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SARS as a 'Health Scare'

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I. Introduction

'How, moreover, might epidemics of fear if not disease be sociologically explained and understood?' Stephen Williams, *From Smart Bombs to Smart Bugs*, 2001

Epidemics of fear, perhaps also of disease: here are two of our most prominent anxieties. By 'us' I mean the various academics, experts and professionals, who in the 'western' nations of North America, Europe and Australia have ongoing conversations on these subjects. We certainly worry about disease. Health professionals genuinely fear the possibility of a vast outbreak of a new or re-emerging infectious disease; some are worried about being deliberately attacked with biological weapons; and there are many who fear the 'urban health penalty', the disease burdens consequent on polluted urban environments with weak social network resources to limit their occurrence (Fitzpatrick and LaGory, 2000). But they don't just worry about these events – they (we) also worry about fear-mongering, as well. Many health professionals worry about the enormous impacts that public fears may have on economies and societies: 'the problem with SARS,' I have heard several in Canada say, 'was not SARS itself, but fear' (Skinner, 2003). By this they mean that the disruptions of SARS were vastly disproportionate to its body count of 44 deaths, a very small number in comparison with the mortality rate commanded by, inter alia, smoking, drinking, driving and not getting a flu vaccine. I know they recall, and would like to prevent, other situations where public worries unjustified by scientific evidence - say, of radiation from powerlines (Abt, 1994, Campion, 1997) - caused much social upheaval and a great expenditure of public money that could have saved many lives if it had been spent on hospital beds rather than on calming unfounded fears. Yet they seem to make little professional effort to trace the tensions between their fears and their fears of fear (Lupton, 1999, Gordon, 2003). And so we who sardonically observe the antics of public health from the padded

balconies of the humanities worry and wonder about their (our) worrying: is ours a 'risk society' (Adam et al 2000, Beck, 1999), a 'culture of fear' (Furedi, 2002)?

In this chapter I will join this - these - conversations to reflect on current concerns about, and responses to, the threats of infectious disease, specifically in an urban context. First, I will situate these concerns and reactions in a more general conceptual framework, concerns about 'health scares' – events in which there is a strong social reaction to a specific hazard that appears to threaten the health of a significant portion of the population. This is, if you will, the problem of not-disease-but-'fear itself' that was mentioned above. I briefly discuss concerns with epidemics of new and re-emerging infectious diseases as a particular category of health scare. In asking how we can analyse, predict and, perhaps, prevent or resolve health scares I then turn to the 'social amplification of risk' framework and to the role that networks – actor-networks that link humans and non-humans in specific responsive alliances, and social networks, including intra-urban networks, professional networks and global cities networks – may play in the amplification or attenuation of risk issue signals and so to the resolution or otherwise of health scare situations. In the remainder of the chapter I show how networked social amplification and attenuation effects played out in the outbreaks of SARS in Toronto in the spring of 2003. I conclude with comments on the central importance of social and professional informational networks and connectivity in the ecology of the urban landscape for successfully managing health scares in the future.

II. Health Scares

'Like a haunted house the morning after Halloween, many a bloodcurdling health hazard looks less frightening in the daylight of follow-up studies than it did in the first shriek of publicity.'
Avery Comoraw, Less Than Scary Health Scares: Killer Cranberries?, 2000

'In U.S., Fear Is Spreading Faster Than SARS' New York Times Banner Headline, April 17, 2003

Public health responses to SARS can only be fully understood as part of a set of wider concerns to which I referred in the opening paragraph: concerns about possible catastrophes on one hand, and about damaging public reactions, not justified by scientific calculation, to certain imagination-grabbing risks on the other. In this section I argue that a new phenomenon has been born from this tension: health scares. Since the subject has not yet attracted scholarly analysis (but see Gwyn 2002, Leiss, 2001), in this section I offer some evidence about what kind of social phenomenon health scares are.

Firstly, health scares are a new social phenomenon. They are hybrid representational-physical entities. They are real not as epidemics or earthquakes are real, but real in a social sense: products of recent politico-cultural concerns, they are events marked by sudden mass insecurities about the consequences of an increasingly globalised, fluid, late-capitalist world. I will demonstrate: A search using the term 'health scare' on electronic indexes – those for news sources, such as CBCA Direct, or for health and medicine, such as PubMed or Medline, and those for the social sciences, such as sociofile – shows that colloquially at least, there is a widely accepted concept of 'health scares' as bounded events in which a group of people hold significant fears for their health. This search collected 56 news articles, many of which contained the term 'health scare' in their titles, and 160 publications in scholarly and professional literatures. The overwhelming majority of articles in both categories were published in the mid

to late 1990s. As the earliest studies in the scholarly/professional collection were published in the early 1970s, this indicates that our preoccupation with 'health scares' is a relatively recent phenomenon. Moreover, although one news article contained references to health controversies from the 1950s and 60s (Rosner and Markowitz, 2002), all the health scares discussed in the scholarly/professional literature occurred in the period after 1970. This period has also seen the growth of scholarly and professional attention to emergency preparedness and planning and of preoccupations with concepts of 'risk' in the health sciences in particular.

So what kind of events do we think 'health scares' are? It turns out that health scares occur in a wide variety of domains. The scholarly/professional literature contained 178 individual discussions of 49 health scares topics, including BSE / prion diseases, HIV/AIDS, SARS, fluoride in water, X rays, genetically modified foods, hormone replacement therapy (HRT), vaccine side effects, channel blocker side effects, radiation from mobile phones and powerlines, Tylenol tampering, dioxins, radon gas, cryptosporidium in water supplies, flesh eating disease, hazardous wastes, food irradiation, acrylamide in foods, West Nile virus, breast implants, Ebola, phthalates, polluted apple juice, lead, vinyl chloride (PCBs), swine flu, bioterrorism, alar and hormones in the milk supply. These health scares came from six domains: disease, especially communicable disease; toxins and contaminants of air, food or water; environmental pollution; side effects of medical products or procedures; intentional harm; and the unanticipated consequences of products or industrial operations (eg genetically modified foods (GM foods), silicone breast implants). Several health scares fitted more than one domain: BSE, for example, was represented as both a disease and as an outcome of late industrial agribusiness practices (Miller, 1999, Ratzan, 1998). The news literature added new local examples from the same domains.

One really important characteristic that emerged from this study is that despite the increasingly multi-networked globalised nature of significant health hazards, health scares reproduce the geography of inequality produced by the 'emerging diseases worldview' (King, 2002). In a meaningful sense, health scares are a 'first world' (constructed) phenomenon: they are events that happen in North America, the United Kingdom, continental Europe and Australia. Of course I don't mean that similar events don't happen in the developing world; they undoubtedly do. I simply mean that this sample of literature published in English-language professional and scholarly journals found no reports of crises or disease outbreaks or any other health hazard in the developing world *described* as 'health scares', that the sample (which of course has only limited value as the representative of the full opinions of the various authors that contribute to it, let alone of social opinion more broadly) effectively distinguished between the 'health scares' that occurred in developed nations and the 'tragedies', 'epidemics' and 'crises' that burdened the developing world. Only HIV/AIDS crossed these two categories, being a kind of health scare whose severest consequences were felt in the poorest countries. It is also significant that although a few articles concerned threats from *within* secure nations (eg, of tuberculosis among drug using populations) the sample was largely blind to the disease burdens of inequitable urban ecologies (Vlahov and Galea, 2002), apart, perhaps, from the implications of some articles concerned with local pollutants. From this de facto representation of 'health scares' I draw the tentative conclusion that they are most accurately described as those events that seem to threaten the privileged and relatively secure West.

Allowing for the fact that controversy continues in most cases at some level, all health scare events discussed in the sample could be classified according to three fears/outcomes profiles, as

depicted in the table below. The overwhelming majority fell into Square G: Fears of large scale destruction but with low to non-existent actual mortality (so far): examples include BSE, inhalation anthrax, SARS, GMOs, radiation from powerlines and mobile phones masts, dioxins and radon in homes. A small group, largely composed of events involving new hazard notifications warning of small rises in the risks attached to specific medical products or procedures, fell in Square I: Low fears and low outcomes. Examples include scares around brands of oral contraceptives, vaccines and channel blockers. (It should be noted for this profile (1) that whilst the reported rise in risk was majoratively very small, the numbers of people using these products or procedures and thus affected by the hazard notification was often very large, and (2) in several cases later reviews of scientific data found no rise in risk at all (eg Spitzer, 1999). Largely, therefore, I is a subset of G.) Finally, a few 'health scares' really did become crisis events, falling into Square E: Severe fears and anticipated outcomes. Examples include food and water borne outbreaks such as the epidemic of e-coli related disease in Walkerton, Ontario, and tuberculosis among the homeless. These cases, except HIV, were localized. I conclude from this spread that 'health scares' are not so much events in which there is a strong fear response from the public but no 'real' threat – which is how health professionals often describe them - but events in which fears of possible but unlikely catastrophe are entertained in conditions of scientific uncertainty and cultural insecurity.

Table I: Fears/ Outcomes as described in articles

	Fears of catastrophe	Fears of severe outcomes	Fears of tiny increase in risk
Large scale devastation	A	B	C
Significant mortality	D HIV/AIDS (developing world)	E Cholera, water borne disease outbreaks, lead poisoning, meningitis	F
Low or nonexistent mortality to date	G BSE, anthrax, SARS, Tylenol tampering, dioxin, GM foods, flesh eating disease, radiation from cell phones, terrorism, acrylamide, Ebola, alar, PCBs, swine or avian influenza	H Radon gas, West Nile virus	I Oral contraceptives, HRT, vaccines, fluoride in water, X rays, channel blockers, cancer mortality, phthalates, interferon

Finally, although they seem unreal because of their low mortality rates, virtually all health scares have commanded attention and concern from journalists and health professionals because of the all-too-real economic cost and social disruption that they have caused. The two are intertwined, of course: often the 'problem' was not so much that people ceased eating cranberries or beef, or even that they ceased using the contraceptive pill mid-cycle or pulled their child out of a school built near powerlines – in any case many of these behaviour changes

were fairly short lived – but the enormous, sometimes devastating, impact these actions had on industries and the communities they sustained. And, while local consumer behaviour has been significant in generating many of these impacts, it was often trade embargoes and drops in tourism that did most of the damage (Powell and Leiss, 1997). Consider BSE: it was the context of international trade that made this the costliest health scare the world has ever seen (Ratzan, 1998). The trade embargoes first put in place by France as a kind of quarantine, and then strategically implemented elsewhere (as Canada found to its cost in 2003) bound notions of health to national identity and economic power. Trade barriers have to a large extent become the lines of hygiene (Bashford, 2001) of the market-driven, deregulated new world order of the late twentieth century, lines that mark nations as pure or as contaminated. Amid an effectively global, interconnected and highly networked economy, health scares reassert the validity of borders: prosperity is equated with *security*, which decodes to border control for health.

I note here that urbanicity is an important, though relatively unexplored, dimension of health scares, for three reasons. Firstly, health scares can be a product of a particular urban setting, as for example when a system breakdown (such as a power failure at a local supermarket) causes a sudden mass or concentrated health impact (unsuspected cases of food poisoning). Secondly, apart from specific agricultural sectors, it is urban areas, particularly global cities, that are likely to directly experience the economic impact of health scares, as industries dependent on prosperity (tourism, entertainment) reduce. And thirdly, the social inequalities of urban geographies can exacerbate a health scare. Cities are resource machines producing and distributing resources according to location (Fitzpatrick and LaGory, 2000). Social inequalities expressed through hazard exposure – the less privileged, the more vulnerable - and through expectations of response, such that those areas within cities with the fewest response resources also experience lack of trust, shaping landscapes of fear and despair (Slovic 2000, Fitzpatrick and LaGory, 2000).

In sum: health scares are events typically characterised by large-scale fears but very low actual mortality and morbidity. As a recent feature of late twentieth century ‘western’ societies, their existence supports the contention of ‘risk society’ theorists that we have become very anxious about the intrusion of those catastrophes to which we - as opposed to those ‘Others’ in the ‘third world’ - have hitherto felt immune (Adam et al 2002). This is the context in which responses to infectious disease are created. Health scares are ‘problems’ (as in my opening quotation, ‘the problem with SARS...’) because of their devastating economic (which means, social) consequences. This means that health and economic concerns must be regarded as interdependent and as shaping one another: one cannot understand responses to, and reflections on, SARS, for example, without understanding these connections. Finally, the economic context clearly demonstrates the tensions between the globalising, border-crossing tendencies / realities in economic systems, and the reification of nationhood, of national economies held and patrolled within national borders. This tension operated in responses to contemporary concerns with infectious disease also.

III. Disease Scares: Pandemics

‘In a world where diseases respect no borders, it is important that we cooperate across borders internationally as well.’ Canadian Health Minister Ujjal Dosanjh to the United Nations, November 17, 2004

'[Pandemic preparation] has been done through programs ... focused more generally on increasing preparedness for bioterrorism and other emerging infectious disease health threats.'
United States of America Department of Health and Human Services (HHS), Pandemic Influenza Response and Preparedness Plan, 2004

Among the panoply of health scares, there is a special place reserved in our cultural imagination for fears of a mass outbreak of disease. This is attested to by movies such as *Virus* and *Outbreak* and novels like Robin Cook's *Contagion*. When I asked Canadian health professionals and policymakers for examples of health scares, they typically thought first of Ebola, West Nile virus, Norwalk, meningococcal disease, *clostridium difficile*, SARS, avian influenza, monkeypox.

Above all, right now we're all supposed to be worried about a global pandemic of influenza. Health professionals on television repeat that the question is not *whether* this will happen, but *when*. 'During the last few years, the world has faced several threats with pandemic potential, making the occurrence of the next pandemic just a matter of time,' says the World Health Organisation (WHO)'s website (WHO, 2005). Accompanied by well-publicised exhortations from the WHO, western nations like Canada, the US and Australia have prepared pandemic influenza preparedness plans, publicly stating strategies on everything from vaccine manufacture and stockpiling to data collection and management systems.

One key reason for our current anxiety about pandemic influenza is encapsulated in the reiterated phrase 'because we are living in a world where diseases respect no borders'. On the face of it, this phrase is a little puzzling: what other kind of world have we ever lived in? It indicates a new preoccupation among health professionals – and let us not forget, also among (western) security and economic policy makers as well – about the health consequences of the dissolution of formerly strong social boundaries, between peoples, communities, professions, nations. In particular the physical movement of people through increasingly globalised socio-economic networks, especially (as discussed elsewhere in this volume) the global cities networks has created fears of contagion, both literal and ideological. Diseases of travel – of which SARS was considered the precedent setting example – represent the discomfiting reality of the connectivity of the developed and developing worlds in late capitalism (Wilson, 1995; de Hart, 2003). The phrase also evokes those modernist anxieties about *transgressions* that I mentioned above - the theme, common in stories of health scares, that danger results either nature's capacity to elude the artificial boundaries that humans construct, or from human violation of 'natural' boundaries. Pandemics are frightening because they are represented as the consequences of particular mobility regimes - the rapid movement of peoples and organisms, agricultural and industrial practices that constantly cross boundaries between species – that are regarded as unsettling in themselves by many westerners, and which are uncomfortably linked by multiple networks to ourselves. The notion of a 'pandemic' itself is defined by the travelling of a disease: the WHO's stages of pandemic alert are built around a disease's geographical movement (Public Health Agency of Canada, 2005).

Borders may be meaningless to a microbe, but in pandemic preparedness planning our security is perceived to rely on our requiring microbes to respect them anyway. (Hence the conceptual and practical entanglement of bioterror – which attacks a state – and influenza preparedness, as shown in the quotation above.) Our first move in combating new and re-emerging infectious diseases has been to double the guard: to put in place more extensive and rigorous quarantine

and border screening regimens, to examine travelers and prospective immigrants and exclude those believed to harbour illness, to identify, cordon off and patrol dangerous places in the world (Hooker, 2007). Yet at the same time, the successful *resolution* of a pandemic is believed to be vested in global networks of another sort: informational networks, managed virtually through technology, directed by an international body, the WHO, and rooted in formal and informal social networks between scientists and health professionals (Fidler, 2004).

In sum, network society (Castells, 2000) and contemporary global mobility regimes have facilitated expansions of actual microbial traffic along with the transgressive, or at least threatening, movements of people and goods. When novel diseases enter the urban ecologies of western cities, especially global cities (Sassen, 1991), place and the health burdens shaped by inequitable urban geographies can facilitate their spread. As discussed above, this is the primary socio-politic-economic context in which health scares occur. How the 'lifecycle' of a health scare plays out can be tracked by examining what social mechanisms contrive to amplify or attenuate collective responses to the health risk as the event progresses.

IV. Network Amplifiers: the social amplification of risk

Understanding how the numerous factors of geographies, media reporting, expert decision making, etc, fit together and influence each other in real time to produce a health scare is challenging by reason of the complexity of these interactions. In my view the model that can best capture this complexity is the social amplification of risk framework (SAR) (Pidgeon et al., 2003). Developed to understand, predict and manage public response to industry-related hazards (nuclear power, the 'Love Canal', chemical contamination), the model may be easily adapted for use in understanding the causes and effects of major types of health scares, side effects of existing therapies and outbreaks of disease.

The SAR framework begins with the assumption that hazards and risk events are only given meaning by being observed and communicated by human beings. In the communication process, hazards and risk events are portrayed through *risk signals* (images, signs, symbols), which change as they are decoded and transmitted by different 'receivers', ie stakeholders and social groups. These signals are subject to (somewhat predictable) transformations as they pass through different information channels and various *social stations*, such as government bodies, expert or professional groups, the news media, community organizations, and individual people. These transformations will *amplify* or *attenuate* the signals by such means as increasing or decreasing the volume of information about an event, heightening the salience or availability of certain aspects of it, or reinterpreting, elaborating, discarding or adding symbols or images (Kasperson et al., 1988). The system is dynamic: transformations in one station will feed back into the system to affect others. This is how a health scare is socially produced.

The SAR framework also explains the impacts of health scares. Signal amplification or attenuation will lead to particular responses by social actors. These responses produce 'ripple effects', secondary and tertiary consequences that spread far beyond the impact of the hazard itself, and include mental perceptions, economic, political and social pressure, social disorder, liability, loss of credibility or trust and stigmatization. Some ripple effects may be positive, including revised hazard response planning or a reduction in the risk posed by the hazard itself.

The advantages of using the SARs framework to analyse health scares can be summarized as follows. (1) It helps identify and focus attention on the different social actors involved in a health scare, and demonstrates how the health scare is the outcome of interactions within and between these actors – including scientists and health experts. This is important because health scares are not uncommonly seen as the result of ‘irrational’ behaviour choices or ‘misinformed’ action, usually on the part of the public or the media. (2) It demonstrates why responses to, and the impacts of, risk events are so often incommensurate with expert risk assessments. Risks are no longer ‘real’ or ‘false’: they are both empirically demonstrated (with real consequences) *and* socially constructed by amplification processes. (3) It demonstrates the temporal aspect to health scares: how perceptions and relationships alter with changes in hazard notification sequences (Pidgeon et al 2003) or communications by specific bodies. (4) It shows how factors such as loss of trust between actors can lead to perceptions and responses that serve to amplify risk signals and spread ripple effects. As discussed above this may be crucial in local urban ecologies. (5) It can be used to show how and why amplification processes cause ripple effects such as the Othering and stigmatic-marking of particular social groups, an issue that was of particular importance during the SARS outbreak, as discussed elsewhere in this volume.

As yet, the importance and functioning of network society (Castells, 2000) to the SAR framework has remained unexplored. And yet clearly social networks are immensely powerful amplification or attenuation devices in a health scare situation. The global cities network and other social networks among different diaspora have already been identified as a strong amplifier of infectious disease risk (Keil and Ali, 2006). In natural disaster situations, social networks are crucial management and survival devices, often altering their character and constituency in ways that attenuate fear (especially by building trust) more efficiently than the provision of external resources. Informational networks – from the informal to those entirely dependent on technology – can act as very strong risk signal amplifiers (as in the case of SARS) if their structure causes their content to bear characteristics such as novelty, mass impact, or dread (Pidgeon et al 2003), or as equally strong risk signal attenuators (as in the very beginning and the aftermath of SARS). Indeed, given the centrality of the network enterprise in the contemporary world and its reliance on the information flows made possible by new technologies (Castells, 2000), the social amplification of risk framework might be more usefully constructed around risk signal transformations in *kinds of networks* than in categories of social station. (Incidentally, this approach may solve some of the problems so far encountered in rendering the framework analytical and predictive rather than merely descriptive, as it allows for the factors that relate amplification effects in different social domains - the media, policymakers and the public for instance – to be studied (Breakwell, 2003)).

In the concluding section I examine SARS as a health scare using the social amplification of risk framework. I concentrate on which networks acted to amplify or attenuate signals about the risk of SARS, and what ripple effects these signal transformations produced.

V. SARS as a health scare

‘I genuinely thought that we were going to see a different world by the next month. I thought we were going to be remembered as the people who failed to stop SARS.’ Paraphrased comments from the Toronto SARS scientific advisory committee.

Risk signals about SARS amplified hugely and rapidly in Toronto during the first days and month of the outbreak, generating a health scare unparalleled in professional or public experience (interview and focus group data). There is a basic psychometric explanation for this. The qualities associated with SARS were those that are typically associated with amplified risk perception: the disease was *novel*; knowledge about it was very limited and its behaviour was *uncertain*; it spread through momentary coincidences, such as sharing an elevator with an infected person, and so appeared extremely *uncontrolled*; it threatened to cause *mass* mortality; there was a certain amount of *dread* associated with its onset and mortality rate; and having crossed from the third world to the first, it was highly *salient* (Slovic, 2000). But such cognitive biases do not explain how social context influenced the construction of this 'scare'. I argue that SARS risk signals were amplified and sometimes surprisingly attenuated through three major kinds of networks: professional or expert networks; communications networks; and staff or responder networks. It is important to note that in so doing I intend no criticism of the actions or decisions of any responder to SARS.

Expert networks. Experts are not immune from psycho-social amplification effects, though their knowledge and training may to some degree substitute the rules of rational decision-making (Slovic, 2000). If 'fear' was a problem during SARS, creating 'irrational' decision making with consequent negative social and economic effects, as some have suggested (Skinner 2003) then it was a significant problem within the SARS scientific advisory committee (SSAC), a close network of scientists and public health professionals which, though constituted ad hoc from semi-formal professional/personal networks, had formal responsibility for responding to the outbreak. The risk signals attached to SARS, including images and symbols of the 1918 'Spanish' influenza pandemic -a model which has been used as the standard for measuring possibilities and fears about contemporary infectious respiratory illnesses, and which has generated at least one very infamous health scare before SARS, the 1976 'swine flu' affair (Neustadt, 1983) – generated significant amplification effects in the SSAC. In the committee process members were guided by two important and related decision values. Firstly, they were attentive to all cases of completely contingent, unpredicted spread, which might indicate a threat to the community. They were particularly alarmed by the reports that arrive at the end of March of the outbreak of SARS amongst the residents of a large apartment building (the Amoy Gardens) in Hong Kong, apparently spread through the air conditioning system. Secondly, they therefore made decision based on worst case scenarios, preferring the costs of over to under reacting (interview data). These values were also held by the community (focus group data).

The result was recommendations for disruptive containment measures that, since *actions* are powerful communications in themselves, greatly amplified risk signals. These 'social distance' measures targeted particular public mobilities within the networked social space in the city (see Sheller, 2004). The extensive quarantines – 30 000 people were examined for quarantine in Toronto alone (Hawryluck et al, 2004) – the closure of one hospital and cancellations of visitor access and non essential service, school closures and event cancellations (Naylor, 2004; Campbell, 2004, 2005) were very strong signals about the magnitude of the risk. The consequent impacts, such as those unable to visit mortally ill loved ones or those who suffered or died as a result of inability to access medical services during SARS (Svoboda et al 2004), generated their own amplification effects through local social networks.

The composition of the responding professional network, especially the lack of connectivity with a particular node (see Urry 2004), led to a block in information flow and a consequent lack of

ability to generate critique of committee decisions, a structural bias that has also existed in other health scares (Neustadt, 1983). A prominent former Chief Medical Officer of Health, now the CEO of a major SARS affected hospital during the outbreak, very early queried the extent of the outbreaks within health care settings on the basis of incidence data that showed the rate of infection had peaked and as declining before the end of March – about the time the Amoy Gardens outbreak was reported – and hence queried the extent of the containment measures. However, he was denied access to the SSAC as a result of previous poor relations with some of its members. Severing this node from the network led to risk signal amplification as he then made his objections publicly (Schabas, 2003).

Having demonstrated how network composition and structural connectivity can generate amplification effects, I should now draw attention to its potential for attenuation. Professional networks strongly attenuated SARS risk signals in two ways. Firstly, clinical learning through local professional networks meant that responders could soon make decisions based on technical information rather than on values. This new security augmented outrage at the travel advisory issued by the WHO at the time of the second outbreak (interview data). Secondly, the international network of scientists and health professionals that raced to gain knowledge about SARS functioned as a brilliant example of the successful ‘network enterprise’ (Castells, 2000), circulating both the virus (for experimental work) and scientific information at record speed around the globe, coordinated by the WHO. The rapid genetic sequencing of the virus and the accumulation of clinical information generated containment and treatment actions that brought the epidemic under control much faster.

Communication networks. Two communications networks were explicitly subject to extensive criticism for amplifying risk during and after the outbreaks (Naylor, 2004; Campbell, 2004, 2005). The first were intra- and inter-governmental. The failures in communication between local, provincial and national government levels were legion: epidemiological tracking done painstakingly by post-it note in the ‘war room’; cross-country daily briefing conference calls for communications officers involving literally thousands of people; the absence of contact details for the province’s family physicians (a common feature of health scares (Skouby, 1998)). Issues about data ownership and access between the three levels of government generated risk signal amplification at the WHO in relation to Canadian government capacity that led to the travel advisory (Naylor, 2004). Again, lack of connectivity and limits on the (literal) space of flows generated by poor communications resources (Castells, 2000) amplified risk signals during SARS.

Unsurprisingly, the mass media, especially newspaper and television coverage, was also commonly identified as a risk signal amplifier during the outbreaks. For example, images of people wearing masks were criticized as atypical and were perceived as crucial risk amplification symbols (focus group data). However, criticism was not uniform. Local media, at least in Toronto, was in general praised for reporting timely and accurate information and, despite constraints in their professional position, for intelligent engagement in the story as it unfolded (interview data, see also Drache and Feldman, 2003). It was international media networks that were blamed, along with the travel advisory, as major contributors to the severe economic impact of SARS on Toronto because they simplified, decontextualised and hence sensationalized the story. International media generated great outrage – a much-examined feature of health scares (Sandman 2005) – and which persisted despite the facts that (a) most Torontonians agreed that they would not travel to south east asia, outbreak areas at the time and (b)

Torontonians noticed risk signal amplification occurred as a function of distance in interpersonal social networks (this is a common network effect of crises (Slovic, 2000) (focus group data).

The most serious media impact lay in the use of images of asian people in relation to SARS, which tended to 'mark' them as carriers of disease in ways the significantly contributed to their general stigmatization, a well-understood effect of amplification processes in health scares (Leung, 2004, Pidgeon et al 2004: 13-46, 326-336).

Employee networks. As has been discussed elsewhere in this volume, the physical extent of the outbreak in Toronto directly resulted from neo-liberal policies that saw the underfunding of health care systems and the casualisation of the health care workforce, particularly in nursing. Semi-formal social networks among health care workers therefore acted as SARS risk signal amplifiers in two ways. Firstly, because these responders were working for very long hours in stressful conditions but were reliant on each other for support, informal communication through the networks acted to validate experience but also to deepen the sense of crisis (Schull and Redermeier, 2003). Secondly, outrage about exposure to the risk and inadequate safeguarding, backed by long standing outrage over the gendered inequities of their position within the health care system, immensely amplified risk signals among nurses (Naylor, 2004). Nurses also felt financially punished by the outbreak because they were limited to working in one hospital instead of the three or four that many commonly used to generate a fulltime income. Worse, many felt stigmatized in the general community, in part as a result of selective media reporting (especially the notorious 'nurse on the GO train' incident (Campbell, 2004)). Because some of them threatened to walk off the job, this amplification had the potential to greatly magnify the extent and impact of the epidemic itself.

VI. Conclusion and Implications.

We can understand SARS as a health scare by a analysis of the kind of network dynamics proposed by Castells (2000) as central to modern social organization in a globalizing, interconnected and information technology dependent world. This analysis fits the conceptual structure provided by the social amplification of risk framework (Pidgeon et al 2003).

Risk signal amplification during SARS was productive of the kind of severe social and economic impacts that are characteristic of health scare situations. SARS carried strong risk signals – it was a novel disease arising in part from the environmental pressures of the late capitalist, globalizing era, and appeared to threaten the security of developed nations. As in other health scares, information and symbols flowing through local and international professional networks raised great fears about its possible mortality toll, but in fact the number of deaths was miniscule compared with many forms of preventable death in the nations it affected. The fearful and precautionary response from experts and governments at various levels was, as in many other health scares, greatly exacerbated by lack of connectivity, node exclusion and other network disruptions that impaired the enterprise and blocked feed-back processes. The huge negative impacts suffered as a result of the outbreaks of SARS were, as in other health scares, both economic and social. Amongst the most damaging were the long-term, physically debilitating stress suffered by those affected, including responders, and the stigmatization of particular social groups, Asians and health care workers.

It should not be forgotten that risk signal amplification also generated positive actions, some of which in turn generated attenuation effects. Among these can be included the swift response of the highly networked international scientific community, coordinated through the WHO, which greatly strengthened the organisation's role as the central node for disease control networks in a globalised world (Fidler 2004). The advent of SARS has also strengthened pandemic preparedness planning in many nations, in which the explicit creation of response networks through different sectors of government has been made central.

Health scares are largely testimonies to western anxieties and have been productive of global and local inequalities and 'othered' identities, reinscribing the boundaries between the 'first' and the 'third' world despite the fact that increasing connectivity has generated an increased likelihood of a primary health scare category, a new infectious disease (King 2002). But the reality of the potential threats remain, and so does the uncertainty. Whether or not to react to a particular constellation of raindrops as if it were the hundred year flood is a question that worries most of those to whom the responsibility of intervention falls. In these scenarios the network enterprise is a crucial provider of speedy and effective answers, leaving us the luxury of debating the values that we wish to guide our choices in health scare situations in the future.

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