unable to point out the obvious. Here, the negotiated information order precluded consideration of information that other parties could have introduced by dismissing suppressed perspectives as unusable non-knowledge. With SARS, as we will see, the first impulse of health workers, scientists, and policy makers was also to assume that they were seeing a
variant of something they had encountered in the past – an atypical pneumonia or a disease caused by chlamydia (Normile 2013; WHO 2003a). In SARS, as in Clarke’s cases, suppressing information allowed actors at least temporarily to move forward with existing routines.

Even when divergent views are not completely suppressed, the context in which information is considered can shape conclusions. In Last Best Gifts, Healy (2006) asks how the major organizations supplying blood and blood products to American patients responded to early evidence that HIV could be transmitted through their products. In the American blood industry, a non-profit whole-blood sector (the blood banks), reliant on donors, coexists with a for-profit plasma industry (the plasma fractionators) that purchases plasma from suppliers. Between 1981 and 1983, when no one was sure whether HIV could be transmitted through tainted blood and blood products, the US Centers for Disease Control (CDC) presented their accumulating evidence and made recommendations about how to keep blood supplies safe (Healy 2006: 99–100). Representatives of blood banks and plasma fractionators received identical information, often at the same meetings. Interestingly, though, these two sectors interpreted the information differently and adopted divergent strategies. Blood banks, dependent on donors, saw blood borne transmission as ‘still unproven’ (Healy 2006: 101) and were unwilling to ask intrusive questions about donor lifestyles and sexual practices. In contrast, plasma fractionators, working in a competitive market that made them more dependent on consumers than suppliers, adopted a policy of questioning potential donors and excluding putatively high-risk groups from their supplier pools. In short, the negotiated information order of the plasma fractionators led them to see the early information about HIV transmission as knowledge to be acted on, while blood banks’ information order constructed the same information as non-knowledge to be ignored. With SARS, people in different social contexts not only interpreted the data differently but also concluded that the data implied different things about their obligations under the ostensibly clear rules of the IHR.

The final example shows how attempts to solve a new problem, not easily managed within the constraints imposed by an existing information order, can lead to modifications in that information order and changes in power relations in the field. Contrasting the insurance of mobile rigs used for exploration and drilling with the insurance of fixed platforms used later for the production of oil in the Norwegian North Sea, Heimer (1985a) shows how Norwegian insurers gradually altered the negotiated information order dominated by powerful British marine insurers. During the crucial early period of the exploration and development of the oil fields, insurers lacked the experience-based information needed for rating and underwriting, making them dependent on the reinsurance offered by British insurers. Because multiple companies had to cooperate to assemble these insurance contracts with their uncertain risks and astronomical face values, insurers had to agree about what information was acceptable for
rating and underwriting. British insurers stubbornly insisted on using conventional types of information. Some types of information that, from a Norwegian perspective, addressed key uncertainties thus could not be used simply because they had not been used in the past; social sufficiency dominated (alleged) technical sufficiency because of the requirement for consensus.

Because the total insurance capacity was insufficient to adequately insure the North Sea oil fields, Norwegian insurers were strongly motivated to create new routines for collecting and analysing data. They worked around and then modified conventions about what information could be used for ratemaking and underwriting. And gradually the situation changed. For mobile rigs, experience-based data slowly became available and pooling risks over time and over similar units became increasingly feasible. This in turn further decreased dependence on the British reinsurance market and enabled Norwegian insurers to be more flexible about what data to use and how to construct the policies. In contrast, little changed in the insurance arrangements for fixed installations, which were more expensive, less uniform, less numerous, and introduced later in the development of the oil fields. In the SARS case as well, as we will see, pressure to change the rules became acute when new sources of helpful information became available but could not be efficiently exploited unless rules and norms were modified.

As these examples demonstrate, organizations’ information use is strongly shaped by social conventions. Negotiated information orders spell out the relationships among different categories of knowledge and non-knowledge – what is known, acknowledged to be known, supplied by official sources, categorized as socially sufficient and therefore available for use versus what might be known, with varying degrees of uncertainty, but cannot be acknowledged or officially used. Non-knowledge, which often comes from unofficial, back-channel sources, may be disregarded because it seems dangerous, threatening, harmful, or simply uncertain; ignored because decision makers are reluctant to bear the costs of retooling to collect, evaluate, and use new forms of information; or discarded because of the symbolic importance attached to information from official sources and the rights accorded to those who possess such high-value information. Negotiated information orders thus introduce a modicum of stability in information use for some period of time until a new opportunity or danger arises. When that occurs, key actors pointing to the strategic value of certain information may successfully advocate for the reclassification of some non-knowledge as usable and technically sufficient and for the renegotiation of the information order. The arrival of a new disease – HIV, for the negotiated information order of the American blood industry; SARS, for the IHR, the corresponding information order of global public health governance – can bring into sharp relief the irrationalities of established understandings about the reliability of information and the appropriate ways of using it.

This article draws on a case study of SARS to demonstrate how the deficiencies of the existing information order, institutionalized in the IHR, became
painfully apparent in the wake of the epidemic. Recognizing the substantial contributions that unofficial, previously illegitimate sources of knowledge could make in the fight against deadly infectious disease in turn helped to solidify the consensus around IHR reform efforts already underway in 2002–3 when the SARS epidemic occurred. In preparing this article, I have drawn especially on primary WHO documentation about the IHR and SARS epidemic, supplemented by reports and commentaries from governmental bodies (e.g., the CDC and US Congress) and non-governmental organizations and policy institutes (e.g., the National Academy of Medicine and Chatham House). I have also drawn extensively on existing journalistic and scholarly accounts chronicling and analysing various features of the epidemic and scholarly articles and books investigating the epidemic's legal ramifications and the 2005 revision of the IHR. These documents were drawn from a larger body of primary and secondary materials collected primarily in 2014–15 for a larger project examining the relationship between law and globalization in healthcare more generally. The article contends that in this case, a strong argument about technical sufficiency ultimately led to a new rule system that recategorized such non-knowledge as socially sufficient, legitimate, usable knowledge.

Knowledge and ignorance in disease surveillance: the 1969 IHR as a negotiated information order

International disease surveillance and global health governance have a long history before the SARS epidemic. This history includes a century of international sanitary conferences to standardize quarantine regulations to prevent the spread of cholera, yellow fever and plague (and, previously, relapsing fever, typhus and smallpox); the crafting and revision of the International Sanitary Regulations (first written in 1851); and the formation of a series of international organizations to oversee disease surveillance and international public health, culminating with the 1948 creation of the World Health Organization, whose member states formally adopted the International Sanitary Regulations in 1951. Revised and renamed the International Health Regulations (IHR) in 1969, these rules were in turn replaced by the 2005 revision, which went into effect in 2007 (Fidler 2003; Fidler and Gostin 2006; Gostin 2014: 177–204; Scales 2010: 54–89).

A key issue in these agreements has been the collection and publication of information about disease outbreaks, with careful rules about who has to report and to whom, what they must report about, and what information they must transmit – in short, a negotiated information order that became more fully institutionalized over time. Only with transparency, the argument went, was there any hope of protecting public health and curbing the spread of disease. Yet, as the history of disease surveillance makes clear, because nations also worry about threats to trade, tourism and national reputation, they often strategize
about what to reveal and on what timetable, hoping that diseases can be brought under control before discrediting information damages the economy or spoils the national reputation. The objective of the international conferences, conventions, and the IHR has been to induce more timely and more complete sharing of information, previously narrowly focused on reporting on a few infectious diseases and now more expansively redefined to include both infectious diseases and a wide variety of other threats to public health, by recognizing and working with this tradeoff.

Under the 1969 IHR (WHO 1983), security against the spread of disease was to be achieved by requiring member states to notify the WHO of disease outbreaks within their borders (Part II, Notifications and Epidemiological Information, Articles 2–13) and maintain public health capabilities at ports and airports to monitor and reduce cross-border transmission of disease (Part III, Health Organization, Articles 14–22). Minimization of interference with trade and travel was to be achieved by specifying the range of responses states would be permitted or required to take in response to public health threats (Part IV, Health Measures and Procedures, Articles 23–49). In effect, commitments to report outbreaks were traded for promises that responses to such information would be moderate, reasonable and scientifically grounded.

Even with this exchange in place, though, the record of compliance has been poor, and poor on both counts (Carvalho and Zacher 2001; Fidler 2004: 35; Kamradt-Scott 2015: 102–5; Scales 2010; Woodall 2001). Countries frequently failed to report disease outbreaks, but they also imposed overly restrictive protective measures, including quarantines and outdated vaccination requirements, that violated the spirit and the letter of the IHR rules on trade and travel. Diseases continued to spread across borders whether or not travellers and goods were impounded, quarantined or otherwise delayed. Although neither the WHO nor the member states seemed very committed to it, as the governing information order, the IHR continued to be consequential in shaping the circulation of information, categorizing information as actionable or not, and providing an excuse for states to shirk or evade pressures to report even as new transparency norms were emerging.

The IHR’s history suggests that this information order is primarily organized around concerns with trade and travel and has favoured the interests of rich countries (Chorev 2012b; Fidler 2004; Kamradt-Scott 2015). Similar patterns of favoring the interests of rich countries in global health governance have been noted by other scholars (King 2002; Erikson 2015; but see Wenham 2015 on recent changes in emphasis). ‘The rising commercial costs imposed by a system of uncoordinated, unregulated national quarantine practices meant that trade rather than health drove the development of international governance on infectious diseases’, concludes Fidler (2004: 29). Quite emblematically, the 1969 treaty and its predecessors focused only on diseases that seemed likely to be spread by trade and travel, and particularly those that might move from poor
to rich countries. Infectious diseases that plagued only poor countries, such as polio, were not listed, and South–South contagion was a secondary concern. Adjustments were unidirectional: diseases were removed from the list, but re-emerging or new diseases were not added; no adjustments were made to take account of changes in modes and speed of transportation.

The official rules of the IHR in some senses imagined a static information order in which states interacted with the WHO – what Fidler (2004) describes as a Westphalian system. Yet the information order has evolved over time in important ways, with the official information order often out of step with informal practices. Two key drivers of change have been innovations in information technologies, which vastly increased the amount of information available while simultaneously reducing state control of information, and the creation of new types of actors in the loosely organized global public health system. As reporting rules were first being developed, it was diplomats who certified that a ship’s last port of call was disease free, allowing ships to avoid quarantine as they entered ports to offload cargo and passengers (Fidler 2004: 27). Although diplomats no longer verify bills of health, the treaty’s reliance on national reporters remains a core element of the reporting framework even though the new categories of actors (NGOs, INGOs, international health workers, laboratory workers, scientists, etc.) have access to much relevant information. Thus an evolving information order peopled with these new actors co-existed with a static legal framework that only recently acknowledged and incorporated them. This meant that the WHO was unable to act even when it possessed information that it believed to be technically sufficient. Because it was bound by a strictly formalized set of rules (few things are more rigid than a treaty with a long list of signatories), it could not adjust to evolving communication patterns.

Although analysts have often described disease surveillance as a collective action problem in which the global interest in transparency is pitted against national interests in episodic strategic concealment, characterizing the problem this way vastly understates the complexity of the interactions among actors. In particular, although it is nation states that have IHR treaty obligations, information about disease may be generated and controlled not only by non-state actors (as mentioned above) but also below the level of the nation-state, by agencies of the state, provincial health departments, individual public or private hospitals, and doctors and other medical personnel. As we will see, the norms and rules about how these lower level actors fit into the IHR negotiated information order have not always been entirely clear.

Until recently, the IHR made the WHO exceedingly dependent on official country reports by prohibiting the use of other sources of information. Although ProMED-mail became an important unofficial source of information about threats to public health after its founding in 1994, for many years the WHO was constrained from officially using it (Woodall 2001). Over time, the WHO’s stance on these alternative sources of information evolved. A
World Epidemiological Record piece suggested that ‘public health authorities should give more attention to information from sources other than the public health sector, including NGOs and the media. The capacity of public health authorities to rapidly respond to outbreak-related information from any source is essential for the efficiency and credibility of the entire surveillance effort’ (WHO 2000: 7).

As the volume of information available from electronic sources and from health experts dispersed around the world increased, the pressure to use such information also increased. With increasingly sophisticated tracking systems, for instance, it became possible to demonstrate that deaths (even of particular named individuals) could have been prevented by earlier issuance of travelers’ advisories (Woodall 2001). Often, though, sub rosa information was less useful for issuing official warnings than for pressuring countries to report or for asking pointed questions about the adequacy or accuracy of reported information. ‘They have accused us of spreading unfounded rumors and posting reports that have had no peer review. But we’re just reporting what is being said or published. We tell health officials, you might as well report this, because you’ll be reading it on ProMED tomorrow’, commented Charles Calisher, an early moderator of ProMED (Miller 2007). Some kinds of action required only that information be seen as technically sufficient (adequate in volume and coverage), but other kinds of action required that information also be socially sufficient (supplied by legitimate sources and arriving through specified routes).

Were the 1969 IHR ever an effective information order? Undoubtedly the treaty was an improvement over earlier agreements, both in clarifying expectations and obligations and in institutionalizing a set of practices for reporting on disease outbreaks and keeping protective reactions in bounds. Although it was an admirable attempt to create a worldwide consensus that balanced health interests against economic ones, it also had several clear deficiencies. An especially important deficiency was the limited coverage of the IHR, which cast doubt on the legitimacy of the treaty. Beyond this severely limited coverage, the IHR were also compromised as an information order by a naïve conception of states as unitary actors and by rules that allowed the WHO to use only limited kinds of information supplied by specified, state-based actors. Over time, informal norms supported fuller reporting on a broader range of threats and exploitation of information from unofficial as well as official sources. But in the medium term, although some nation-states adhered to the new norms, others hid behind the inadequate formal rules of the IHR, and still others continued to ignore even the limited formal requirements of the IHR.

How well did this imperfect, outdated information order function when the IHR encountered SARS, a new, deadly infectious disease that seemed poised to spread rapidly around the world? Did the deficiencies of the information order in fact prevent the WHO from acting quickly and appropriately to contain the disease?
What WHO knew: SARS and the limits of the IHR

Many accounts of the 2002–3 SARS episode describe the Chinese as concealing information or misrepresenting the situation in the first months, often suggesting that the country acted illicitly or illegitimately in doing so (Altman 2004; The Guardian 2003). Yet closer examination of the record (see especially Huang 2004) suggests that something considerably more complex occurred – there were multiple legitimate reasons for China to conceal early evidence of the outbreak. To begin, during the first days, there was nothing to report because no one understood that this was a new viral disease. Because most apparently new diseases are in fact not new, physicians are reminded to think of horses not zebras when they hear hoof beats. As perhaps happened with SARS, this advice sometimes leads people astray. With the benefit of hindsight, it is easy to conclude that Chinese health workers should have been more diligent in forwarding reports about early cases of ‘atypical pneumonia’. But we must be careful not to interpret actions taken in the confusion of the earliest days with knowledge acquired only later. Still, local hospitals did call on provincial authorities for help. Provincial authorities contacted the national ministry of health. A group of experts conducted an investigation. A report was prepared and circulated to all of the hospitals in the province. But here Chinese law altered the disease’s trajectory because the report became a state secret that could be shared only with specified people (such as the heads of hospitals). And then the trajectory was modified serendipitously when the report arrived in hospitals during the Chinese New Year celebrations. Because no one read or acted on the report for a three-day period, precautionary measures were not implemented, creating an opportunity for the disease to spread.

As noted, several months passed between the first appearance of SARS and the first reports to the WHO. Had the first suspicious cases been reported promptly, the disease likely would not have spread beyond Guangdong province and hundreds of deaths could have been prevented. Reports on the case suggest that in the earliest period, people ‘knew’ but ‘didn’t know’ about the epidemic. And although healthcare workers, officials and other actors suspected a problem, at least in some instances they were either forbidden to share information or prohibited from acting on the information they received. In this case, the complex interplay of international, national and local rules and norms seems to have done as much to delay as to accelerate the spread of information about threats to public health.

Information about SARS gradually leaked out, though, with a report from the Chinese Ministry of Health finally reaching the WHO on 11 February 2003 (WHO 2003d). Accounts of this period mention ‘medical whistle-blowers’ (see, e.g., Eckholm 2003), ProMED-mail, the Global Health Intelligence Network (GPHIN, the ‘rumor list’), the Global Outbreak Alert and Response Network (GOARN), and the move of the disease across borders into Hong
Kong and then Vietnam. Although WHO personnel were investigating cases of what turned out to be SARS in China as early as late February (Enserink 2013a: 1266), the WHO issued its first alert about a severe form of atypical pneumonia only on March 12. According to David Heymann (then Executive Director of WHO’s Communicable Diseases Cluster), Vietnam was ‘the trigger’ for this announcement (Enserink 2013a: 1267). A 3 March report from Carlo Urbani, a WHO parasitologist consulting on a case in the French hospital in Hanoi, provided the first indication that the new disease had spread beyond Guangdong and Hong Kong. (Urbani himself subsequently died from SARS.) With the second WHO announcement, the world was informed that the atypical pneumonia, now named SARS, was a new and very serious communicable disease. The secret was out.

During this period, it could be hard to discern the signal in the noise. Many things contributed to the noise – the irreducible uncertainties of the early days of a new disease, fear, mistakes, lack of preparation, incompetence, reputational concerns, and of course deliberate obfuscation. To be sure, there was ample evidence of outright concealment, foot-dragging, and obfuscation. The Guangdong provincial government ‘initially banned the press from writing about the disease and downplayed its significance’ (Enserink 2013b: 1265). Although the WHO diplomatically reported cooperative efforts (see, e.g., WHO 2003b), it carefully avoided comment on Chinese silence or obfuscation between November and February, and even later. In fact, although Chinese officials agreed to share information, their first promises were followed by more deceptions (Fidler 2004; Huang 2004; Knobler et al. 2004). When the Chinese government began to share information, WHO officials were still unable to get meetings with Chinese health officials and were refused permission for travel to Guangdong (Enserink 2013b: 1266). When the early undercount of SARS patients was attributed to the inadvertent exclusion of patients in military facilities, Eckholm pointed out that the high proportion of Beijing SARS patients in military hospitals ‘could [instead] indicate that patients were placed there to avoid their inclusion in civilian disease reports’ (2003). What the nation-state does not know, it cannot report.

But the IHR was little help in dampening the noise or strengthening the signal. Although the 1969 IHR treaty was officially the governing document when the 2002–3 SARS outbreak occurred, it was an imperfect information order that did not authoritatively mandate a clear course of action. ‘[N]othing compelled China, or any other country, to tell the rest of the world what was happening within its borders early in 2003’ (Enserink 2013b: 1266). Indeed, the shocking weakness of the international health governance system was surely a factor in China’s failure to report the outbreak quickly. Under the 1969 IHR, most disease outbreaks, including those of previously unknown diseases, were domestic business.
But if China had no formal obligation to report, why was it so soundly condemned for its delay in transmitting information to the WHO? Although the treaty – international law – did not require reporting, emerging norms around the management of global public health governance diverged from formal law. Under these emerging norms, a failure to report a new disease, an environmental disaster, or some other occurrence that might affect global public health was a serious infraction (Heymann 2006). Indeed, it was the conflict between these emerging norms and the existing treaty provisions, along with the emergence of new infectious diseases like Ebola, that helped spur the 2005 IHR revision, first called for in a 1995 resolution, well ahead of the SARS outbreak. An important difference between formal treaty obligations and norms, though, is that the first applies uniformly and the second does not. Being a signatory to a treaty is a bright line. Membership in a moral community is more ambiguous, with some treaty signatories more fully incorporated and others more peripheral. Thus although the long silence of the Chinese government was not technically a violation of the IHR, it nevertheless appeared dishonest and inappropriate to the international community, undermining rather than supporting emerging cooperative norms and in fact harming global public health by allowing the new disease to spread beyond China’s borders.

The institutional incoherence around global public health governance was in fact deeper than this; the treaty provisions were inconsistent with domestic law as well as with emerging norms. Until treaty provision and domestic law are harmonized, health workers can be caught between local and global legal obligations, two distinct sets of rules laying out inconsistent requirements for partially overlapping groups of actors. Although only state representatives were responsible for reporting to the WHO, domestic law compelled medical workers to preserve state secrets about the very matters that international norms – but not IHR treaty provisions – compelled them (or others in their chain of command) to report. Many Chinese actors were in a terrible bind, legally required to protect state secrets but morally obligated to share information so fellow citizens could protect themselves from a virulent emerging disease and so international bodies could study the disease and develop methods to combat it. Individual and global interests both demanded transmission of information, yet the Chinese state initially mandated secrecy instead. Moreover, the IHR specified roles and obligations for only a few actors, thus offering no guidance about appropriate courses of action for many other actors who possessed relevant information.

Beyond legalistic matters about obligations to report or to conceal, the evidence from SARS also suggests that fears about economic consequences of adverse publicity associated with disease outbreaks strongly shaped the thinking of Chinese authorities (Huang 2004: 119). These economic concerns were in fact justified, though overstated, in hindsight. The economic effects of SARS include much more than the cost of providing medical care for those affected, as analysts acknowledge. Lee and McKibben (2004) estimated the short-term
impact of SARS to be about $40 billion for 2003 alone if people expected the epidemic to be a one-time event and considerably higher if they behaved as if they anticipated recurrences. Subsequent research suggests that the economic impacts were considerably smaller than anticipated and that recovery occurred quickly (Keogh-Brown and Smith 2008). Although the economic impact was widely dispersed, the losses were greater in Asian countries than in the rest of the world, with strong shocks to mainland China, which experienced a decline in foreign investment, and especially to Hong Kong whose service economy depends on travel and tourism. For government officials responsible for the overall welfare of a society, including both physical and economic health, worries about commercial impacts cannot be dismissed.

Revising the IHR: renegotiating the information order and bringing law up to speed

As a negotiated information order, the 1969 IHR was thus ineffective, unstable, and ripe for change for a host of reasons. First, legal obligations were out of sync with the higher expectations of an evolving normative system. Second, international law and domestic law often had not been harmonized and disagreed about whether threats to public health should be reported or kept secret, creating a serious conundrum for health workers. Third, the IHR failed to take account of the social complexity of a system in which information was produced and controlled by a wide variety of actors, including not just official national representatives (e.g., ministries of health) and provincial or other sub-state actors (e.g., provincial departments of health), but also actors who were not state representatives but nevertheless had relevant roles and expertise (e.g., heads of hospitals, whether private, public or military), journalists, and private citizens all with varying relationships to the international treaty, emerging norms, and domestic law. Fourth, although the IHR did not envision that the WHO would act on the basis of information other than that provided officially by nation-states, pressure to use such ‘non-knowledge’ had increased over time as information sources multiplied, tools to parse such information were created, and threats to public health came to seem increasingly urgent. One important effect of SARS was to shift the boundary between official and unofficial knowledge, ultimately modifying the information order so that unofficial information of questionable quality could be used as leverage, forcing states to reveal what they might have preferred to conceal.

The revision of the IHR was adopted by the World Health Assembly (WHA), the governing body of the WHO, in 2005 and put into force in 2007. Just as revisions to the IHR were being crafted, the deficiencies of the existing legal framework were made glaringly apparent by the rapid spread of SARS and the numerous – and avoidable – deaths it caused. Although China had not in fact violated the existing treaty, it clearly violated emerging norms on the reporting
of infectious diseases. The objective of the new treaty provisions was to induce earlier and fuller reporting by acknowledging the importance of non-state actors as suppliers of information and recrafting the information order so that previously unusable kinds of information – information that might have been seen as technically sufficient but was not socially sufficient – could now be used.

The 2005 revision brought important changes in what has to be reported – any ‘public health emergency of international concern’. Along with this broader range of reportable threats, the 2005 IHR introduced a decision tool to replace the short, simple list and guide reporting; offered considerable guidance about who should report and how (e.g., mandates for designated reporters, now called ‘national focal points’); and created tool kits for implementation including for harmonizing the IHR with domestic law (WHO 2009). In effect, these changes move the IHR from the realm of ‘soft law’ further into the domain of ‘hard law’ (Abbott and Snidal 2000) by making the rules more specific and more obligatory, by adding processes for interpretation of law and for dispute settlement, and by inserting rudimentary enforcement mechanisms. Some of the work of hardening the IHR is delegated to individual member states as they bring domestic law into harmony with the IHR. As treaty provisions and domestic law are harmonized and gaps bridged, excuses for non-compliance are eliminated and domestic supports for compliance are added (see, e.g., the agreement between the Australian federal government and its states and territories to ensure timely reporting [Commonwealth of Australia 2008; Scales 2010: 81]).

Fidler (2004) argues that SARS exposed the conflict between an outdated, unworkable, Westphalian system of international governance and a world in which global diseases required a global governance system. States have lost their primacy, he suggests, in a world in which they can control neither the movement of disease nor the movement of information. Believing it had the right to suppress information, the Chinese government attempted to treat information about infectious disease as it always had: as a matter of state secrets. But in a world of cell phones and internet, text messages and email allowed both patients and physicians to circumvent the state. Prohibiting news media from reporting the outbreak of the deadly disease did not keep individuals from communicating with one another inside China and sending information and questions to contacts outside the country.

With the growth of new information technologies, state monopolies on information have decayed and the balance between socially and technically sufficient information has shifted. As the volume of information considered technically sufficient has increased and the WHO has developed more sophisticated techniques for extracting high-quality information, its capacity to pressure states to meet their treaty obligations has increased. Something like an enforcement capacity, albeit one not formally recognized in the 1969 IHR, grew up in the midst of all this complexity. With the 2001 vote of the World Health Assembly (WHA) and the subsequent revision of the IHR, this enforcement capacity has
been recognized, endorsed and formalized, first with the WHA’s blessing of the WHO’s use of unofficial information and then with the incorporation of this information use into the procedures outlined in the revised IHR.

In this case, changes in practice preceded changes in the legal infrastructure as the WHO increasingly drew on information that did not come directly from the official reporters of member states. But in a pattern of ‘punctuated globalization’ (Heimer 2015), the legal framework seems now to have reclaimed the lead in moving forward global coordination around public health surveillance. As countries and agencies adjust to the IHR, we can expect the development of a host of new strategies for exploiting the opportunities created by this new framework. The 2005 revisions have required many countries to invest heavily in improving their systems for tracking and reporting threats to public health. This, in turn, has created an opening for many joint activities between rich and poor countries, including construction of new CDC facilities around the world (Gootnick 2007).

Do these changes then signal the end of the gap between actionable, socially sufficient information and technically sufficient information in global health governance? Rather than an end to the gap, we should expect a shift of the gap’s location. Gaps arise because parties with imperfectly aligned interests have some incentive to game systems. Such discrepancies between global, collective interests and regional, state or local interests will continue to exist and some evidence suggests both continued and fresh strategies for gaming and non-compliance (Scales 2010: 59–76). The exact configuration of the gaps will change, of course, as the nature of the key actors changes (less emphasis on states, perhaps) and as technologies change (easier transmission of information by both official and lay actors). The gap itself will not vanish. States will remain relevant actors – indeed world politics suggests that national borders are as often reinforced as demolished and that states continue to have responsibilities and interests that might motivate them to conceal information. Moreover, a clarification of treaty obligations and the introduction of a new lever for the WHO will not entirely resolve the problem. In the past, with no uncertainty about obligations to report, countries nevertheless failed to report outbreaks (Carvalho and Zacher 2001; Fidler 2004: 35; Kamradt-Scott 2015: 102–5; Scales 2010). Although the WHO can more nimbly alert the world about an outbreak, it can do little beyond that: no sanctions, no fines, no cancellation of membership. And new incentives for non-compliance will continue to arise. Until samples were used to create flu vaccines, countries had little reason to withhold samples of new influenza strains. But under a regime that protects intellectual property and gives those supplying samples no share of the income from the sale of resulting vaccines, countries now have an incentive not to offer their samples for the common good. When Indonesia, responding to this incentive structure, began withholding flu samples, a new WHO working group developed a non-binding framework to
encourage both virus and benefit sharing (Fidler 2008; Fidler and Gostin 2011; Scales 2010; Smith 2014).

In the argument of this article, SARS plays a central (albeit non-determinative) role. But is SARS simply a useful case on which to hang the argument? Or could the argument have been built around HIV/AIDS, H1N1, Ebola, Zika, or some other infectious disease? In fact, other diseases and SARS are not interchangeable in this argument; SARS is not ‘merely’ an example. Because of historical timing, SARS was the epidemic that brought the previously recognized failings of existing disease surveillance systems into the spotlight and stiffened the spines of those pushing for change. The features and timing of SARS helped to bring the shortcomings of the IHR into sharp relief, undermining their legitimacy and making it essentially impossible for the WHO and public health specialists to continue working under the old rules. The legitimacy of the WHO increasingly depended on denying the legitimacy of the 1969 IHR.

By the time SARS appeared, the deficiencies of the IHR had become so glaringly apparent that the WHA had endorsed the WHO’s use of unofficial information even before the rules changed. But particular features of the disease, namely its brief incubation period and moderate transmissibility, meant that the adage that microbes do not respect national borders was all too applicable. Local outbreaks of SARS had global relevance in a way that local outbreaks of HIV/AIDS, with its long period of dormancy, did not. SARS quickly became a global threat. But it also mattered that the disease arose in a country that wished to suppress information about the outbreak. In the age of the internet and cell phones, information, like microbes, neither respects borders nor governmental edicts on secrecy. Thus SARS brought to a head a long-standing clash between national governments’ desires to keep secrets and new capacities to transmit information with or without governments’ blessing. In Fidler’s view, ‘China’s behavior [at the start of the SARS epidemic] put the final nail in the coffin of basing global surveillance for infectious diseases only on government information’ (2004: 135) as the 1969 rules required. SARS was a ‘historic moment in public health governance’ (Fidler 2004: 186), the tipping point for new governance strategies (Fidler 2004: 187). In a limited sense, then, SARS was a boon to the WHO because it provided an added inducement for the WHA and member states to modify the rules in ways that benefited the entire group and gave the WHO and IHR new relevance.

Although the IHR’s limitations had long been apparent, by making it impossible to deny that the treaty provisions were outmoded SARS accelerated the process of reaching consensus on proposed changes. The 2005 revisions of the IHR attempted to deal with two kinds of ignorance: ignorance about outbreaks of known diseases and ignorance about newly emerging diseases and other threats to public health. Before revision, the IHR had focused only on outbreaks of known diseases and therefore on ignorance that could in principle be reduced or even eliminated by full and honest disclosure. As it became clear
that infectious diseases were not going to be eradicated, as new diseases continued to emerge, and as natural disasters, industrial accidents, air and water pollution, and so forth came to be understood as threats to public health, the IHR’s focus shifted to these less tractable forms of ignorance and thinking changed about what should be reportable under the IHR. This expanded understanding of threats to public health brought both expanded obligations for states and expanded obligations for the WHO. The WHO’s remit now included not just spreading the word and issuing advisories about a larger package of threats to public health, but also overseeing and orchestrating the scientific work of untangling the etiology, symptom patterns, modes of detection, and effective remedies for these threats.

Into this changed environment, the reworked information order introduced a more sophisticated understanding of the relationship between what was or could be known and what was unknown and perhaps even unknowable. The modified procedures of the 2005 IHR in some senses acknowledged the difference between technically sufficient information that was also socially sufficient – because it had been supplied by mandated state reporters – and technically sufficient information that was not socially sufficient because it travelled to the WHO by unconventional or even clandestine routes. But the loosening of constraints on the sourcing of information did more than simply make information usable by recategorizing previously unofficial, socially insufficient information. The modified procedures also opened the door to using information as leverage, with information of inferior quality or illegitimate provenance being used to pry loose information of better quality or from official sources. Moreover, in casting a wider net and exhibiting its willingness to draw on an expanded network of informants and more variable kinds of information, the 2005 IHR seem to acknowledge the essential irreducibility of ignorance. When uncertainty cannot be eliminated, and when the transmission and withholding of information is at least in part a strategic game, an entity such as the WHO is in no position to sharply limit the information it will consider. The 2005 IHR, a renegotiated global public health information order, thus incorporate into their structure an acknowledgement of the complex relationship between knowledge and ignorance, socially sufficient information and technically sufficient information, and the socially constructed nature of these distinctions.

Conclusion: what we don’t know can help us

Although this article focuses on negotiated information orders in global public health governance, its argument and evidence address broader issues about how global norms change and how social groups manage risk. The story of the 2002–3 SARS epidemic, the core empirical component of the article, is about the possibility that a virulent new disease would become a devastating pandemic and about an emerging (but not yet formalized) obligation to inform
the WHO about serious threats to public health. The comparison points – the threat of AIDS contamination in banked blood (Healy 2006); threats from oil spills, nuclear power accidents, and nuclear war (Clarke 1999); and threats from accidents on North Sea oil rigs and platforms (Heimer 1985a) – are also about how key actors assessed novel risks. In all of these cases, the assessment of the core risk was implicitly balanced against other risks – risks to trade and tourism for SARS; risks to relationships with important constituencies for the blood banks (Healy 2006); risks to desired investments in business and government enterprises (Clarke 1999); and risks to vested interests in the insurance business (Heimer 1985a). Generally speaking, though, as discussions unfolded, only some of the risks were fully on the table, perhaps because people were not wholly aware of how other considerations were shaping their thinking, perhaps because of the questionable legitimacy of balancing other risks (trade and tourism, in the SARS case) against threats to life and health.

The result is often a pattern of minimizing assessments of danger and normalizing those (implicit) assessments. As noted earlier in the article, many disease outbreaks, even of the three reportable diseases, had not been reported to the WHO. Somewhat like the normalization of deviance that Diane Vaughan (1996) so carefully describes in *The Challenger Launch Decision*, the deviant non-reporting of disease outbreaks had been normalized. Some countries – especially poorer ones – were learning from one another that they would suffer no consequences from ignoring IHR treaty obligations. Although the IHR were described as regulations to protect health in all countries, in fact they focused on stemming the spread of disease from poor countries to richer ones. As Chorev (2012a) suggests, international obligations perceived as coercive are more likely to be reinterpreted locally and perhaps ultimately transformed through processes of reactive diffusion. In the case of the IHR, reactive diffusion essentially made the already unenforceable IHR progressively less useful.

But in the pre-SARS period, the evidence in fact suggests a more complex process of normative change. Two rather different norms were being institutionalized simultaneously in global public health governance. At the same time that ignoring IHR treaty obligations was becoming the norm in some circles, a different norm was spreading in other circles. Some countries – especially the richer ones – were adopting a more cooperative stance, sharing information not only on IHR reportable diseases but also on other infectious diseases and threats to public health. It was this cooperative norm, not the norm of non-reporting, that ultimately diffused and, coupled with the SARS epidemic, led to a reinvention of the IHR as a treaty with a few more teeth.

How did this happen? Here a comparison with the space shuttle launch decision is instructive. Although NASA carried out rigorous, carefully scripted pre-launch reviews, contextual pressures to launch could subtly shift thinking about which risks could be dismissed and which warning signs ignored. Over time, these modified assessments were institutionalized and the insularity of the
process made it hard for alternative viewpoints to force a recalibration. The conflict between protecting against rare events and attending to business is utterly mundane (Vaughan 1996), so mundane that insurers have institutionalized methods for protecting key risk management tasks from production pressures (Heimer 1985b). The job of the IHR, arguably, is to rebalance risk assessments so global public health interests are not regularly sacrificed when discrediting information about health threats is concealed to protect a country’s trade and tourism. Yet the 1969 IHR treaty gave the WHO few levers to induce such a rebalancing.

Unlike space shuttle launch decisions, though, global public health governance does not take place behind a single set of closed doors. Thus, although a practice of non‐reporting – normalized deviance – seemed to be developing in some sectors, changes in information technologies and communication patterns made secret keeping more difficult and shifted the balance in favour of the more cooperative norm. Even with China’s strict control over the internet and the press, text messages and emails spread news about ‘atypical pneumonia’, forcing public officials to acknowledge the outbreak. Although any single medium might fail to pick up the news, the proliferation of methods for detecting signals makes suppression of information more difficult. A news blackout might make GPHIN, which scrapes information from news outlets, less effective, but have less effect on ProMED‐mail, which relies on medical workers’ postings.

Working together over some considerable period of time and in a series of discrete steps, the new information technologies and the emerging norm of information sharing reconfigured the rules about global public health governance and reshaped understandings about what information could be used and who could supply it. Information technologies first reshaped some practices of the WHO. As the WHO began to use the unofficial information supplied by entities like GPHIN, it also initiated the process of redefining non‐knowledge as technically sufficient, at least for some purposes. As the WHO rebuilt its routines to use unofficial information alongside official country reports, new relationships and resources (e.g., GOARN) were created around those new information sources.¹¹ Both the suppliers of information and the WHO increasingly treated this new information as technically sufficient. With the endorsement of the WHA, these new practices and new definitions of the adequacy of unofficial information were further institutionalized, moving one step further to a formal change in the treaty itself. With the adoption of the 2005 IHR, the process was complete – what had previously been categorized as unusable non‐knowledge was first reconceptualized as technically sufficient, and ultimately accepted as socially sufficient for use in an expanded menu of actions.

Nevertheless, information categorized as unusable non‐knowledge will always exist and will continue to be important precisely because it comes from different social locations than those tapped by official information. As Mary Douglas would remind us, we need the sentinels on society’s margin to warn
us of unexpected dangers every bit as much as we need people working in core institutions to protect us from more routine risks (Douglas and Wildavsky 1982). Although admittedly the uses of non-knowledge or clandestine knowledge are typically different than the uses of official knowledge, that should not lead us to underestimate either the vital strategic value of non-knowledge or the importance of using it efficiently in a smoothly functioning, adaptable information order. Just ask Kim Philby or David John Moor Cornwell, aka John Le Carré.

(Date accepted: 6 June 2018)

Notes

1For their detailed and insightful comments, I am deeply grateful to Arielle Tolman, Jaimie Morse, Grégoire Mallard, Linsey McGoey, and three anonymous reviewers. I also received helpful feedback on earlier versions of this work from audience members at the annual meeting of the Law and Society Association, the Health and Society Working Group at the University of Illinois at Chicago, and the Programme for the Study of International Governance at the Graduate Institute, Geneva.

2Timelines of the epidemic are readily available. See, for example, WHO (2003d) and Enserink (2013b).

3ProMED-mail, an internet-based system hosted by ProMed (the Program for Monitoring Emerging Infectious Diseases), facilitates informal, unofficial communication among members of the international infectious disease community. See Woodall (2001); Madoff and Woodall (2005); Wenzel, Bearman and Edmond (2005); Miller (2012); and Morse (2012). ProMED-mail was credited with bringing very early news about SARS to people outside China.

4Established by Health Canada in collaboration with the WHO, GPHIN is a multi-lingual electronic early warning system monitoring and ‘reading between the lines’ of a wide swath of online sources, including news outlets and websites, for information suggesting unusual disease patterns (Morse 2012). The WHO, which began using GPHIN in 1997 (WHO 2003c: 4), notes that ‘[m]ore than 60% of the initial outbreak reports come from unofficial informal sources, including sources other than the electronic media, which require verification’ (WHO n.d.). GPHIN is often credited with picking up news of a disease outbreak in China in late November (Heymann and Rodier 2004: 173).

5Set up in 1997 by the WHO and formally launched in 2000, GOARN is a collaboration of other networks, linking a wide variety of experts and combining both surveillance and response (Fidler 2004; Heymann 2006; Heymann et al. 2001; WHO 2003c: 4). As of 2018, GOARN includes as members over 200 technical institutions and networks concerned in one way or another with public health (https://extranet.who.int/goarn/; last viewed 22 March 2018). Fidler (2004), especially, credits GOARN with a major role in containing SARS.

6According to virologist Malik Peiris, ‘If something untoward was happening across the border, it would come to Hong Kong pretty quickly’ (Enserink 2013a: 1265).

7Vietnam was a reluctant trigger, though. As hospital staff fell ill, the Vietnamese government had to be persuaded that this was not simply a ‘private problem in a private
hospital’ but might instead be ‘very important’ (Enserink 2013a: 1267, quoting Pascale Brudon).

8 According to the WHO, the resurgence of cholera in South America and plague in India, as well as the emergence of new infectious agents such as the Ebola virus, ‘resulted in a resolution at the 48th World Health Assembly in 1995 calling for the revision of the Regulations’ (https://www.who.int/ihr/about/faq/en/; last viewed 22 March 2018).

9 Some observers (e.g., Katz and Fischer 2010; Wenham 2015) contend that states have not lost their primacy.

Bibliography

Abbott, K.W. and Snidal, D. 2000 ‘Hard and Soft Law in International Governance’, International Organization 54(3): 421–56.
Ackerlof, G.A. 1970 ‘The Market for “Lemons”: Quality Uncertainty and the Market Mechanism’, Quarterly Journal of Economics 84(4): 88–500.
Altmann, L.K. 2004 ‘New Questions on Tracking’, New York Times, 13 January.
Arrow, K.J. 1963 ‘Uncertainty and the Welfare Economics of Medical Care’, American Economic Review 53: 941–73.
Carvalho, S. and Zacher, M. 2001 ‘The International Health Regulations in Historical Perspective’, in A.T. Price-Smith (ed.) Plagues and Politics: Infectious Disease and International Policy, New York: Palgrave MacMillan.
Chorev, N. 2012a ‘Changing Global Norms through Reactive Diffusion: The Case of Intellectual Property Protection of AIDS Drugs’, American Sociological Review 77(5): 831–53.
Chorev, N. 2012b The World Health Organization Between North and South, Ithaca, NY: Cornell University Press.
Clarke, L. 1999 Mission Improbable: Using Fantasy Documents to Tame Disaster, Chicago: University of Chicago Press.
Cohen, M.D., March, J.G. and Olsen, J.P. 1972 ‘A Garbage Can Model of Organizational Choice’, Administrative Science Quarterly 17: 1–25.
Commonwealth of Australia, Department of Health and Ageing. 2008 Health Emergency Preparedness and Response: National Health Security Agreement.
Cook, K.S. (ed.) 2001 Trust in Society, New York: Russell Sage Foundation.
Douglas, M. and Wildavsky, A. 1982 Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers, Berkeley, CA: University of California Press.
Eckholm, E. 2003 ‘China Admits Underreporting its SARS Cases’, New York Times, 21 April.
Enserink, M. 2013a ‘War Stories’, Science 339(6125): 1264–8.
Enserink, M. 2013b ‘SARS: Chronology of the Epidemic’, Science 339(6125): 1266–71.
Ericson, R.V. and Doyle, A. 2004 Uncertain Business: Risk. Insurance and the Limits of Knowledge, Toronto: University of Toronto Press.
Erikson, S.L. 2015 ‘Secrets from Whom? Following the Money in Global Health Finance’, Current Anthropology 56(Supplement 12): S306–16.
Feldman, M.S. 1989 Order without Design: Information Production and Policy Making, Stanford, CA: Stanford University Press.
The uses of disorder in negotiated information orders

Feldman, M.S. and March, J.G. 1981 ‘Information in Organizations as Signal and Symbol’, Administrative Science Quarterly 26: 94–118.

Fidler, D.P. 2003 ‘Emerging Trends in International Law Concerning Global Infectious Disease Control’, Emerging Infectious Diseases 9(3): 285–90.

Fidler, D.P. 2004 SARS. Governance and the Globalization of Disease, New York: Palgrave Macmillan.

Fidler, D.P. 2008 ‘Influenza Virus Samples, International Law, and Global Health Diplomacy’, Emerging Infectious Diseases 14(1): 88–94.

Fidler, D.P. and Gostin, L.O. 2006 ‘The New International Health Regulations: An Historic Development for International Law and Public Health’, Journal of Law, Medicine and Ethics 34(1): 85–94.

Fidler, D.P. and Gostin, L.O. 2011 ‘The WHO Pandemic Influenza Preparedness Framework: A Milestone in Global Governance for Health’, Journal of the American Medical Association 306(2): 200–1.

Goffman, E. 1969 Strategic Interaction, Philadelphia, PA: University of Pennsylvania Press.

Gootnick, D. 2007 U.S. Agencies Support Programs to Build Overseas Capacity for Infectious Disease Surveillance, Washington, DC: United States Government Accountability Office.

Gostin, L.O. 2014 Global Health Law, Cambridge, MA: Harvard University Press.

Granovetter, M. 1985 ‘Economic Action and Social Structure: The Problem of Embeddedness’, American Journal of Sociology 91: 481–510.

Gross, M. 2007 ‘The Unknown in Process: Dynamic Connections of Ignorance, Non-Knowledge and Related Concepts’, Current Sociology 55(5): 742–59.

Gross, M. and McGoey, L. (eds) 2015 Routledge Handbook of Ignorance Studies, London: Routledge.

Healy, K. 2006 Last Best Gifts: Altruism and the Market for Human Blood and Organs, Chicago: University of Chicago Press.

Heymann, D.L. 2006 ‘SARS and Emerging Infectious Diseases: A Challenge to Place Global Solidarity above National Sovereignty’, Annals of Academy of Medicine, Singapore 35(5): 350–3.

Heymann, D.L., Rodier, G. and the WHO Operation Support Team to the Global Alert and Response Network. 2001 ‘Hot Spots in a Wired World: WHO Surveillance of Emerging and Re-Emerging Infectious Diseases’ Lancet Infectious Diseases 1: 345–53.

Heymann, D.L. and Rodier, G. 2004 ‘Global Surveillance, National Surveillance, and SARS’, Emerging Infectious Diseases 10(2): 173–5.

Huang, Y. 2004 ‘The SARS Epidemic and its Aftermath in China: A Political Perspective’, in S. Knobler, A. Mahmoud, S. Lemon, A. Mack, L. Sivitz and K. Oberholtzer (eds) Learning from SARS: Preparing for the Next Disease Outbreak, Washington, DC: National Academies Press.
Kamradt-Scott, A. 2015 Managing Global Health Security: The World Health Organization and Disease Outbreak Control, New York: Palgrave Macmillan.

Katz, R. and Fischer, J. 2010 ‘The Revised International Health Regulations: A Framework for Global Pandemic Response’, Global Health Governance 3(2): 1–18.

Keogh-Brown, M.R. and Smith, R.D. 2008 ‘The Economic Impact of SARS: How Does the Reality Match the Predictions?’ Health Policy 88: 110–20.

King, N.B. 2002 ‘Security, Disease, Commerce Ideologies of Postcolonial Global Health’, Social Studies of Science 32(5–6): 763–89.

Knight, F.H. 1971 Risk, Uncertain and Profit, Chicago: University of Chicago Press [first published in 1921].

Knobler, S., Mahmoud, A., Lemon, S., Mack, A., Sivitz, L. and Oberholtzer, K. 2004 ‘Summary and Assessment’, in S. Knobler, A. Mahmoud, S. Lemon, A. Mack, L. Sivitz and K. Oberholtzer (eds) Learning from SARS: Preparing for the Next Disease Outbreak, Washington, DC: National Academies Press.

Lazcano-Ponce, E., Allen, B. and González, C.C. 2005 ‘The Contribution of International Agencies to the Control of Communicable Diseases’, Archives of Medical Research 36(6): 731–8.

Lee, J.-W. and McKibbin, W.J. 2004 ‘Estimating the Global Economic Costs of SARS’, in S. Knobler, A. Mahmoud, S. Lemon, A. Mack, L. Sivitz and K. Oberholtzer (eds) Learning from SARS: Preparing for the Next Disease Outbreak, Washington, DC: National Academies Press.

Madoff, L.C. and Woodall, J.P. 2005 ‘The Internet and the Global Monitoring of Emerging Diseases: Lessons from the First 10 years of ProMED-mail’, Archives of Medical Research 36(6): 724–30.

March, J.G. and Simon, H.A. 1958 Organizations, New York: Wiley.

McGee, L. (ed.) 2014 An Introduction to the Sociology of Ignorance: Essays on the Limits of Knowing, London: Routledge.

Meyer, J. and Rowan, B. 1977 ‘Institutional Organizations: Formal Structure as Myth and Ceremony’, American Journal of Sociology 83: 340–63.

Miller, J. 2007 ‘Website for the Germ-Obsessed’, Los Angeles Times, 13 January.

Morse, S.S. 2012 ‘Public Health Surveillance and Infectious Disease Detection’, Biosecurity and Bioterrorism-Biodefense Strategy Practice and Science 10(1): 6–16.

Normile, D. 2013 ‘Understanding the Enemy’, Science 339(6125): 1269–73.

Scales, D.A. 2010 ‘The World Health Organization and the Dynamics of International Disease Control: Exit, Voice, and (Trojan) Loyalty’, PhD Dissertation, Yale University, Ann Arbor, MI: ProQuest.

Shapiro, S.P. 2005 ‘Agency Theory’, Annual Review of Sociology 31: 263–84.

Simon, H.A. 1947 Administrative Behavior, New York: Macmillan.

Smith, F.L., III 2014 ‘Advancing Science Diplomacy: Indonesia and the US Naval Medical Research Unit’, Social Studies of Science, 44(6): 825–47.

The Guardian. 2003. ‘China Accused of SARS Cover-Up’, 9 April.

Vaughan, D. 1996 The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA, Chicago: University of Chicago Press.

Wenham, C. 2015 ‘GPHIN, GOARN, GONE? The Role of the World Health Organization in Global Disease Surveillance and Response’, in S.E. Davies and J.R. Youde (eds) The Politics of Surveillance and Response to Disease Outbreaks: The New Frontier for States and Non-State Actors, London: Routledge.

Wenzel, R.P., Bearman, G. and Edmond, M.B. 2005 ‘Lessons from Severe Acute Respiratory Syndrome (SARS): Implications for Infection Control’, Archives of Medical Research 36(6): 610–16.

Williamson, O. 1975 Markets and Hierarchies, New York: Free Press.

Woodall, J.P. 2001 ‘Global Surveillance of Emerging Diseases: The ProMED-mail Perspective’, Cadernos de Saúde Pública (Reports in. Public Health) 17(Suplemento): 147–54.
World Health Organization (WHO) 1983
*International Health Regulations (1969)*. Third Annotated Edition, Geneva: World Health Organization.

World Health Organization (WHO) 2000
‘An Integrated Approach to Communicable Disease Surveillance’, *Weekly Epidemiological Record* 75(1): 1–7.

World Health Organization (WHO) 2003a
‘Acute Respiratory Syndrome, China – Update’, *Weekly Epidemiological Record* 78(9): 57.

World Health Organization (WHO) 2003b
‘Outbreak News – Acute Respiratory Syndrome, China, Hong Kong Special Administrative Region of China, and Viet Nam’, *Weekly Epidemiological Record* 78(11): 73.

World Health Organization (WHO) 2003c
‘Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future’, Geneva. Available at: www.who.int/csr/media/sars_wha.pdf [Accessed on 8 May 2015].

World Health Organization (WHO) 2003d
‘Update 95 – SARS: Chronology of a Serial Killer’. Available at: www.who.int/csr/don/2003_07_04/en/ [Accessed on 22 March 2018].

World Health Organization (WHO) 2009
‘International Health Regulations (2005): Toolkit for Implementation in National Legislation’, Geneva. Available at: https://www.who.int/ihr/NFP_Toolkit.pdf [Accessed on 22 March 2018].

World Health Organization (WHO) n.d.
‘Epidemic Intelligence – Systematic Event Detection’. Available at: www.who.int/csr/alertresponse/epidemicintelligence/en/ [Accessed on 22 March 2018].