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Examining Pandemic Responses in Asia

The recent pandemic disease outbreaks which affected many Asian countries underscore the need for appropriate pandemic responses to be developed in order to contain and mitigate the spread of pandemics that emerge in the future. Through an examination of the different responses to SARS and H1N1 in the region, and the effects of those efforts, this NTS Insight seeks to highlight issues which should be considered when developing pandemic response programmes.

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An example of Singapore's public health campaign, encouraging the public to practice good hygiene and seek medical attention in the event of symptoms, during the H1N1 pandemic in July 2009.

Credit: xcode, flickr.com

The Asian region has been no stranger to pandemic disease outbreaks in the last two decades. Each outbreak has yielded different impacts upon the region and has been handled differently by the local and international authorities involved. The management of each outbreak has undoubtedly played an integral role in mitigating or accelerating its spread across borders and regions. In the past decade, there have been two main epidemics that spread rapidly through human-to-human transmission, namely, the severe acute respiratory syndrome (SARS) outbreak in 2003 and the influenza A (H1N1), or swine flu, outbreak in 2009. This NTS Insight will examine the responses in Asia to the 2009 H1N1 pandemic given the 2003 SARS epidemic as a prior reference point. It will also outline several policy recommendations based on lessons learned from the handling of the H1N1 outbreak.

An unknown pneumonia-like respiratory syndrome – one which tested negative for influenza – was first reported in Guangdong province, southern China, in November 2002. By 12 February the next year, 305 cases and 5 deaths had been reported. On 12 March, the World Health Organization (WHO) issued a global health alert. Three days later, it issued a 'rare travel advisory' (WHO, 2003a). It also named the illness after its symptoms: severe acute respiratory syndrome (SARS). When epidemiological analyses indicated that SARS was spreading along international travel routes, the WHO issued emergency travel recommendations to all its member states, declaring SARS 'a worldwide health threat' (WHO, 2003b:6). By the end of the month, cases had been reported in Canada, Germany, Taiwan, Thailand, the United Kingdom, Hong Kong, Vietnam and Singapore.

Consequently, affected states implemented containment strategies to prevent further transmission in an effort to keep the number of new cases low (WHO, 2003b). However, there were significant differences in how each country applied the containment strategy.

Damage Dealt: China and Hong Kong

China and Hong Kong were arguably the two places hardest hit by the SARS epidemic. Although both employed containment strategies as per WHO recommendations, the execution of this strategy was markedly different and resulted in different consequences for the two countries.

According to Zheng and Lye (2004:47), the way in which China dealt with SARS was a reflection of three major characteristics of China's political context at the time: political priority, political correctness and non-transparency. At the national level, the SARS epidemic was perceived as a medical problem which warranted a medical, and not social or political, response (Caballero-Anthony, 2005:480). Therefore, their *modus operandi* for SARS was, as per WHO recommendations, containment: to isolate the affected area and prevent disease spread. Alongside this, China also undertook additional measures such as control of information dissemination and containment of negative news reports in order to maintain social stability and minimise any potential political fallout resulting from the situation (Zheng and Lye, 2004:52).

At the international level, China was heavily criticised for being less than cooperative in providing updated statistics of SARS cases and similar or suspected cases to the WHO. The Chinese government officially alerted the WHO only four and a half months after the first SARS cases were discovered. It should be noted that, in 2003, the International Health Regulations (IHR) made only cholera, yellow fever and plague compulsory reporting diseases (Caballero-Anthony, 2005:480). Therefore, China was not technically violating the terms of its membership of the WHO by neglecting to report SARS cases to the world health body. The government also placed strong restrictions on media coverage of the crisis, which included a blanket prohibition on reporting of the crisis except those outlined in official press communiqués (Abraham, 2004:21–2). This clampdown led to text messaging and internet rumours, contributing to the spread of false notions and panic among Chinese citizens, many of whom fled the nation's largest cities for fear of contracting the disease (Kalathil, 2003).

Ultimately, a total of 5,327 SARS cases were reported in China, of which 349 proved fatal – incurring significant economic costs in the process (WHO, 2004). As the number of new SARS cases peaked, international criticism of China's under-reporting to the WHO grew more vocal, media coverage on the epidemic increased, and consumer and investor confidence fell, causing a decrease in domestic demand and threatening the collapse of many businesses in the region. China alone suffered losses of USD6.1 billion in gross domestic product (GDP) and USD17.9 billion in domestic demand plus imports in 2003 (ADB, 2003:88).



Masked passenger on the Hong Kong MTR during the SARS epidemic.

Credit: Ka-Ho Pang, flickr.com

Hong Kong was the second worst-hit area after mainland China, with 299 deaths and 1,755 infections. Although Hong Kong's public health infrastructure was more developed than that of China and it had implemented containment measures, it still struggled to fight off SARS for various reasons.

In an assessment of Hong Kong's containment strategy post-SARS, the WHO identified three main obstacles faced by Hong Kong. Firstly, the fatality rate of SARS in Hong Kong was high – 17.1 per cent compared to China's 7 per cent – which meant not only a higher case load but also an increased severity of the disease in sufferers, both of which put pressure on an already inundated public health system. Secondly, effective and rapid medical and policy responses were hindered by communication problems which included failures in communication between local health experts, the national Department of Health and the Hospital Authority (the agency governing all hospitals in Hong Kong), and the fact that information from Guangdong, where the disease originated, was being withheld. Thirdly, there was held to be a lack of contingency planning as well as flexibility in the national response plan. The gaps included

inadequate infection control, poor environmental conditions, an absence of comprehensive laboratory surveillance, high numbers of healthcare workers succumbing to the disease (386 had been affected) and inadequate knowledge of the disease or its cause (Siu and Wong, 2004:68; Marshall, 2003:848).

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Success Stories: Vietnam and Singapore

Like its neighbours China and Hong Kong, Vietnam was initially seen as one of the countries worst affected by the virus. In spite of this initial assumption, however, Vietnam suffered minimal SARS casualties: 5 people had died out of a total of 68 reported infections (Vietnam Contains, 2003). It was declared the first nation in the world to successfully contain and eliminate SARS on 28 April 2003 after going 20 days without a new case. The WHO attributed this success to the Vietnam government's 'real, old-fashioned infectious disease containment' policy. The country was viewed as having fought the outbreak quickly, transparently and intensively. Among methods used were immigration screening and infrared machines at airports and border crossings to detect people with high temperatures. The WHO also cited the government's efforts – its speed in requesting WHO assistance, and the full support given to WHO in tackling the outbreak which includes effectively and efficiently implementing rapid case detection, immediate isolation and infection control, and contact tracing mechanisms – as the reason behind the Vietnamese success story (Mydans, 2003).

Singapore, like most of its neighbours, dealt with SARS through a series of strict containment measures coupled with worst-case-scenario planning. However, unlike Vietnam, Singapore's anti-SARS efforts were spearheaded by the government and not the WHO. In Singapore, suspect and probable SARS cases were identified and reported using a modification of the WHO case definition – surveillance encompassed any fever and/or respiratory symptoms among healthcare workers, clusters of cases of community-acquired pneumonia, unexplained respiratory deaths, and individual cases with no contact but which are clinically suspicious for SARS. All persons in contact with or exposed to these groups or individuals during the 10 days prior to symptom onset would be traced to identify the source of infection, or mandatorily home quarantined under the Infectious Diseases Act. Other measures implemented included twice-daily temperature checks for healthcare workers (CDC, 2003). Then-Prime Minister Goh Chok Tong announced a high-level task force on SARS. One of its functions was 'to think in terms of worst-case scenarios ... asking a lot of "what if" questions' in order to generate credibility and confidence; the aim is to 'err on the alarming side rather than risk falling into over-reassurance' (Lanard and Sandman, 2003). These consolidated, concerted government-led measures met with success. By the end of May 2003, Singapore was declared SARS-free by the WHO (Singapore Success, 2003).

SARS: Lessons Learned

In the aftermath of the SARS outbreak, the WHO Communicable Disease Surveillance and Response division published a report stating that SARS demonstrated the capacity and importance of global alerts and the support of mass media and electronic communications media, and praised developing countries for the speed with which they mobilised their health services with preparedness plans and launched health campaigns to guard against imported cases (WHO, 2003b).

In the same report, the WHO also noted four main lessons to take away from SARS in the event of a future pandemic: the need to stimulate rapid high-level research to generate the scientific basis for sound disease control interventions; the need for increased transparency and surge capacity; the need to not underestimate the ability of a poorly understood new infectious disease to incite international public anxiety leading to social unease, economic loss and political change; and the importance of international collaboration and strong global leadership in managing an outbreak (WHO, 2003b:4–9).

Although the WHO did not declare the disease a pandemic, SARS was the first disease to alert the region to the potential health security threat posed by a pandemic. Abraham (2004:140) described SARS as a 'dress rehearsal for the more serious threat posed by a new influenza pandemic'; the SARS outbreak also informed and influenced all pandemic preparedness and response planning that occurred thereafter, operating under the assumption that the next pandemic would be similar in nature to SARS, but it was not.

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H1N1

H1N1 was declared a pandemic by the WHO in June 2009 (WHO, 2010). The first signs of the global spread of influenza A (H1N1) emerged in April 2009 when the WHO announced that there were seven reported cases in the US and another three in Mexico (WHO, 2009b). The government of Mexico first identified the cases in March 2010 and subsequently reported them to the WHO. The disease spread rapidly around the world and within a week, the WHO raised the alert level to Phase 5, which occurs when 'the same identified virus has caused sustained community level outbreaks in two countries in one WHO region' (WHO, 2009e). By the start of May, the criteria for raising the alert further to Phase 6 were met (WHO, 2009b), but the WHO did not announce a complete pandemic until 11 June 2009 (WHO, 2009c).



Influenza AH1N1 (swine flu) vaccines.

Credit: Madmoiselle Lavender, flickr.com

Once H1N1 appeared to be on a rapid spread globally, many countries moved quickly to contain the new influenza virus. The virus was also commonly known as 'swine flu' due to its similarity to other strains of the virus that are prevalent in pigs in an attempt to minimise the social and financial costs of the epidemic. Government policy responses to H1N1 could generally be classified into two categories, namely, containment and mitigation (Nicoll and Coulombier, 2009).

Asian Responses to H1N1: Limits to Containment?

Initial Stages of Containment: Surveillance and Screening

In the initial phases of the spread of a disease, that is, before community outbreaks are observed, containment, which aims to limit the rate and extent of the spread, is an appropriate strategy. Many Asian countries employed the same types of containment measures – quarantine, on-board temperature checks and temperature screening at ports of entry. In Hong Kong, after the confirmation of the first case of H1N1 involving a 25-year-old Mexican man, the hotel he was staying at, the Metropark Hotel, was ordered to be sealed off and the 200 guests and 100 staff inside the hotel were given the antiviral drug Tamiflu (Five New, 2009). In Singapore, thermal scanning was deployed at all airports, as well as sea and land checkpoints, by 3 May 2009. The first confirmed case of H1N1 in the country was established on 26 May when a Singaporean woman who flew back from New York consulted a general practitioner who then decided to admit her to hospital based on her travel history. She had begun to develop a cough while on board her flight but had passed through the thermal scanner undetected because she did not have a fever at that point (Singapore Confirms, 2009). Similarly, the first case in Malaysia of a 21-year-old student returning from the US was not detected by the thermal scanners at the airport because a fever had not yet developed (Foong and Singh, 2009).

The effectiveness of measures such as antiviral treatments and thermal scanning for detecting persons who were ill, and the relevance of such measures for a disease that generally did not cause serious illness, was questionable. Data from a study conducted by researchers from various Chinese Centers for Disease Control and Prevention of an H1N1 outbreak among members of a tour group in China in June 2009 showed that thermal scanning failed to detect the illness. This data, as well as the Singaporean and Malaysian examples given earlier, suggests that 'thermal scanning and health questionnaires at the airports were not effective for detecting pandemic (H1N1) 2009 infections' (Han et al., 2009). The WHO also asserted that exit and entry screenings could not help reduce the proliferation of the disease but a number of countries continued to employ those measures (WHO, 2009a). Individual admission, where people admitted themselves for treatment, appeared to be more effective in isolating affected cases. Although thermal scanners can screen large numbers of people, it cannot detect individuals who are in the latent phase of the flu who are contagious. Thus, in trying to prevent the spread of the disease, it may be more beneficial to highlight self-awareness of the illness (without causing undue alarm to the public) than to implement screening.

The extensive and intensive quarantining and surveillance methods which were employed in some countries despite emerging evidence that such measures were not effective reflect the extent to which the H1N1 response was influenced by the SARS experience. The policy for preventing and controlling the spread of H1N1 was apparently designed for a virus such as SARS that was highly contagious and caused greater fatality. The perceived success of certain measures in stemming the spread of SARS led policymakers to implement similar measures for H1N1 – due to H1N1 being a respiratory infection, it was thought to be similar to SARS – without allowing for greater flexibility to alter the policy direction when new evidence emerged that the disease was not as severe as initially predicted. Although H1N1 was highly infectious, it often did not result in severe illness or death, yet the extended period of the implementation of containment measures imply concerns of a similarly fatal respiratory disease breaking out in Asia.

Other Measures

Some other government responses to the virus arguably went beyond the basics of a containment strategy and the regular purview of public health issues. The World Organisation for Animal Health (OIE) stated that 'it is not necessary to introduce specific measures for

international trade in swine or their products nor to consider that consumers of pork products are at risk of infection' and the WHO also issued statements advising against trade restrictions (INFOSAN, 2009). Even though there is no evidence pointing towards the animal-human transmission of the current strain of H1N1, and even after the statements issued by the OIE and WHO, some countries put into place measures targeting the production and trade of pigs and pork products.

In addition to thermal scanners set up at airports and seaports, Indonesia imposed a blanket ban on pork imports and also enforced an examination of 9 million pigs in the country (Indonesia Halts, 2009). China also instituted a ban on pork imports from Mexico and parts of the US on 27 April 2009 and extended it to imports from Alberta, Canada after a herd of pigs there was found to have the H1N1 strain. China's imposition of trade restrictions on pork led to censure from the affected exporting countries. They called for the lifting of the ban as evidence suggested that the virus could not be transferred from consuming pork (Canada Demands, 2009). However, China did not lift the import ban until 30 November; its response was seen as unnecessarily harsh, straining bilateral relations with the countries affected by the ban (Niu, 2009). Thus, it could be seen that some measures have negative ramifications such as strained diplomatic relations and additional costs from unwarranted screening of animals and their by-products. In addition, economic losses were incurred due to the decrease in trade of pigs and pork products.

As new evidence emerged on the low virulence and low mortality rates of H1N1, some countries did seek to scale down the measures in place. Singapore ceased enforced self-quarantine of passengers returning from Mexico in mid-May (Huang, 2010) and ended temperature screening at its borders by 13 July as part of its shift from containment to mitigation (WHO, 2009d). Hong Kong, which also pursued a strict policy of containment for both H1N1 and SARS, stopped tracing those who were in close contact with confirmed cases by mid-June and instead emphasised the treatment of severe cases (Huang, 2010:9).

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H1N1: Lessons Learned

However, the measures which continued to be implemented after evidence emerged of the low virulence of H1N1 point to the fact that some states as well as international organisations were entrenched in programmed policy responses. Although the information available increasingly suggested that an H1N1 pandemic on the scale of the Spanish Flu pandemic in 1918, the Asian Flu outbreak in 1957, or the more recent avian flu (H5N1) or SARS outbreaks, was no longer likely, both states and the WHO continued with vaccination programmes and with pushing for increased vaccine uptake (Ricci, 2010:13).

Faced with a number of emerging infectious diseases (EIDs) in the past decade exhibiting a range of virulence and ability to cause fatalities across regions, countries and the WHO alike have had to establish national and international pandemic preparedness programmes which could adequately deal with new or existing EIDs. The current WHO pandemic alert system was adopted as part of the preparations for pandemic influenza after the panic surrounding the H5N1 avian flu virus. The alert system's different phases come with recommended actions for national governments.

The definition of a pandemic is crucial but it remains a contentious and confusing concept. The WHO declared H1N1 a Phase 6 pandemic on 11 June 2009 despite many governments and health experts arguing against it (Fidler, 2009:768). Prior to the declaration of H1N1 as a pandemic, the WHO had revised its definition of a pandemic flu to exclude the requirements that a pandemic virus had to be new and result in widespread and severe disease (Schabas and Rau, 2010). Also, it was no longer defined as outbreaks that caused 'enormous numbers of deaths and illness' (Doshi, 2009).

The definitional problems around what should be considered a pandemic would shape governments' responses as well as public perceptions. The changes in the definition at a time when a pandemic was imminent resulted in confusion among public health professionals and alert observers. It is necessary for a clearer, more distinct definition and description of a pandemic to be established through a more transparent process of negotiation among the various parties involved (Council of Europe, 2010).

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Conclusion: Future of Pandemic Response?

SARS played a crucial role in shaping and guiding public health policy learning with regard to pandemic preparedness and handling in three main aspects (Huang, 2010:9). Firstly, risk assessment and communication tended to be dominated by worst-case-scenario planning, both at the national and WHO level. WHO Director-General Dr Margaret Chan, for example, noted the 'notorious' nature of influenza viruses and declared the H1N1 pandemic a threat to all humanity (WHO, 2009a). Secondly, after being criticised for its belated response during the SARS outbreak, China had become sensitive to allegations that it was not reacting responsibly to public health crises. It was therefore predisposed towards a visible, high profile approach such as a strict containment strategy which would present the image of the government being proactive. Thirdly, the successful containment of SARS encouraged the use of forceful measures such as quarantine and travel restrictions on H1N1 because 'SARS and H1N1 were both respiratory infections' (Xu and Ren, 2009).



A snapshot of a supermarket in China during the SARS epidemic.

Credit: thepismire, flickr.com

As a result, national and regional authorities may have adhered too strictly to the pandemic preparedness plans developed over 2004–06 to cope with emerging infectious respiratory disease pandemics of the same or similar pathology as SARS in 2003. Consequently, the possibility of an outbreak with varying levels of severity was not taken into serious consideration. The response to H1N1, therefore, was shaped by the contingency plan in place as opposed to being tailored to the nature and pathology of the virus itself (Fitzpatrick, forthcoming).

A review of the 1976 H1N1 outbreak in the US concluded that a public health response to a pandemic should not be premised only on the worst-case scenario and that it would be a mistake to bundle all response measures into a single go or no-go decision, 'with no provision for the monitoring of the situation and continual reconsideration of policy directions based on new evidence' (PCAST, 2009:9).

According to Fitzpatrick (forthcoming), proclaiming a worst-case scenario and reinforcing the 'prepare for the worst, hope for the best' doctrine can be detrimental to rational contingency planning, and lead to scaremongering. Therefore, it is recommended that policymakers and governments should prepare not for a worst-case-scenario but instead adopt a most-likely-outcome approach based on the pathological and epidemiological nature of the disease while being prepared to monitor and change strategies if need be (Fitzpatrick, forthcoming). In other words, a more flexible approach to tackling a potential pandemic outbreak could lead to its more effective management and control.

When developing pandemic responses, governments and international organisations should also take into consideration the potential costs of a worst-case-scenario approach, such as the erosion of public confidence in governments, public health authorities and international organisations such as the WHO, and the economic impact of absenteeism due to travel restrictions, border control measures, quarantines and school and work closures within a containment context. For example, the low vaccine uptake among health professionals as well as the public due to the low perceived risks associated with H1N1 indicates the damage dealt to public confidence in health systems and health authorities (Fielding, forthcoming). The absence of reliable, accurate information and its accountable and responsible dissemination can also contribute to the spread of an outbreak.

The trade restrictions that certain countries imposed on the import of pigs were detrimental to relations with pig-exporting countries while not proving beneficial in terms of stemming the spread of H1N1. In addition, the potential political cost of not being seen to be actively addressing the pandemic flu was a factor motivating a number of countries to adopt an intensive and extensive containment strategy. In the case of countries such as China, Hong Kong and Singapore which were particularly affected by SARS, the memory of its virulence could explain statements by government spokespersons such as 'a large-scale breakout would be fatal for China' (Bennett, 2009). The continuing implementation of containment measures even after H1N1 had spread suggests attempts by governments to assuage public concern and to be seen as acting swiftly and resolutely. This implies that the potential political fallout that could otherwise be incurred was a vital consideration for governments when formulating pandemic responses.

Furthermore, opportunity costs are incurred when governments choose to concentrate public health resources on implementing high levels of public surveillance and screening such as thermal scanning at ports of entry. Limited public health resources which could be more effectively deployed to address other health issues are redirected to containing or delaying such pandemics. The emphasis on raising public awareness could also divert attention from other chronic and more pervasive diseases present in a country. Such costs should be weighed against the potential benefits of delaying the arguably inevitable importation and spread of pandemic influenza (Hien et al., 2010).

Also, an individual state's economic development significantly influences how a pandemic is handled. Without economic resources, it is difficult to create and maintain the medical infrastructure, medical personnel, surveillance mechanisms, laboratory and diagnostic capabilities and response surge capacity required to adequately address a pandemic outbreak. Less developed countries with particularly limited resources may find it difficult to contain and mitigate such an outbreak. However, there are other possible avenues that they could

pursue, such as seeking assistance directly from the WHO or from other forms of international assistance under its auspices and supervision. The WHO cannot intervene unless a member state requests its assistance in the event of a public health crisis (WHO, 2008:15). For instance, a developing nation such as Vietnam was able to overcome SARS effectively and rapidly with WHO intervention. Countries, civil society groups and international organisations should collaborate in order to come up with ways to address basic issues of development and infrastructure in order to most effectively respond to pandemics, particularly in a globalised age.

The SARS epidemic and the H1N1 pandemic illustrate the inextricable links between national and international public health, health crises and the economy, and the importance of foreign policy and security concerns with regard to health. It is imperative that both the disaster and opportunity elements of the lessons learned from the SARS and H1N1 crises be applied within the evolving landscape of global health to effect more efficient, deliberate responses to public health emergencies of international concern.

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References

- Abraham, Thomas, 2004, *Twenty-First Century Plague: The Story of SARS*, Hong Kong: Hong Kong University Press.
- Asian Development Bank (ADB), 2003, 'Assessing the Impact and Cost of SARS in Developing Asia', *Asian Development Outlook 2003 Update*, Manila. <http://www.adb.org/documents/books/ado/2003/update/sars.pdf>
- Bennett, Simeon, 2009, 'They Shoot Frequent Fliers, Don't They? Only in China's Flu Era', *Bloomberg*, 21 June. <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a3hHFvo8NN1k>
- Caballero-Anthony, Mely, 2005, 'SARS in Asia', *Asian Survey*, Vol. 45, No. 3.
- 'Canada Demands Answers from China over Pork Ban', 2009, *CTV News*, 4 May. http://www.ctv.ca/CTVNews/Canada/20090504/china_alberta_090504/
- Centers for Disease Control and Prevention (CDC), 2003, 'Severe Acute Respiratory Syndrome – Singapore 2003', *Morbidity and Mortality Weekly Report*, Vol. 52, No. 18, pp. 405–11. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5218a1.htm>
- Council of Europe, 2010, 'The Handling of the H1N1 Pandemic: More Transparency Needed', Document 12283, Social, Health and Family Affairs Committee, Parliamentary Assembly of the Council of Europe, 7 June. <http://assembly.coe.int/Main.asp?link=/Documents/WorkingDocs/Doc10/EDOC12283.htm>
- Doshi, Peter, 2009, 'Calibrated Response to Emerging Infections', *BMJ*, Vol. 339, No. b3471. <http://www.bmj.com/content/339/bmj.b3471.full>
- Fidler, David P., 2009, 'H1N1 after Action Review: Learning from the Unexpected, the Success and the Fear', *Future Microbiology*, Vol.4, No. 7, pp. 767–9. <http://www.futuremedicine.com/doi/full/10.2217/fmb.09.54>
- Fielding, Richard, forthcoming, 'Pandemic Influenza A/H1N1 (pH1N1) in Hong Kong: Anatomy of a Response'.
- Fitzpatrick, Michael, forthcoming, 'Pandemic Flu: Public Health and the Culture of Fear'.
- 'Five New UK Flu Cases Confirmed', 2009, *BBC News*, 2 May. <http://news.bbc.co.uk/2/hi/asia-pacific/8029871.stm>
- Foong, Pek Yee and Dharmender Singh, 2009, 'Malaysia Confirms First Case of A (H1N1) Flu (Update 2)', *The Star*, 15 May. <http://thestar.com.my/news/story.asp?file=/2009/5/15/nation/20090515141134&sec=nation>
- Han, Ke, Xiaoping Zhu, Fan He, Lunguang Liu et al., 2009, 'Lack of Airborne Transmission during Outbreak of Pandemic (H1N1) 2009 among Tour Group Members, China, June 2009', *EID Journal*, Vol. 15, No. 10. <http://www.cdc.gov/eid/content/15/10/1578.htm>
- Hien, T.T., M.F. Boni, J.E. Bryant, T.T. Ngan et al., 2010, 'Early Pandemic Influenza (2009 H1N1) in Ho Chi Minh City, Vietnam: A Clinical Virological and Epidemiological Analysis', *PLoS Medicine*, Vol. 7, No. 5. <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000277>
- Huang, Yanzhong, 2010, 'China's Reaction to H1N1 Pandemic Flu', EAI Background Brief No. 498, 8 January. <http://www.eai.nus.edu.sg/BB498.pdf>

'Indonesia Halts Pig Imports due to Swine Flu Fears' (in Indonesian), 2009, *Kompas*, 27 May.
<http://nasional.kompas.com/read/2009/04/27/13282547/Takut.Flu.Babi..Indonesia.Hentikan.Impor.Babi>

International Food Safety Authorities Network (INFOSAN), 2009, 'The Influenza Outbreak in Humans Caused by Influenza A/H1N1 – Considerations at the Human-animal Interface', INFOSAN Information Note No. 2/2009 – Human-animal Interface Aspects of Influenza A/H1N1, World Health Organization (WHO) / Food and Agriculture Organization of the United Nations (FAO), 30 April.
http://www.fao.org/ag/againfo/programmes/en/empres/AH1N1/docs/No_02_influenza_Apr09_en_rev1.pdf

Kalathil, Shanthi, 2003, 'Battling SARS: China's Silence Costs Lives', *International Herald Tribune*, 3 April.
<http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=1227>

Lanard, Jody and Peter M. Sandman, 2003, 'SARS Communication: What Singapore is Doing Right', *The Straits Times*, 6 May.
<http://www.psandman.com/articles/sars-2.htm>

Marshall, Sarah Jane, 2003, 'Expert Committee Finds Little Fault in Hong Kong's Response to SARS', *Bulletin of the World Health Organization*, Vol. 81, No. 11, p. 848. <http://www.who.int/bulletin/volumes/81/11/news1103.pdf>

Mydans, Seth, 2003, 'The SARS Epidemic: Containment; How Vietnam Halted SARS And Saved the Life of a Nurse', *The New York Times*, 7 May. <http://query.nytimes.com/gst/fullpage.html?res=9C0DE1D81E3CF934A35756C0A9659C8B63>

Nicoll, A. and D. Coulombier, 2009, 'Europe's Initial Experience with Pandemic (H1N1) 2009 – Mitigation and Delaying Policies and Practices', *Eurosurveillance*, Vol. 14, No. 29, 23 July. <http://www.eurosurveillance.org/viewarticle.aspx?articleid=19279>

Niu, Shuping and Tom Miles, 'China Lifts Import Ban on U.S., Canada, Mexico Pork', 2009, *Reuters*, 30 November.
<http://www.reuters.com/article/idUSTRE5B00IW20091201>

President's Council of Advisors on Science and Technology (PCAST), 2009, *Report to the President on U.S. Preparations for 2009-H1N1 Influenza*, Washington, D.C. http://www.whitehouse.gov/assets/documents/PCAST_H1N1_Report.pdf.

Raffles Medical Group, n.d., 'Development of H1N1 in Singapore'. <http://www.rafflesmedicalgroup.com/h1n1/development-of-h1n1-in-singapore/development-of-h1n1-in-singapore.aspx>

Ricci, James, 2010, 'H1N1 Returns, Again: The Globalization, Re-Conceptualization and Vaccination of "Swine Flu"', *Global Health Governance*, Vol. 3, No. 2. http://www.ghgj.org/Ricci_H1N1%20Returns.htm

Schabas, Richard and Neil Rau, 2010, 'How the WHO Overshot on H1N1', *The Globe and Mail*, 27 January.
<http://www.theglobeandmail.com/news/opinions/how-the-whoovershot-on-h1n1/article1436739/>

'Singapore Confirms First Case of H1N1', 2009, *Channel NewsAsia*, 27 May.
<http://www.channelnewsasia.com/stories/singaporelocalnews/view/432062/1/.html>

'Singapore Success against SARS', 2003, *BBC News*, 31 May. <http://news.bbc.co.uk/2/hi/americas/2951508.stm>

Siu, Alan and Y.C. Richard Wong, 2004, 'Economic Impact of SARS: The Case of Hong Kong', *Asian Economic Papers*, Vol. 3, No. 1, pp. 62–83. <http://www.mitpressjournals.org/doi/abs/10.1162/1535351041747996?journalCode=asep>

'Survey Shows that 85% of Public Polled are Satisfied with China's Anti-H1N1 Initiatives' (in Chinese), 2009, *China Youth Daily*, 26 May.
<http://news.anhuinews.com/system/2009/05/26/002261874.shtml>.

'Vietnam Contains SARS Outbreak', 2003, *BBC News*, 28 April. <http://news.bbc.co.uk/2/hi/asia-pacific/2980831.stm>

World Health Organization (WHO)

2003a, 'WHO Update 95: SARS: Chronology of a Serial Killer', 4 July. http://www.who.int/csr/don/2003_07_04/en/index.html

2003b, *Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*, Geneva.
http://www.who.int/csr/media/sars_wha.pdf

2004, 'WHO Summary of Probable SARS Cases with Onset of Illness from 1 November 2002 to 31 July 2003', 21 April.
http://www.who.int/csr/sars/country/table2004_04_21/en/index.html

2008, *International Health Regulations 2005 – 2nd edition*, Geneva.
http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf

2009a, 'Statement by WHO Director-General, Dr Margaret Chan – Influenza A H1N1', 29 April.
http://www.who.int/mediacentre/news/statements/2009/h1n1_20090429/en/index.html

2009b, 'Influenza A(H1N1) – Update 7', 1 May. http://www.who.int/csr/don/2009_05_01/en/index.html

2009c, 'Statement to the Press by WHO Director-General Dr Margaret Chan – World Now at the Start of 2009 Influenza Pandemic', 11 June. http://www.who.int/mediacentre/news/statements/2009/h1n1_pandemic_phase6_20090611/en/index.html

2009d, 'Singapore Ends Temperature Screening at Borders for Pandemic H1N1', 13 July.
http://www.wpro.who.int/media_centre/news/news_20090713_H1N1.htm

2009e, 'WHO Pandemic Phase Descriptions and Main Actions by Phase', Geneva.
http://www.who.int/entity/csr/disease/influenza/pandemic_phase_descriptions_and_actions.pdf

World Organisation for Animal Health, 2009, 'OIE Position on Safety of International Trade of Pigs and Products of Pig Origin', April 28.
http://www.oie.int/eng/press/en_090428.htm

Xu, Huiyun and Ren Shaoming, 2009, 'Two Days and Nights of Fighting' (in Chinese), *Diye caijing ribao* (First Financial Daily), 4 May.
<http://news.carnoc.com/list/132/132612.html>

Zheng, Yongnian and Lye Liang Fook, 2004, 'SARS and China's Political System', in Wong, John and Zheng Yongnian (eds) *The SARS Epidemic: Challenges to China's Crisis Management*, Singapore: World Scientific Press.

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