

SARS and Emerging Infectious Diseases: A Challenge to Place Global Solidarity above National Sovereignty

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Abstract

Severe acute respiratory syndrome (SARS) emerged in a world where information about infectious disease outbreaks travels at speeds and in ways not imagined just 30 years ago, and where scientists are increasingly working together on detecting and responding to public health events that threaten international public health and economic security. The SARS outbreak clearly demonstrated that it is no longer the exclusive privilege of countries to report and respond to infectious diseases occurring in their own territories, but that the global community has also assumed this role, aided by the ease and power of electronic communication through the World Wide Web. This phenomenon has been cited by some scholars as a potential infringement on national sovereignty that compromises the concept that states reign supreme over their territories and peoples. At the same time, however, countries are increasingly seeking to collaborate internationally in infectious disease surveillance and response, as shown in the current situation of avian influenza (H5N1), and in the formal agreement leading to the revised International Health Regulations (IHR), suggesting that a new world order prevails over issues that once had been considered the sole domain of a sovereign nation.

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Reporting and Responding to Infectious Disease Outbreaks in the 21st Century

The majority of the world's information about infectious disease outbreaks no longer comes from voluntary reporting by countries, the willingness of which is influenced by fears of severe decreases in travel, tourism and trade as a result of aggressive protective measures undertaken by other countries.^{1,2} It now comes from real-time electronic communications and the World Wide Web, available simultaneously to all with online computer access. Of the 1315 unverified reports of an infectious disease outbreak to the World Health Organization (WHO) between 1 January 2001 and 31 October 2004, only 509 (39%) were reported by ministries of health through the WHO or other United Nations agencies; while 806 (61%) were reported from unofficial and mostly electronic sources such as the media, personal communications or NGOs (source: WHO/CSR). These sources of information include the Global Public Health Intelligence Network (GPHIN) maintained by Health

Canada, a computer application that continuously and systematically trawls web sites, news wires, local online newspapers, public health e-mail services, and electronic discussion groups in 6 languages (English, French, Spanish, Russian, Arabic and Chinese) for reports of infectious disease outbreaks using key words or phrases.³ GPHIN provides this information to the WHO for confirmation and action if required. GPHIN and other electronic websites, such as ProMed,⁴ have placed countries in a position in which they cannot ignore or hide information about disease outbreaks that occur within their sovereign borders.

The response to infectious disease outbreaks has also been affected by electronic communications. A recently established network for coordination of support to disease outbreaks is the Global Outbreak Alert and Response Network (GOARN).⁵ This partnership of experts from over 120 public health institutions throughout the world constantly validates information about health-related events,

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and ensures a coordinated international response should one be necessary.⁶

GOARN works in real time through electronic, telephone and video communications. It responds with public health expertise to a wide range of disease outbreaks each year, many of them in remote areas where transportation and logistics platforms are also provided. Once an infectious disease outbreak has been validated, a description of the outbreak, along with the technical and logistics competencies required to support national containment activities, is provided to all partners electronically. Those experts who signal availability are then made available to the country in need.

The Emergence of Severe Acute Respiratory Syndrome (SARS) in an Electronically Connected World: The First Reports

During November 2002, when SARS is thought to have first emerged, GPHIN picked up media reports of a suspected influenza outbreak in mainland China.⁷ At the same time, another GOARN partner, the US Global Emerging Infections Surveillance and Response System (GEIS), picked up similar media reports about an influenza B outbreak in Beijing and Guangzhou, the capital of Guangdong Province.⁸ Validation of these reports began with a request for information from the WHO to the Chinese Ministry of Health on 5 and 11 December, and on 12 December, the WHO received confirmation of influenza B transmission occurring in both Beijing and Guangzhou.

Two months later, on 10 February, partners in GOARN picked up reports of an unusual outbreak of fatal pneumonia-like illness in Guangdong Province that was affecting health workers, and the WHO office in Beijing received an e-mail message describing an infectious disease in Guangdong Province with more than 100 deaths. On 11 February, the Chinese Ministry of Health officially confirmed the reports to the WHO, and on the following day reported that the outbreak dated back to 16 November 2002, that influenza had been ruled out as the cause, that the outbreak was coming under control, and that there was no need for support from the WHO.

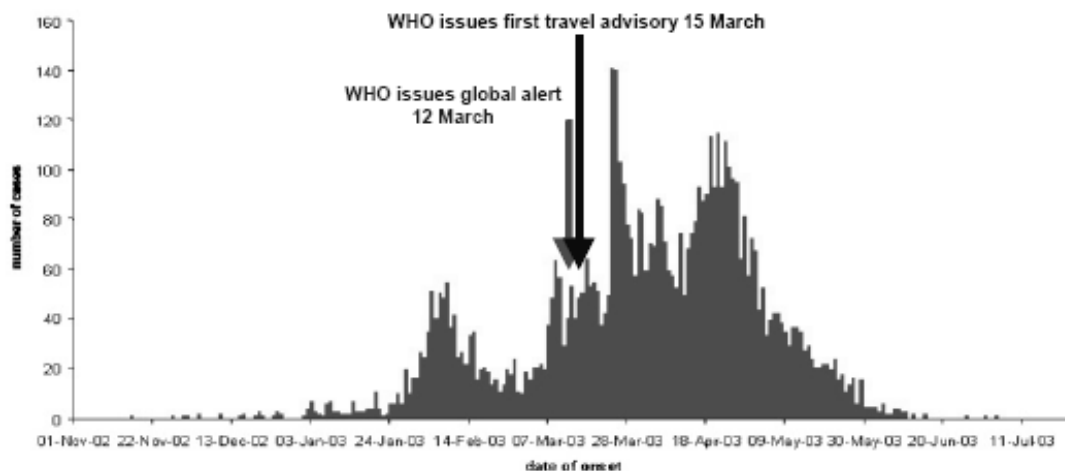
Because of concern about the possibility that a major influenza pandemic was evolving in southern China (a possible source of the first recorded human outbreak of avian influenza H5N1 in 1977),⁹⁻¹² and because of lack of full access to data being collected within Chinese borders, surveillance for respiratory diseases was heightened throughout Asia, resulting in the rapid identification of 2 important public health events. The first was the isolation of the avian influenza virus (H5N1) on 19 February from a father and son in Hong Kong who had become ill immediately after returning from travel to Fujian Province,

China.¹³ The second was the report of an American businessman who had travelled through China and Hong Kong en route to Viet Nam, where he was hospitalised with a severe atypical pneumonia on 26 February.¹⁴ By 5 March, reports began coming in from both Viet Nam and Hong Kong about health workers who were severely ill with the same symptoms, and on 11 March the WHO Director-General contacted China to express the concern of several WHO member states about a perceived lack of transparent information about the outbreak in Guangdong Province. On 19 March, the Chinese Ministry of Health reported that a common bacteria, chlamydia, had been confirmed as the cause of the outbreak. During the next 8 days, the Ministry reported that 792 cases and 31 deaths had occurred between 16 November 2002 and 28 February 2003, and 4 weeks later on 28 March expressed its belief that the Guangdong outbreak was most likely SARS. Following this announcement, China joined the global network of GOARN scientists, clinicians and public health experts working on containment (WHO/CSR).

Placing Global Solidarity above National Sovereignty

Demands on China and all other countries throughout the world during the SARS outbreak were unprecedented.¹⁵ Countries were first asked to report probable cases of SARS in real time using electronic reporting formats. As real-time epidemiological evidence showed that persons with SARS were spreading the disease internationally by air travel, countries were then asked to screen airline passengers and prevent those with SARS or a history of contact with SARS from travelling. Finally, as real-time epidemiological evidence continued to show that persons with SARS were travelling internationally, and that other factors might also be involved in SARS transmission at a Hong Kong apartment complex,¹⁶ international travellers were asked to postpone travel to certain areas where SARS was occurring.

Through open and transparent collaboration among countries, human-to-human transmission of SARS was interrupted at all sites within 4 months, and on 5 July the SARS outbreak was declared contained (Fig. 1). Despite the negative impact of the SARS outbreak, countries willingly collaborated in these measures of global solidarity. Apart from the high costs of intensive medical care, control interventions and death, there was widespread social disruption and economic loss. Schools, hospitals, and some borders were closed, and thousands of people were placed under quarantine. International travel to affected areas plummeted by 50% to 70% and hotel occupancy dropped by more than 60%. Businesses failed, particularly in tourism-related areas, while some large manufacturing facilities were forced to suspend operations when cases appeared



* This graph does not include 2,527 probable cases of SARS (2,521 from Beijing, China), for whom no dates of onset are currently available. Adapted from World Health Organization. Epidemic curves - Severe Acute Respiratory Disease (SARS) <http://www.who.int/csr/sars/epicurve/epiindex/en/index1.html>

Fig. 1. Probable cases of SARS by week of onset worldwide (n = 5910), 1 November 2002 to 10 July 2003.

among workers. Preliminary estimates have placed the direct and indirect costs of the outbreak at nearly US\$100 billion (source: Bio Economic Associates of Cambridge, Massachusetts).

The detection of, and international response to, the SARS outbreak clearly demonstrated that countries are willing to forgo the exclusive privilege of reporting and responding to infectious diseases occurring in their own territories in a manner over which they have supreme control. The global solidarity in the detection and validation of, and response to, the SARS outbreak has blurred the concept that states are sovereign and reign supreme over their territories and peoples,¹⁷ and by so doing has established new norms and standards in international public health. Countries did not refuse to report or collaborate on the grounds that SARS (and most other infectious diseases) was not covered by the International Health Regulations (1969), the existing international legal framework for the prevention and control of international spread of infectious diseases that had been under revision since 1995.¹⁸

New Norms and Standards: The Post-SARS Era

During the remainder of 2003 and 2004, Asian countries continued to adhere to the norms and standards that had been established during the SARS outbreak by open reporting of, and collaborative response to, important events in public health. Suspect cases of SARS in Singapore, Taipei and Beijing were rapidly reported and confirmed by international collaboration through GOARN.¹⁹ Those countries and areas involved immediately reported the laboratory incidents that led to infection, and openly described the procedures undertaken to ensure that they

would not occur again.

In late 2003, another infectious agent that had first been shown to cross the species barrier between animals and humans in 1997 – the avian influenza virus (H5N1) – began to appear rapidly within Asia in poultry and then in poultry in the Middle East, Africa and Europe.¹² Governments have been remarkably frank about reporting when poultry flocks become infected, and have also been rapid to report any human cases that occur, keeping both their own citizens and the international community informed. As with SARS, reporting is occurring even though financial consequences are enormous in the agricultural sector, with the culling of entire flocks, and despite tensions at times between health and agricultural ministries. Interests of national and international public health continue to prevail; they are not being masked by concepts of national sovereignty.

Specific examples of the seriousness with which governments in Asia have accepted the challenge from avian influenza are remarkable. When possible human-to-human transmission of avian influenza occurred in a family cluster in one region of Thailand, more than 1 million volunteers were recruited by the government to conduct house-to-house and farm-to-farm searches for any additional clusters of human cases or unreported outbreaks in poultry (source: WHO/Thailand).

Vietnam, China, Laos, Cambodia and Indonesia have likewise reported regularly on outbreaks in poultry, while Laos and Cambodia have also openly recognised that they lack sufficient resources to institute control measures, and that surveillance would not be adequate to track evolution of the outbreaks or identify human cases.²⁰ Asian governments remain willing to disclose information about

influenza H5N1 and other infectious diseases, witnessed most recently by the report of 206 human infections associated with an outbreak in China of *Streptococcus suis* in pigs with 38 deaths, and detailed information about the outbreak investigation and containment.²¹

Other countries have also demonstrated solidarity, and their willingness to forgo previous concepts of national sovereignty with the recent international spread of the wild polio virus. Since the latter part of 2003, the wild poliovirus has spread internationally to 24 previously polio-free countries, and countries have continued to freely exchange genetic information about these viruses through the global polio surveillance networks, linking each imported virus to its country of origin. The shared information has shown that virus from northern Nigeria is at the source of 19 exportations, with virus from India at the source of the remaining 5.²² Solidarity in surveillance and response, with synchronised immunisation campaigns in countries with common borders, again affirms that global solidarity and new ways of working internationally prevail over issues that might once have been considered the domain of a sovereign nation alone.

New norms and standards for reporting and responding to public health events of international importance have been established and clearly demonstrated in the world's response to SARS. The SARS outbreak occurred in an interconnected world where new ways of working were already being established, and current outbreaks of avian influenza and other infectious diseases demonstrate a redefinition of national sovereignty as governments increasingly hold themselves accountable for appropriate responses to outbreaks of infectious disease by their own citizens, and by the international community. In the recent completion of the revision of the International Health Regulations, many of these new norms and standards have now been formalised within an international legal framework.²³

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National Emerging Infectious Diseases Laboratories, Boston University, Boston, MA, USA. Search for articles by this author. Nicola Petrosillo, MD. Nicola Petrosillo. Affiliations. European Society for Clinical Microbiology and Infectious Diseases, Basel, Switzerland. Department of Clinical Research, National Institute for Infectious Diseases Lazzaro Spallanzani, Rome, Italy. Search for articles by this author. Prof Francesco Castelli, MD. Francesco Castelli. Affiliations. SARS-CoV was highly lethal but faded out after intense public health mitigation measures. Mortality due to SARS-CoV-2 and SARS-CoV is strongly skewed towards people older than 70 years, dissimilar to the 1918 and 2009 influenza pandemics. The majority of emerging infectious diseases have their source in animals, and emergence occurs at the human/animal interface, when infections in animals breach the species barrier to infect humans. Heymann DL (2006) SARS and emerging infectious diseases: a challenge to place global solidarity above national sovereignty. *Ann Acad Med Singapore* 35(5):350-353. <http://www.ncbi.nlm.nih.gov/pubmed/16830003> Google Scholar. Heymann DL, Rodier G (2004a) Global surveillance, national surveillance, and SARS. *Emerg Inf Dis* 10(2):173-175. doi: 10.3201/eid1002.031038 CrossRefGoogle Scholar. Heymann DL, Rodier G (2004b) SARS: a global reponse to an international threat. *Brown J World Aff X(2):185-197*Google Scholar. SARS and Emerging Infectious Diseases: A Challenge to Place Global Solidarity above National Sovereignty. David L Heymann, MD. Abstract. Severe acute respiratory syndrome (SARS) emerged in a world where information about infectious disease outbreaks travels at speeds and in ways not imagined just 30 years ago, and where scientists are increasingly working together on detecting and responding to public health events that threaten international public health and economic security. SARS and emerging infectious diseases: a challenge to place global solidarity above national sovereignty. *Ann Acad Med Singapore*. 2006;35(5):350-3. Preventing the next SARS - European healthcare workers' attitudes towards monitoring their health for the surveillance of newly emerging infections: qualitative study. *BMC Public Health*. 2011;11(1):541. <https://doi.org/10.1186/1471-2458-11-541> PMID: 21740552. McDougall CW, Upshur REG, Wilson K. Emerging norms for the control of emerging epidemics. *Bull World Health Organ*. 2008;86(8):643-5.