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Pigs, People and a Pandemic: Communicating Risk in a City-state

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Abstract

The 2009 H1N1 influenza pandemic, also known as the swine flu pandemic, was a test of risk communications methodology and processes. Governments were called upon to make tough decisions in the absence of substantive epidemiological data and baffling case fatality rates (CFRs). While New York adopted mitigation measures, Hong Kong and Singapore followed aggressive containment protocols. Recent studies however suggest that the benefits of such measures – achieved at great cost and allocation of resources – are minimal.

This review looks primarily at the experience of a small city-state, Singapore, and compares it with two other equally densely populated cities – New York and Hong Kong – and how all three confronted the challenge and the lessons to be drawn from their experience in risk communications. Communicating risk required deft handling by political leaders and officials to persuade people to adopt strict measures. In the wake of the 2003 severe acute respiratory syndrome (SARS) epidemic, there were high expectations in Hong Kong and Singapore for visible containment measures to continue in the event of future pandemics even when benefits were known to be minimal. Cultural differences may explain the receptivity of the populace in these countries to the stiff measures put in place to contain the disease. However, this requires further study.

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Biography

K.U. Menon is Senior Consultant with the Ministry of Information, Communications and the Arts (MICA), Singapore. For over a decade, until Oct 2009, he headed the division responsible for emergency planning, coordinating information flow during civil and national emergencies and nation-building programmes.

He began his career with the Ministry of Defence in 1978. Prior to his deployment to MICA, he was Research Fellow at the Institute of Southeast Asian Studies (ISEAS).

He has an Honours degree in Social Anthropology from Victoria University, Wellington, New Zealand, and in Communications and Media Management from the University of South Australia. He did his postgraduate work in Political Science at Monash University, Melbourne.

He has published articles in political science journals and monographs and more recently in the *Journal of Communications Management* (London) and the *Annals of the Academy of Medicine* (Singapore), touching on issues of public health and risk communications.

Introduction

In September 2005, the then newly appointed UN coordinator for avian influenza, Dr David Nabarro warned, on the very first day of his job, that up to 150 million people would soon be afflicted with the little understood virus.[1] Thereafter, many countries scrambled to come up with emergency plans to deal with an avian flu pandemic. However, while the experts and administrators of global public health assumed that the coming enemy would be avian flu, passed from poultry to humans in Asia, in actual fact, the next pandemic influenza virus originated in pigs, and the attack came in April 2009, not in Asia, but in distant Mexico.

The arrival of an influenza pandemic was anticipated, but that it would originate from the H1N1/swine flu virus was unexpected. It took even the influenza and surveillance experts by surprise. The pandemic did not evolve according to prior planning assumptions. By definition, disasters we anticipate and prepare for are less likely to occur, partly perhaps because anticipation gives us time to mitigate the disaster. It is invariably the disasters we do not anticipate that throw us out of kilter.

Communicating Risk

The 2009 H1N1 influenza pandemic was a major test of Singapore's risk communications principles and processes that were put in place soon after the 2003 severe acute respiratory syndrome (SARS) epidemic. World Health Organization (WHO) Director-General, Dr Margaret Chan, has also acknowledged that H1N1 created a 'communications challenge' for those in public health in general and for the WHO in particular. She observed that '[w]e have never, in public health, had to experience this diversity of channels of communications.'[2]

Risk is defined by most experts as simply the probability of an unintended event, and the science of risk assessment traditionally involves estimating the probabilities and consequences of these events.[3] Risk is difficult to quantify as there is no instrument available to measure risk. Also, risk probability constantly varies, changing as more information becomes available.

Communicating risk to the populace at large is an important area of expertise that has acquired prominence in recent years, particularly in the wake of 9/11 and other large-scale disasters. Communicating risk is further complicated by the tendency for people to expect their governments to protect them completely from all risk in their daily lives. We all know this is impossible and there has to be some trade-off.

Communicating risk is not a public relations exercise to avoid conflict situations or to convince the public that there is nothing to fear. Risk communications calls for difficult decisions from professionals engaged in public health and medicine. In most models of health behaviour, a perception of being at risk is a prerequisite for behavioural change, a

[1] McNeil D Jr. UN Expert Stands by His Dire Warnings. International Herald Tribune. 28 March 2006.
[2] Branswell H. H1N1 Pandemic Poses Big Communications Challenge for Global Public Health Agency: Chan. The Canadian Press. 29 December 2009. [cited 6 Jan 2010]. Available at: http://cottontopssandbox.wordpress.com/2009/12/29/helen-branswell-h1n1-pandemic-poses-big-communications-challenge-for-global-health-agency-chan/.
[3] Cabinet Office. UK Resilience. Updated 12 May 2010. [cited 14 March 2006]. Available at: http://interim.cabinetoffice.gov.uk/ukresilience.aspx.

supposition backed by empirical studies. These models endorse the belief that a high perceived risk of harm encourages persons to take actions to reduce their risk.[4] In short, fear can be a constructive emotion. When people are fearful of a particular risk, they will pay more attention to it and take action where necessary. Soft warnings and reassurances do not work, but clearly, communications that incite unreasonable fear can also be harmful. Risk judgements are also undoubtedly a by-product of social, cultural and psychological influences.

In 2004, then WHO Director-General, Dr Jong-Wook Lee, acknowledged that '[w]e have only recently come to understand that communications are as critical to outbreak control as laboratory analyses or epidemiology'.[5] It involves a set of skills which, as Sandman and Lanard have noted, can help health officials find the middle ground between loud warnings provoking needless fear, panic and economic damage and warnings which are too soft – a middle ground based on building mutual trust through involving the public early in the crisis, arousing appropriate levels of fear and helping people to cope with the crisis.[6]

However, risk communications is not a hard science. It is a young discipline, no more than three decades old, intersecting with many other areas of research and professional practice.[7] In working to control emerging infectious diseases like SARS, avian flu and H1N1, measures such as identifying the organism and its infectivity and epidemiology, contact tracing, isolation and screening, as well as developing vaccines, are critical components in the process. However, these actions to contain the spread can only be carried out if, at the same time, the general populace is prepared to comply with simple behavioural recommendations like wearing masks, practising hand hygiene and effecting social distancing measures.[8] The difficulty of controlling the spread of such diseases is compounded by the fact that what experts may consider a risk and what the public considers a risk are often not one and the same thing. Indeed, studies show that people tend to overrate the probability of rare, serious events and underrate the probability of more common, but less serious, events.[9]

These situations therefore call for effective risk communications that leads to realistic perceptions of risk, as well as the knowledge and skills to promote precautionary practices. Communicating realistic perceptions of risk is a challenge as it has been observed by many scholars that today's public will not automatically comply or even believe unexpected advice

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[4] Sadique MZ, Edmunds WJ, Smith RD, Meerding WJ, de Zwart O, Brug J et al.. Precautionary Behavior in Response to Perceived Threat of Pandemic Influenza. Emerging Infectious Diseases. 1 September 2007. Vol. 13, No. 9, pp. 1307–1313. [cited 4 April 2008]. Available at: http://www.cdc.gov/EID/content/13/9/1307.htm.

[5] Lee J-W. 'Address to the WHO Expert Consultation on Outbreak Communications Held in Singapore', September 2004, pp. 21–23. In: Hyer RN and Covello VT (eds). Effective Media Communication during Public Health Emergencies: A WHO Handbook. 2007. Geneva, Switzerland: WHO Press.

[6] Sandman PM and Lanard J. Bird Flu: Communicating the Risk. Perspectives in Health. 2005. Vol. 10, No. 2, pp. 1–6. Available at: http://www.paho.org/english/dd/pin/Number22_article1.htm.

[7] Leiss W and Powell D. Mad Cows and Mother's Milk: The Perils of Poor Risk Communication, 2nd Edition. 2004. Ontario: McGill-Queen's University Press. p. 35.

[8] Brug J, Arja RA and Richardus JH. Risk Perceptions and Behaviour: Towards Pandemic Control of Emerging Infectious Diseases. International Journal of Behavioral Medicine. 2009. Vol. 16, No. 1, pp. 3–6. http://www.springerlink.com/content/2416557840914w86/.

[9] Glik DC. Risk Communication for Public Health Emergencies. Annual Review of Public Health. April 2007. Vol. 28, pp. 33–54. http://www.annualreviews.org/doi/abs/10.1146/annurev.publhealth.28.021406.144123?journalCode=publhealth.

to avoid some unseen danger.[10] The worst thing that can and often does happen in risk communications is the transmission of conflicting messages and messages that are poorly translated or presented as scientific information from voices of authority. In such situations, people will often seek a second source for confirmation. Not all intuitively understand the concept of probability or cumulative risk. A probability of 5 per cent makes less sense to an individual than a clear statement that '5 out of 100 people have an increased risk for a disease'.[11] Another example cited that aptly illustrates the problem of cumulative risk from a public health perspective is that of a farmer who is directed to cull his chickens and ducks during an avian flu outbreak. Here, he is being asked to bear the burden of destroying his livelihood to reduce the risk to other members of society. He is likely to view it as an unfair imposition by the state and his compliance with health messages will depend very much on whether broader issues of economic compensation have been incorporated.[12]

The capability therefore to reach out to the public swiftly with authoritative and consistent messaging marked by clarity and simplicity to ensure public trust, understanding and confidence is critical. Governments bear the primary responsibility for risk communications in a pandemic, and when well-managed, risk communications helps to build mutual respect between the government and the target groups with which it is communicating.

The H1N1 Virus

The major problem encountered in communicating risk is often the absence of information on the most basic variables – such as method of transmission, causative agent, case fatality rate (CFR) or morbidity ratio, and the necessary precautions. This happened with SARS; its onset was sudden, its spread rapid and its cause unknown.

Winston Churchill's oft-quoted remark made in his radio broadcast of 1939 – 'a riddle wrapped in a mystery inside an enigma' – perhaps best describes how little we knew about the H1N1 virus. The virus appeared out of the blue in April 2009 in Mexico, apparently born from the combination of at least two pig viruses that also carried gene segments originating in viruses of other species such as birds or humans.[13] The WHO issued its first public response on the influenza outbreak only on 24 April 2009, some 18 days after Mexican health officials first raised the alarm locally. By then the virus had spread across Mexico's borders to the US where 7 cases were confirmed on 24 April. Three days later, on 27 April, the Mexican Health Minister announced that Mexico's death toll from swine flu fever had risen to 149, with 20 laboratory confirmed cases. A day later, the number of death cases had risen to 152.[14]

[10] Granatt M. On Trust: Using Public Information and Warning Partnerships to Support the Community Response to an Emergency. Journal of Communication Management. 2004. Vol. 8, No. 4, pp. 354–364.
[11] U.S. Public Health Service. Risk Communication: Working with Individuals and Communities to Weigh the Odds, Prevention Report. February/March 1995. [cited 3 June 2009]. Available at: http://odphp.osophs.dhhs.gov/pubs/prevrpt/Archives/95fm1.htm.
[12] Abraham T. Risk and Outbreak Communication: Lessons from Alternative Paradigms. Bulletin of the World Health Organization (WHO). 2009. Vol. 87, No. 8, pp. 604–607.
[13] Barclay W. Expert Analysis: Mexican Swine Flu – The Story So Far. New Scientist. 29 April 2009. [cited 22 May 2009]. Available at: http://www.newscientist.com/article/dn17049-expert-anlysis-mexican-swine-flu-the.
[14] Ministry of Health Singapore. Media Release Update. 29 April 2009.

Further developments that revealed the severity of the virus deepened the mystery surrounding it. In the initial weeks, data emerging from Mexico was serious, with reports of a high CFR of some 6.2 per cent in contrast to the usual rate of less than 0.1 per cent for seasonal flu, and casualties in Mexico were largely young adults including pregnant women.[15] The mortality rate was far higher than even the Spanish Flu of 1918–1919. In addition, WHO flu expert Dr Keiji Fukuda warned that a third of the human population, that is, some 2 billion people, would be infected with the virus within the next six months to a year. In early May, WHO Director-General Dr Margaret Chan also touched on the imminent possibility of a 'second wave' of infection.[16] Not surprisingly, the high mortality rate among young Mexicans and its rapid spread worldwide across multiple countries in four continents raised the spectre of the 2003 SARS epidemic. The situation was sufficiently serious for the Mexican government to subsequently shut down its capital city to contain the virus spread.

Compounding the mystery was the disparity between different countries in terms of the spread of the H1N1 virus. Wire reports in August indicated that there were over 250,000 cases of infection in the UK as opposed to about 1,022 cases in France.[17] This disparity was subsequently attributed to differences in health surveillance methods, tourist arrival numbers and population density. The WHO did not help matters either as its six-phase pandemic alert system engendered confusion and later, alarm, when categorising the level of pandemic severity and spread. The WHO moved quickly from phase 4 to phase 5 of the pandemic alert system, then qualified that 'its severity was not completely established' and followed up on 11 June by raising its global pandemic alert to phase 6, the first time that the WHO has made such a declaration in 41 years.

The differences in how various cities responded to the outbreak also sparked off some confusion and public debate. For instance, New York pursued a mitigation strategy from the onset while Singapore and Hong Kong adopted a determined containment strategy at the beginning, but moved on later to mitigation measures. In view of this, it might be useful to look briefly at how the three major cities of New York, Hong Kong and Singapore confronted the challenge of H1N1, the public's response to the actions taken, and the lessons and insights that can be gathered from managing risk communications during the pandemic.

New York

By 24 April, there were confirmed H1N1 cases reported in the US states bordering Mexico, specifically in southern California and Texas. The Centers for Disease Control and Prevention (CDC) had confirmed eight cases of the new strain of influenza in New York City and had declared a public health emergency.[18] The virus was first detected in a number of students from St Francis Preparatory School in Queens, New York, who had exhibited flu-like symptoms upon their return from a trip to Mexico. Thus, on 26 April, within days of the WHO's first public response on the virus, New York Governor David A. Paterson announced

[15] Statement by Minister for Health Mr Khaw Boon Wan at the Press Conference on Influenza A (H1N1). Press Release. 20 July 2009. Available at: http://www.moh.gov.sg/mohcorp/parliamentaryqa.aspx?id=22590.
[16] Jack, A. Chan Hits Back at Critics. Financial Times. 3 May 2009. Available at: http://www.ft.com/cms/s/0/e6260d9a-37d4-11de-9211-00144feabdc0.html.
[17] H1N1: A Tale of Two Neighbours. The Straits Times. 3 August 2009
[18] New York Governor's Office. Governor Paterson Activates Health Emergency Preparedness Plan; Puts State on 'High Alert' for Swine Flu. Press Release. 26 April 2009. [cited 6 Oct 2009]. Available at: http://www.schenectady.k12.ny.us/Swine_Flu_Information/paterson.swineflu.pdf.

the activation of the state's Pandemic Influenza Preparedness and Response Plan and placed the state on high alert to quickly identify and respond to any cases of swine flu. That same day, the US Department of Health and Human Services issued a nationwide public health emergency declaration. The US Government also released new guidelines stipulating that schools with one or more confirmed cases would be closed for at least 14 days, and by 30 April, 433 schools had shut down in some 17 states.[19] On the issue of closing the US-Mexico border to prevent virus spread, US President Barack Obama made clear on 29 April that his health advisers saw no reason to close the border with Mexico since it would be akin 'to closing the barn door after the horses are out'[20] as there were already cases in the US. Indeed, during congressional hearings, US Secretary of Homeland Security, Janet Napolitano, came under much pressure to defend her decision not to close the border with Mexico, saying it 'would be a very, very heavy cost for what epidemiologists tell us would be [of] marginal benefit.'[21]

New York's pandemic plan is grounded in the knowledge that the authorities will not be able to prevent pandemic flu from entering the city the moment it emerges anywhere in the world, and that once it arrives, the city can, at best, try to slow down its transmission, but will not be able to halt it. Thus no quarantine measures or travel advisories were implemented or given. Only standard guidelines, similar to those given for seasonal influenza, were provided. A key part of the plan was to minimise severe illness and death by identifying and treating New Yorkers who were most at risk as early as possible in the pandemic.[22] Measures were put in place largely to limit spread, morbidity and mortality, while minimising social disruption and cost. The plan also allowed for school closures to reduce the spread of the disease. In short, the strategy implemented by New York – a city which was the hardest hit of all cities in the US – was largely one of mitigation rather than containment. The President's Council of Advisors on Science and Technology summarised the main pillars of the mitigation effort as such – vaccines, antiviral drugs, medical care and non-medical interventions.[23]

As part of measures to address concerns and limit virus spread, the New York State Department of Health issued many press releases and held regular press conferences and briefings; produced a variety of fact sheets, brochures, posters and pamphlets for mass circulation with information tailored to specific populations; translated documents into up to 12 languages and developed low-literacy communication materials. All these were made available on an H1N1 dedicated webpage on the US Department of Health and Mental Hygiene's website. Health messages focused on informing the public to 'cover [their] cough; avoid close contact with people with influenza-like illness; wash [their] hands often with soap and water or alcohol-based cleansers and [call] on individuals at high risk of complications

[19] CDC: 141 Confirmed Cases of H1N1 in U.S. Associated Press. 30 April 2009. http://cbs3.com/national/h1n1.swine.flu.2.999159.html.
[20] WHO: Global Pandemic Imminent. CBSNews.com. 29 April 2009. [cited 15 June 2009]. Available at: http://www.cbsnews.com/stories/2009/04/29/health/main4976572.shtml.
[21] McNeil, DG. Containing Flu Is Not Feasible, Specialists Say. The New York Times. 30 April 2009. [cited 19 May 2009]. Available at: http://www.nytimes.com/2009/04/30/health/30contain.html?pagewanted=print .
[22] Farley TA. Commissioner, New York City Department of Health and Mental Hygiene before the New York City Council Committees on Health, Government Operations, and Public Safety on New York City's Response to H1N1. Testimony. 11 June 2009. Available at: http://www.nyc.gov/html/doh/downloads/pdf/public/testi/testi20090611.pdf.
[23] President's Council of Advisors on Science and Technology (PCAST). Report to the President on U.S. Preparations for 2009-H1N1 Influenza. 7 August 2009, p. ix. Available at: http://www.whitehouse.gov/assets/documents/PCAST_H1N1_Report.pdf

from influenza to seek preventive treatment from a health care provider early'.[24] Additionally, the department responded to a flood of public queries with customised scripts prepared for call takers and also the distribution of important clinical information to healthcare providers across the state.

Ultimately, the CFR in New York was lower than was initially predicted, but the number of H1N1 cases, hospitalisations and deaths was nonetheless substantial. National public opinion polls conducted in the US between April 2009 and January 2010 on the public response to H1N1 revealed that Americans were quick to adopt two central public health recommendations – hand-washing and the reduction of social interactions by avoiding crowded places such as sports venues and shopping malls. Throughout the course of the pandemic, more than half of the US population appeared to have a positive impression of the government's response but concern was focused on vaccine shortage and safety. Polls showed that public health communications efforts related to personal influenza-prevention behaviours was effective in reaching a large swath of the public.[25]

Hong Kong

In striking contrast to New York, Hong Kong's reaction and response was a lot more dramatic. Some six years after the devastating SARS epidemic of 2003 which killed 299 of its citizens, the Hong Kong Special Administrative Region government was not prepared to take any chances with H1N1. Very soon after Asia's first H1N1 case involving a 25-year-old Mexican tourist was confirmed in Hong Kong on the evening of 1 May 2009, the police cordoned off the Metropark Hotel in Wanchai – where the Mexican tourist was staying – and quarantined some 350 guests and hotel staff from 1–8 May 2009. Some 36 passengers who were seated close to the Mexican traveller during his flight to Hong Kong were also diligently traced and, together with the flight crew, quarantined for a week.[26]

In addition, the government raised its emergency response level to the highest tier. All travellers entering Hong Kong by air were required to fill in health declaration forms while arriving Mexican nationals or travellers who had been to Mexico in the previous seven days were subjected to temperature screening checks at border control points where thermal infrared scanners were used. The controller of the Hong Kong government's Centre for Health Protection made it clear that 'until that [screening] test is negative, we won't allow [anyone] out'.[27]

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[24] Farley TA. Commissioner, New York City Department of Health and Mental Hygiene before the New York City Council Committees on Health, Government Operations, and Public Safety on New York City's Response to H1N1. Testimony. 11 June 2009. Available at: http://www.nyc.gov/html/doh/downloads/pdf/public/testi/testi20090611.pdf.

[25] SteelFisher GK, Blendon R, Bekheit MM and Lubell K. The Public's Response to the 2009 H1N1 Influenza Pandemic. The New England Journal of Medicine. 3 June 2010. Vol. 362, p. e65. [cited 7 June 2010]. Available at: http://content.nejm.org/cgi/content/full/NEJMp1005102 .

[26] Bradsher K. Quick Action by Hong Kong Reflects Experience of SARS. The New York Times. 2 May 2009. [cited 19 Feb 2010]. Available at: http://www.nytimes.com/2009/05/02/world/asia/02asia.html.

[27] Bradsher K. Hong Kong, Minding SARS, Announces Tough Measures in Response to Swine Flu. The New York Times. 26 April 2009. [cited 20 Feb 2010]. Available at: http://www.nytimes.com/2009/04/27/world/asia/27kong.html.

The first reported local case – defined as one not otherwise epidemiologically linked with overseas travel, contact with an imported case-patient or contact with an infected person who had contact with an imported case-patient – was confirmed on 10 June 2009. In the early stages of the pandemic, the Hong Kong government followed containment-phase protocols. This called for confirmed cases to be isolated in hospitals followed by contact tracing, with contacts to be quarantined in hotels, hospitals and holiday camps, and provided with antiviral drug prophylaxis. The mitigation phase commenced when the first non-imported case was confirmed, with the government promptly announcing the immediate closure of all primary schools, kindergartens, childcare centres and special schools.[28]

As in New York, the Hong Kong authorities took pains to educate the populace on the risks posed by H1N1 through a variety of platforms – press releases and conferences (held on a regular basis), pamphlets and posters, websites, as well as television and radio programmes. In the wake of SARS, frequent hand-washing and mask-wearing were common practices and the public appeared to approve of the government's actions during the pandemic, including the quarantining of hotel guests. Indeed, the Hong Kong government's actions were 'highly acclaimed'.[29] A survey based on a random sample of 550 Chinese adults in Hong Kong in early May 2009 indicated that the public did not perceive the likelihood of a local H1N1 outbreak to be high nor did they regard H1N1 as a threatening disease. There was little evidence of panic but there was some complacency and misconceptions about the spread of the disease.[30]

Singapore

Singapore confirmed its first H1N1 case on 27 May 2009. The patient was a 22-year-old female Singaporean who had earlier returned to the city-state from New York. Upon arriving at the airport, she passed through the thermal scanners without incident as she did not have a fever then. When symptoms appeared, she consulted her doctor at a local clinic and was subsequently sent to a local hospital designated to treat H1N1 cases. Singapore thereafter experienced three waves of H1N1 cases imported from overseas. The first wave originated from the US, the second and larger wave from Australia, and the third and final wave from neighbouring ASEAN countries.

Singapore's response to H1N1 was as dramatic as that of Hong Kong's and has been very well-documented in the April 2010 issue devoted to H1N1 of the *Annals of the Academy of Medicine*, Singapore. Singapore activated its National Influenza Pandemic Readiness and Response Plan promptly, well before its first case, on 28 April, a day after the WHO raised its alert level from phase 3 to 4. Initial reports on the virus had revealed a high CFR in Mexico, a higher secondary attack rate than seasonal influenza and a disproportionate

[28] Wu JT, Cowling BJ, Lau EHY, Ip DKM, Ho L-M, Tsang T et al.. School Closure and Mitigation of Pandemic (H1N1) 2009, Hong Kong. Emerging Infectious Diseases. March 2010. Vol. 16, No. 3 [cited 14 June 2010]. Available at: http://www.cdc.gov/eid/content/16/3/538.htm.
[29] Griffiths S and Lau J. The Influence of SARS on Perceptions of Risk and Reality. Journal of Public Health. 2009. Vol. 31, No. 4, pp. 466–467. http://jpubhealth.oxfordjournals.org/content/31/4/466.full.
[30] Lau JTF, Griffiths S, Kai CC and Tsui HY. Widespread Public Misconception in the Early Phase of the H1N1 Influenza Epidemic. Journal of Infection. August 2009. Vol. 59, No. 2, pp. 122–127. Available at: http://download.thelancet.com/flatcontentassets/H1N1-flu/preparedness/preparedness-51.pdf.

number of young adults being affected.[31] Given the information available at that point in time, and Singapore's painful experience with SARS in 2003, it was decided, from a risk management perspective, that the best strategy was to raise alert levels to buy time for community-wide preparations to handle a pandemic. The plan was crafted with the objective of reducing morbidity and mortality through the treatment of influenza cases, the slowing down of the spread of influenza to ease the rapid increase in demand for healthcare services, and finally, maintaining essential services to limit social and economic disruption.

At the heart of this plan was the Disease Outbreak Response System (DORSCON) – a framework that comprises a series of colour-coded alert levels designed to guide the ramping up or scaling down of response measures. DORSCON is premised on the outbreak of a virulent virus and its different levels correspond with the WHO's alert phases of 1 to 6. Red and Black represent the levels at which the most exacting control measures have to be taken. The slew of measures employed during H1N1 included the use of thermal scanners at all border control points, the quarantining of all travellers coming from Mexico, an ambulance service dedicated to H1N1 cases, the use of full protective gear including N95 masks by healthcare workers, the imposition of restrictions on hospital visits, and also amendments to the infectious diseases regulations, to name a few.[32]

Singapore's strategy was similar to Hong Kong's and comprised two broad phases – containment and mitigation. Authorities launched the containment phase at the time when cases were either imported or were part of local clusters linked to imported cases. Containment measures were aimed at delaying the spread of the disease in the community. The mitigation phase commenced towards the end of June 2010 when sustained community spread had occurred. Mitigation measures were directed at minimising morbidity and mortality, and at slowing down the spread of the disease to avoid overwhelming the healthcare system.

As with New York and Hong Kong, massive efforts were made at all levels to inform and educate the public on public hygiene and social responsibility with the aim of slowing the spread of disease and managing public expectations of the pandemic via proactive public messaging, frequent press releases and conferences, and prominent announcements on DORSCON elevations. Every conceivable media platform was used to its full advantage. These platforms included print media such as brochures and pamphlets; print, television and radio advertising; as well as online and social media such as websites, blogs, YouTube, Facebook, electronic direct mailers and even Wikipedia. Health messages were translated into the country's four official languages – English, Malay, Chinese and Tamil. However, DORSCON announcements, in particular, invariably prompted confusion in hospitals and within the government as changes had to be effected mid-stream when alert levels shifted, from Green to Yellow on 28 April, to Orange on 30 April and back to Yellow on 11 May.

[31] Tay J, Ng YF, Cutter J and James L. Influenza A (H1N1-2009) Pandemic in Singapore – Public Health Control Measures Implemented and Lessons Learnt. Annals of the Academy of Medicine, April 2010. Vol. 39, No. 4, p. 322. Available at: http://www.annals.edu.sg/pdf/39VolNo4Apr2010/V39N4p313.pdf.
[32] Ong CWM, Khek YH, Lim AYT, Fisher DA and Tambyah PA. Reacting to the Emergence of Swine-Origin Influenza A H1N1. The Lancet. July 2009. Vol. 9, p. 398. http://download.thelancet.com/flatcontentassets/H1N1-flu/preparedness/preparedness-54.pdf.

During the pandemic, the Homefront Crisis Management System (HCMS) came into play promptly and took on the task of coordinating a whole-of-government response to H1N1. It has two main components: the Homefront Crisis Ministerial Committee (HCMC) and the Homefront Crisis Executive Group (HCEG). The HCMC, chaired by the then Deputy Prime Minister and Minister of Home Affairs, leads the HCMS, and provides strategic and political guidance on managing a crisis, while the HCEG, headed by the Home Affairs Permanent Secretary, provides the executive command during a civil crisis or emergency. Cutting across the top levels of the civil service, the HCEG has the breadth to marshal resources across the entire public sector and the teeth to ensure compliance. This group maintains a low profile during peacetime but it conducts several major exercises along the way to keep the machinery well-oiled. Singapore's position on crises has always been that it is better to err on the side of over-reaction than under-reaction, a function perhaps of its being a vulnerable, small city-state.

The Minister for Health took on the role of official government spokesperson. He was accompanied by medical experts at press conferences which were held on a regular basis. To impress upon the population the gravity of the threat, the first press conference was chaired by the Deputy Prime Minister. The Health Minister made clear very early on the risk H1N1 posed to Singapore, saying that, 'sooner or later, we will have our first case of H1N1' and warned of deaths at some point in the future.[33] However, he hastened to put things in context by noting that over 600 people die each year in Singapore from seasonal flu. Nevertheless, given the CFR of 0.37 per cent in North America, he cautioned that with every 1,000 infected cases, 'we can expect a few deaths'.[34] To help the public understand Singapore's pandemic plan, the Minister summed it up simply with the acronym PDIP which stood for '*Protect* the borders from imported cases, *Detect & Isolate* suspect cases, and *Personal* hygiene at the highest possible level by the community' (emphasis added).[35]

The Health Minister employed a range of colourful metaphors and imagery to prepare the public for the pandemic, referring to the event on several occasions as 'a long war', 'a global war', 'waves of attack', 'quick battle', 'the enemy is still out there and ready to pounce'. He touched on the 'wildfire', and said that 'control measures will ensure slow burn transmission' to instil hope that all would go well. He urged the public on the need to be 'alert in detecting, isolating, contact tracing very aggressively, hunting down every possible close contact and quarantining them [the infected persons]'. Concerned about public complacency given Singapore's success with SARS earlier, the Minister said it was 'unrealistic' for Singaporeans to expect to be untouched by H1N1.[36]

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[33] Statements by Minister for Health Khaw Boon Wan at Press Conferences on Influenza A (H1N1). Press Releases. 12 May and 22 June 2009. Available at: http://app.crisis.gov.sg/influenzaA/Page.aspx?id=180

[34] Statement by Minister for Health Mr Khaw Boon Wan at the Press Conference on Influenza A (H1N1). Press Release. 22 June 2009. Available at: http://www.moh.gov.sg/mohcorp/uploadedFiles/Web_Parts/swineflu/Statement%20by%20Health%20Minister%20_22%20Jun_.pdf.

[35] Statement by Minister for Health Mr Khaw Boon Wan at the Press Conference on Influenza A (H1N1) Outbreak. Press Release. 6 May 2009. Available at: http://www.moh.gov.sg/mohcorp/uploadedFiles/Web_Parts/swineflu/Statement%20by%20Health%20Minister%20Khaw%20Boon%20Wan%20at%206May_v4.pdf.

[36] See Statements by Minister for Health Khaw Boon Wan at Press Conferences on Influenza A (H1N1). Press Releases. 29 April, 30 April, 6 May and 12 May 2009. Available at: http://app.crisis.gov.sg/influenzaA/Page.aspx?id=180.

Efforts were also made to communicate to the public the preparations the government had made to prepare for the community spread of H1N1. Upon commencement of the mitigation phase, the Minister was quick to highlight to the public that it was the containment phase which had bought Singapore 'valuable time' – at least seven weeks – to prepare people psychologically and gear up the system for the community spread phase. It had provided time for the government to gear up public hospitals to handle H1N1 cases and free up isolation wards and intensive care unit (ICU) beds to treat complicated cases, prepare polyclinics to treat walk-in patients suspected of having H1N1, and provide for laboratory facilities and testing.[37]

However, some difficulties were encountered during the messaging and these required deft handling by the Minister and his officials. Criticisms were raised about the selective response – people from certain countries or regions, for instance, Mexico, were not allowed into Singapore and could be quarantined on arrival whereas travellers from other areas with similar reports of human-to-human transmission, such as the US, did not face such measures. Critics also called for some 'logic' in using thermal scanners; they may have been effective for SARS but in the case of H1N1, scanning resulted in a high percentage of 'false negatives'. Messaging for downgrading from containment to mitigation had to be calibrated to avoid abrupt changes and assure the public that measures were not being abruptly terminated. There were also obvious contradictions in messaging which led to some confusion as stringent control measures continued to be enforced at specific sites – the Asian Youth Games Village and hospital settings – while such measures were relaxed elsewhere. Even as the public was told to avoid crowded places, Singapore hosted the Asian Youth Games, attracting foreign delegations and large crowds to the stadium for the opening ceremony.

Following the government's success in confronting SARS in 2003, public trust in its ability was a crucial factor in public reactions during the pandemic. A typical response was, 'I'm not worried. The authorities did a good job during the SARS crisis. I'm sure they'll work hard again'.[38] A visiting Yale University student spending his summer in Singapore observed that the Singapore government had 'excellent preventive measures' in place to shield people from the effects of the virus.[39]

Regular surveys reaffirmed the positive public sentiments present during the crisis. Surveys by government agencies such as the Ministry of Information, Communications and the Arts (MICA) and the Health Promotion Board (HPB) consistently showed that citizens felt that the information provided by the government and media was 'just right', that is, they were adequately updated on the H1N1 situation with a majority expressing confidence in the government.

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[37] Statement by Minister for Health Mr Khaw Boon Wan at the Press Conference on Influenza A (H1N1). Press Release. 22 June 2009. Available at: http://www.moh.gov.sg/mohcorp/uploadedFiles/Web_Parts/swineflu/Statement%20by%20Health%20Minister%20_22%20Jun_.pdf.

[38] A Long War Ahead: Health Minister Warns the Public to Prepare Themselves on All Fronts. Today. 1 May 2009.

[39] Oh, To Be in Battle-ready Singapore: With More than a Million Cases of the Virus in the US, It's a Great Time to be in the Republic. Today. 25 July 2009.

The Enigma and Lessons Learnt

It has been well argued that a deadly pandemic such as the Spanish Flu of 1918–1919 was less likely to recur in 2009 given the obvious differences in circumstances between then and now. For starters, there is in place today a global human health surveillance and response system which facilitates regular information exchanges and delivers prompt early warning signals of a pandemic. In addition, many advances in technology and R&D in medical countermeasures have generated new drugs and enhanced capabilities to develop vaccines rapidly. Finally, whereas trench warfare during World War I served as a kind of incubator and vector for the lethal influenza virus, no such global conflict or similar situation exists today.[40]

Notwithstanding these significant differences which decreased the likelihood of a pandemic on the scale of that of the Spanish Flu recurring, the H1N1 pandemic sparked off global panic and the WHO came under criticism for precipitately raising alert levels dramatically. Fareed Zakaria, a prominent *Newsweek* columnist, observed that '[i]t certainly looks like another example of crying wolf.'[41] Many countries were unhappy with the vast stocks of vaccines they had accumulated in response to miscues – especially the initial WHO recommendation that two doses of the vaccine be given to each infected case. Their unhappiness was compounded when experts claimed that the swine flu incident was a 'false pandemic'.[42] Critics argued that what most countries had suffered was nothing more than the usual seasonal influenza and blamed the WHO and its experts for overstating the dangers of H1N1 with their exaggerated claims. Dr Henry Miller, a molecular biologist and former flu researcher at Stanford University, observed that the WHO had ignored Sherlock Holmes' warning, that is, 'it is a capital mistake to theorise before you have all the evidence'[43], and that the WHO's paradigm was 'fundamentally flawed'.[44] The WHO has since promised to clarify its data on H1N1. It has launched a review inviting a group of experts to scrutinise its response. The WHO's top flu official, Dr Fukuda, acknowledged that the choice of words may have to be reviewed in future disease outbreaks as the term 'pandemic' during swine flu caused confusion among some who believed that the WHO overplayed the threat posed by the virus.[45]

There have been criticisms as well of the measures undertaken by many countries in response to H1N1, measures which were reminiscent of those taken during the 2003 SARS epidemic. Much criticism was levelled at the Egyptian public health authorities for over-reacting and ordering the slaughter of all pigs in the country. It has been argued that containment measures directly contradicted the findings of a WHO study that travel restrictions and quarantines are ineffective and a misallocation of public health resources.

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[40] Koblentz GD. The Threat of Pandemic Influenza: Why Today Is Not 1918. World Medical & Health Policy. 2009. Vol. 1, No.1, Article 9. [cited 12 Jan 2010]. Available at: http://www.psocommons.org/wmhp/vol1/iss1/art9/.

[41] Zakaria F. The Sky Isn't Falling : Our World Is More Stable than We Think. Newsweek. 25 May 2009. p. 20. Available at: http://www.newsweek.com/2009/05/16/the-sky-isn-t-falling.html.

[42] Swine Flu Warnings 'Totally Overblown,' Some Say. Associated Press. 7 May 2009. Available at: http://www.msnbc.msn.com/id/30627377/print/1/displaymode/1098/.

[43] Miller HI. The Pandemic That Wasn't. Project Syndicate. 5 April 2010. Available at: http://www.project-syndicate.org/commentary/miller8/English.

[44] Ibid.

[45] Jordans F. Outside Experts to Review WHO's Swine Flu Response. Associated Press. 29 March 2010. [cited 14 April 2010]. Available at: http://seattletimes.nwsource.com/html/health/2011469271_apunwhoswineflu.html?syndication=rss

Indeed, as early as 30 April 2009, Dr Fukuda declared that, '[c]ontainment is no longer a feasible option ... The world should focus on mitigation. We recommend not closing borders or restricting travel.'[46] One critic went on to argue that 'some countries still look to [a] centuries-old approach to "contain" the rapid spread of H1N1' and that 'pandemics are global, but the political calculation to confront them is decidedly local'.[47] This same critic observed that decisions made by US leaders appear to have been governed by science and epidemiology. He argued that the US response avoided giving the public the impression that the outbreak was comparable to the Spanish Flu (a worst-case scenario) and was based on a continual reconsideration of policy directions based on new evidence.[48]

It is clear that the lessons of SARS weighed heavily on the H1N1 risk management approaches of the governments of Hong Kong and Singapore. In light of the baffling high CFR in Mexico and its reported impact on young adults, public health leaders in Hong Kong and Singapore chose to confront the risks head-on. Risk assessments were made based on the concerns of international experts, including those from the WHO, over the possibility of a lethal second wave. It was also reasonable to assume that there would be high expectations from the local populace that, in the wake of the SARS experience, a slate of very visible measures would be instituted to promptly contain the disease. In Singapore's case, the Minister for Health took the lead and, in consultation with medical experts and his cabinet colleagues, assessed that the risks at hand required prompt and visible responses. These responses were communicated to the public by the Minister on a regular basis to ensure a measure of public confidence and morale.

While Singapore received accolades for its handling of SARS in 2003, its tough measures like electronic tagging and quarantine were the object of considerable criticism in the Western media for its 'authoritarianism' and its 'harsh' and 'draconian' approach.[49] Indeed questions were raised over whether the 'best practices' in the Singapore experience could indeed be reasonably replicated elsewhere.

Responding to criticisms of over-reaction during the H1N1 crisis, it has been argued that 'it is reasonable that different cultures and political systems place different emphases on the potential risks of impact of an epidemic of a new disease.'[50] A 2006 study by Sandra Mounier-Jack and Richard Coker compared the strategies of countries in the Asia-Pacific with those in Europe and found that many of the Asia-Pacific plans did indeed have a stronger focus on early containment of disease and 'social distancing'. It was assessed that developing countries were likely to pursue this strategy more than developed ones because

[46] McNeil DG. Containing Flu Is Not Feasible, Specialists Say. The New York Times. 30 April 2009. [cited 19 May 2010]. Available at: http://www.nytimes.com/2009/04/30/health/30contain.html?pagewanted=print.
[47] Huang Y. The H1N1 Virus: Varied Local Responses to a Global Spread. YaleGlobal Online. 1 September 2009. [cited 7 Oct 2009]. Available at: http://yaleglobal.yale.edu/print/5921.
[48] Huang Y, 2010, Comparing the H1N1 Crises and Responses in the US and China. NTS Working Paper Series No. 1. Singapore: RSIS Centre for Non-Traditional Security (NTS) Studies. Available at: http://www.rsis.edu.sg/NTS/resources/research_papers/NTS%20Working%20Paper1.pdf.
[49] See Duncanson J. How Singapore Avoided WHO Advisory. Toronto Star. 25 April 2003. See also Beech H. and Forney M. Control Issues: As the SARS Outbreak Spreads across China, It's Make or Break for the Leaders in Beijing. Time. 12 May 2003.
[50] Griffiths S and Lau J. The Influence of SARS on Perceptions of Risk and Reality. Journal of Public Health. November 2009. Vol. 31, No. 4, pp. 466–467. Available at: http://jpubhealth.oxfordjournals.org/content/31/4/466.full.

of chronic shortages of antiviral drugs and vaccines.[51] Thus, we find in the case of the city of London for instance that 'containment' measures involved little more than 'laboratory testing of suspected cases, treating cases with antiviral medication and providing preventative courses of antiviral medication (prophylaxis) to close contacts and some school closures.'[52]

It may well be that cultural differences do (perhaps) go some way towards explaining the differences in perceptions of risk but this is a contentious issue that defies conclusive judgements. However, it does help to explain the willingness of populations in places like Singapore and Hong Kong to accommodate stern risk messages, to have the discipline necessary to mobilise people to ensure daily temperature checks in schools and public facilities, to diligently pursue contact tracing and implement school closures, as well as to carry out stiff measures such as quarantine, the use of thermal scanners, the implementation of border controls, the issuance of travel ban advisories and the like.

In the meantime, the jury is still out and there is very little consensus in the literature on the potential benefits and cost effectiveness of a range of non-pharmaceutical interventions such as school closures, border screening with thermal scanners, quarantine and social distancing, all of which are used to control the spread of pandemic influenza. In Singapore, temperature scanners at border control points identified 25 per cent of H1N1-infected return travellers but failed to identify the other 75 per cent that slipped through the borders as they displayed no symptoms on arrival.[53] A number of recent studies on non-pharmaceutical interventions such as school closures and border screening in Hong Kong show that it helped facilitate some delay in local transmission but not much.[54] The actual cost effectiveness – when viewed against the cost of resource allocation – of such measures therefore remains to be seen.

Be that as it may, the success in handling SARS and now H1N1 in Singapore and Hong Kong places a heavy burden on their governments to respond visibly and in the same fashion to the next pandemic crisis – with quarantine, border controls and screening, and a host of other measures – even when there is evidence that it may well be a drain on resources while producing limited results. One critic has compared these actions with those of a witch doctor performing his dance not because he believed it would bring rain, but because he believed the tribe expected it from him.[55]

The recent BP oil leak in the Gulf of Mexico showed clearly that many organisations and indeed many governments pay little more than lip service to the development of risk management strategies. They provide impressive risk management analyses and reports

[51] Shetty P. Preparation for a Pandemic: Influenza A H1N1.The Lancet. June 2009. Vol. 9, No. 6, p. 339–340. Available at: http://www.thelancet.com/journals/laninf/article/PIIS1473309909701306/fulltext?rss=yes.
[52] Health and Public Service Committee. Swine Flu: The London Response. June 2010. [cited 16 June 2010]. Available at: http://www.london.gov.uk/who-runs-london/the-london-assembly/publications/health/swine-flu.
[53] Statement by Minister for Health Mr Khaw Boon Wan at the Press Conference on Influenza A (H1N1). Press Release. 20 July 2009. Available at: http://www.moh.gov.sg/mohcorp/parliamentaryqa.aspx?id=22590.
[54] Wu JT, Cowling BJ, Lau EHY, Ip DKM, Ho L-M, Tsang T et al.. School Closure and Mitigation of Pandemic (H1N1) 2009, Hong Kong. Emerging Infectious Diseases. March 2010. Vol. 16, No. 3 [cited 14 June 2010]. Available at: http://www.cdc.gov/eid/content/16/3/538.htm ; see also Cowling BJ, Lau LLH, Wu P, Wong HWC. Fang VJ, Riley S et al.. Entry Screening to Delay Local Transmission of 2009 Pandemic Influenza A (H1N1). BMC Infectious Diseases. 30 March 2010. Vol. 10, No. 82. Available at: http://www.biomedcentral.com/content/pdf/1471-2334-10-82.pdf.
[55] Lee WL. Fighting H1N1 Flu: Don't Go Overboard, The Sunday Times. 5 July 2009.

that bear little relation to their actual capability to respond to a crisis. Indeed as one observer rightly noted, there is too much made of the need for 'transparency', 'best practices' and 'trust' and other fashionable jargon of risk management by governments and organisations, with little attention given to actual operational capability to deal with crises.[56] For densely populated, highly urban city-states like Singapore and Hong Kong, managing and communicating risk is a matter of life and death. Notwithstanding the criticisms levelled at their actions, they will continue to use all possible means available to pre-empt, delay and prepare themselves and their populace for a pandemic or any other similar crisis entering their borders.

Disease outbreaks are fundamentally unpredictable and risk events like these will in future continue to test public confidence in our risk management institutions. How we communicate risk to our populace is a serious business and will continue to be so in an increasingly troubled and uncertain public health ecosystem.

[56] Durodie B. Beyond Petroleum: Limits of Risk Management, S.Rajaratnam School of International Studies (RSIS) Commentaries No. 79. 15 July 2010. Available at: http://www.rsis.edu.sg/publications/Perspective/RSIS0792010.pdf.