SARS in Singapore: surveillance strategies in a globalising city

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Abstract

   Public health measures employed to fight against the spread of SARS need to be guided by biomedical knowledge as well as an understanding of the social science aspects of the disease. Using Singapore as a case study, we explore how the state constructs the disease and implements measures targeted at creating a ring of defense around the island and using surveillance to monitor and prevent its spread. While there is support, there is also resentment among some Singaporeans who complain that their right to privacy has been invaded and that over surveillance may have actually occurred. Marginalisation and discrimination have not only affected the local population but in this open economy which is striving to achieve global city status, businesses, tourism, foreign talent, foreign contract workers and foreign students studying in Singapore have also been negatively affected. While Singapore has been applauded by WHO and used as an example of quick and effective response, a holistic approach to the management of infectious disease must address the social implications of strategies that are drawn from medical knowledge alone because it impinges on the social lives of people and how people interact with each other under stressful circumstances.
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Keywords: Surveillance; Globalisation; Space; State; Public health

1. Introduction

   A family of microbes called the coronavirus which has been responsible for the severe acute respiratory syndrome (SARS) has been labelled a "deadly virus" [1, p. 18]. It infected over 8000 people worldwide and killed 908 people in the main areas affected. The disease reveals "globalisation's dark side" [2, p. 3], hop

scotching the world from Guangdong in China to other epicentres such as Hong Kong, Taiwan, Vietnam, Singapore and Canada. Altogether, 29 countries fell victim to this "scourge" since it first surfaced in November 2002 [3, p. 1].

   The World Health Organisation (WHO), the watch dog in charge of curbing the spread of the disease and rallying countries together to find a fast and reliable test kit as well as a "cure", has benefited from the guidance provided by medical practitioners and epidemiologists whose concerns have been primarily biomedical. The focus has been on the possible sources of the virulent organism, the modes of transmission, symptoms presented and treatment [4, p. 39]. These clinical features and the pathology of the disease form the basis on

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which policies are formulated and tested to check their effectiveness in controlling the spread of SARS. We acknowledge the importance of this research agenda but suggest that the social dimensions of the SARS outbreak also need to be documented and understood. Many draconian policies were put in place arising from the medicalisation of SARS. Seeking medical solutions seem appropriate in a situation of imperfect knowledge. However, there are many implications such policies have on society, and more so if these societies are highly connected with the rest of the world. This paper has two objectives. First, we explore the implications of surveillance strategies used during the SARS outbreak on a city with globalising aspirations. While open borders and strong interlinkages have been heralded for creating economic growth and enriching societies through intercultural exchanges, SARS has resurfaced the dangers of overexposure and rekindled fears of security breaches. We show which specific groups of people are deemed as external threats to the nation-state and examine the emergent public discourse on the costs of keeping borders open. Second, we investigate state and non-state, spatial and non-spatial strategies which have emerged to contain the disease. We will unpack, within a specific context, the broad public discourse on the contagion effects of SARS and the need to wage a "war" against the "epidemic". Framing the disease within such rhetoric increases public consciousness and elicits co-operation. We examine public perceptions of surveillance and policing as a means to understanding the implications containment has as a strategy for future plans of action in case of re-emergence. We will also explore how members of society construct "safe" and "unsafe" zones as social reactions to contagious outbreaks.

Kearns and Moon [5], in their analysis of medical geography over a decade, pointed out that diffusion studies of disease tend to adopt a geometric, acontextual perspective of space. While scientifically rigorous, such studies tend to ignore the interaction of social, economic, cultural, institutional and historical contingencies of place which are crucial for understanding disease, health and health care. While not denying the value of positivist research to understanding the geography of disease, Parr [6] argues that such studies must be approached more critically in order to understand the social lineaments and construction of disease. Thus, this study attempts to work through and understand

SARS from a social perspective within the primary context of Singapore, taking into account the idea that specific locality issues are important to understanding outcomes [7]. Why was the island so successful [8,9] in its containment policies, disruptive as these were to economic and social institutions and to daily life? By examining the social responses to these measures, we hope to "relocate" public health research away from a purely medical focus. As Foucault [cited in 10, p. 112] argued, illness may be biologically determined but insofar as it is observed and treated by others than self, current research must enter the realm of politics, of discrimination and of civil rights [11,12].

2. The epidemiological outbreak and measures to fence in SARS

Medical knowledge on SARS was very limited when it began its insidious spread in Singapore in early 2003. The disease was called "atypical pneumonia" and was later identified as a member of the coronavirus family "never before seen in humans" [WHO cited in 13, p. 1]. Classification was employed to separate the probable from suspected cases using temperature and other symptoms such as cough, shortness of breath/breathing problems, lab test results and X-rays. The index case-patient, Patient A, was admitted into Tan Tock Seng Hospital on 1 March 2003 for atypical pneumonia after returning from a trip to Hong Kong. While two others who accompanied this patient on the trip recovered, 24 of Patient A's primary contacts were infected. These included eight nurses, one health attendant, five patients in the same ward and 10 visitors. The first person to die, on 25 March 2003, was the father of Patient A. The second was the pastor of Patient A, a day later. SARS started off as a primarily nosocomial (hospital-acquired) infection. According to Gopalakrishna et al. [14], the early stages were the most detrimental because lack of knowledge prevented quick action to isolate and contain, leading to the spread of SARS into the community. Individuals who were infected during their visits to hospitalised friends and relatives spread the disease to another epicentre, Pasir Panjang Wholesale Market, which was closed for 15 days. Table 1 shows the profile of those infected. In total, there were 238 cases and a fatality rate of 13.9% [15,16]. By 30 May 2003, WHO had removed Singapore from the list of countries

Table 1
Profile of probable SARS cases

	No.	%
Gender		
Male	161	67.6
Female	77	32.4
Total	238	100.0
Median age in years (age range of infected persons in brackets)	35 (1–90)	–
Number of deaths	33	13.9
Date onset of first probable case	25 February 2003	–
Date onset of last probable case	5 May 2003[a]	
Profile of cases		
Healthcare workers	97	40.8
Family/household members	55	23.1
Inpatients	31	13.0
Visitors to hospital	20	8.4
Social contacts	15	6.3
Imported	8	3.4
Co-workers in Pasir Panjang Wholesale Market	3	1.3
Taxi drivers	2	0.8
Flight stewardess	1	0.4
Undefined	6	2.5
Total	238	100.0
Location of transmission		
Hospital/nursing home	178	74.8
Household	33	15.5
Overseas	8	3.4
Community	7	2.9
Pasir Panjang Wholesale Market	3	1.3
Taxi	2	0.8
Flight	1	0.4
Undefined	6	2.5
Total	238	100.0

Source: [15,16].

[a] Does not include the single isolated case that occurred in September 2003 involving a researcher working on the virus in a research laboratory.

affected by SARS. On 9 September 2003, a new but isolated case appeared as a laboratory researcher working on the virus became infected. No further cases have been reported since then.

The high fatality rate and the rapid spread caused concern and action was taken to put a ring around the infection. To elicit the co-operation of the public, Singaporeans were warned about the methods of transmission, e.g., close contact (droplets), and there was even mention of the length of time the virus can stay alive on any surface [17]. The incubation period was defined as 10 days before the onset of symptoms and Singapore-

ans were informed how the initial index case was imported from Hong Kong and the subsequent spread of SARS was traced over time and space, both locally and on a global basis. A slew of information on infection control measures such as the use of the N-95 mask, gloves, shoe and head covers, goggles, gowns, hand washing, change of clothing, disinfection of facilities and isolation rooms and hospitals provided the public with a basic understanding of how to assess the risk of spread and the need to contain the disease [4,13].

Based mostly on this biomedical information, the Singapore government designed isolation and containment strategies. In the first instance, Tan Tock Seng Hospital was designated the SARS hospital. Isolation wards were set up and arrangements made for special ambulances to transport SARS cases to the hospital. Doctors were not allowed to practise in more than one hospital during the SARS outbreak period and a certain number of healthcare workers were dedicated to provide care in the SARS wards. A "No Visitor Rule" was imposed for all public hospitals except those treating children and obstetric cases. A ring of protection had thus been set up.

Externally, contact tracing and home quarantine were put in place to further tighten the grip around the disease. In addition, checks were also created to monitor the possible spread of the disease. Island-wide, in public places, people had to have their temperature taken (later thermal scanners were introduced) before they were allowed into public buildings and even into offices and some residential locations. Common areas were disinfected more frequently, e.g., elevators, public toilets and hawker centres. Schools, kindergartens and child-care centres were especially vigilant in an effort to protect the children. In fact, at the very beginning of the outbreak, schools were closed for 2 weeks until the state could develop better means of control and monitoring. An education programme was started on television (there was even a special SARS channel set up) advising Singaporeans to wash their hands frequently, to cover their nose and mouth with tissue paper when coughing or sneezing, not to spit and to take their temperature twice a day. They were also advised to eat properly in order to build up body immunity. Details were also provided with regard to what to do if one suspects oneself/family members to be infected. Doctors were instructed by the Ministry of Health (MOH) on diagnostics and containment/protection strategies such

as the setting up of fever stations away from the main human thoroughfare.

As a globalising city-state, Singapore is extremely open to people coming for leisure, work, education or other reasons. The airport, port, road and rail openings into the country were equipped with thermal scanners costing SGD90,000 a piece (USD1 is approximately equivalent to SGD1.75 at current prices) [18]. Foreign workers who came to Singapore to work as construction workers, including those from the Peoples' Republic of China (PRC), were subject to a 14-day quarantine at a more isolated location on the island. Foreign professionals working in Singapore as well as Singaporeans who had visited SARS-affected countries were asked to voluntarily quarantine themselves for 10 days. Students were likewise asked to do so and to declare their overseas visits to the school. Although not mandatory, some offices and public institutions also employed this method of surveillance. Anyone who had a temperature above 37.5 °C was asked to stay away from school or work and did not have to provide a medical certificate as proof for absence.

3. Inserting the "social" in understanding SARS: some theoretical considerations

From the many recommendations and policies implemented in Singapore, it is clear that medical understanding of contagion guided policies on containment which seriously affected the daily routines of many Singaporeans and disrupted people flows from outside the city-state. How have Singaporeans reacted to quarantine and confinement, especially if the former entailed the use of web cameras for policing? Should the names of those who were served such orders be made public? Would public naming infringe the privacy and rights of individuals? Do hospitals have a right to prevent Singaporeans from seeing their loved ones who are ill and need their moral support? Evidently, Singaporeans sensed unequal distributions of power [19]. Health, being basic to human endeavour, may be regarded as a foundational justification for government action. However, not everyone accepts the diminution of individual autonomy and privacy in exchange for collective benefits [20]. Certainly there will be degrees of acceptance in such social contracts, even if they pertain to the "new global threat" [21]. These form the grist for

understanding the disease from a social point of view of which the next sections outline three broad areas of discussion: how security becomes redefined as global movements of people threaten to spread infectious diseases; social responsibility in maintaining surveillance and control for good public health; and fear in shaping perceptions of safe and unsafe places when infectious diseases threaten.

3.1. Global linkages in a time of crisis

In conventional security terms, since statehood is tied to territory, movements of population can undermine security as people have long been known to be responsible for the transmission of disease. Infectious diseases were often named after their areas of origin, e.g., the "Spanish pox" and expulsion and quarantine used as measures to control spread [22]. For instance, the Immigration Law of 1891 in the US made it mandatory for all immigrants entering the country to be given a health inspection by public health service doctors at Ellis Island, New York, or other ports of entry. Infectious diseases like typhoid, tuberculosis, smallpox and trachoma raised the spectre of eugenics in US immigration policy [23]. As the flows of people increase in contemporary times, the rhetoric used in conventional discourse on security is now employed for disease, e.g., we talk about the "fight against disease" or use the term "a time bomb" [Thomson, 1997 cited in 22, p. 226]. Globalisation has encouraged business and tourist travel as well as legal and illegal migration. With the freer movement of people, the unconscious spread of disease has serious consequences for any nation. On the one hand, multinational organisations such as WHO put up and enforce protective policies but at the same time, national governments can undo these efforts by actively promoting business and tourism travel and overseas studentships. For nations that are well plugged into the global economy, such movements can only grow in the foreseeable future. Will the potential threats to health and security be put aside for more immediate benefits?

To understand Singapore's reaction to SARS, there is a need to understand Singapore's rationale for sustaining "exceptionalism" in the global context. Leifer [24, p. 19], for example, wrote that Singapore's "circumstances and condition as a city state . . . are *sui generis* in the modern world". Agreeing, Ow [25] says that Singaporeans have a perennial "crisis mentality".

They are constantly reminded by the government that Singapore's position in the global economy is a very vulnerable one. Singaporeans need to work hard to sustain its economic and social growth. This mindset has helped to direct Singaporeans' energies in the same direction so that the country can grow economically. In 2003, Singapore recorded a GDP of SGD38,023 per capita compared to SGD1567 per capita in 1965 when the country first became independent [26]. Much of the growth has been attributed to the purposeful global engagement of the island's economy. While foreign direct investments (FDI) into the country was SGD217 billion at the end of 2001, Singapore also invested SGD131 billion abroad [27]. As a business epicentre, Singaporeans have to act responsibly so that investors, entrepreneurs and business executives will still continue to come. At all costs, investment confidence in the island should not be diminished by the SARS outbreak [28].

In addition, Singapore is a cultural marketplace. Dr. Aline Wong, then Senior Minister of State for Education outlined this concept:

Singapore aims to be a cosmopolis in the next millennium, a city that is [not only] economically dynamic, [but] socially cohesive and culturally vibrant. Culture and the arts would form important strands in the many-coloured fabric of our city life that exudes confidence, charm and creativity [29, p. 1].

The global linkages mean that fragments of people and cultures hailing from different parts of the globe are expected in Singapore. Many of these are sojourners, people circulating among different cities, or shuttling between the global city and the home-nation. As national borders become more porous in keeping with the pace of globalisation, trans-nationalism as a phenomenon describing the way people live their lives straddling "home" and "host" societies also becomes more common. Thus, besides the 7.5 million visitors who passed through in 2002 [24], Singapore's trans-national profile also includes foreign talent who are highly skilled and highly paid professionals, the 650,000 low-waged unskilled migrant workers who come for 2-year contracts to work on the construction sites or as domestic maids, and expressive specialists who are creative individuals who participate in the cultural scene in areas such as art, fashion, design, photography, film-making, writing, music and cuisine [30].

Openness of the economy and society has assisted the country in the past and this quality is fundamental to its global city aspirations. What happens, however, in a time of crisis such as the SARS threat? Will openness be reinterpreted as negative rather than positive? Will the fluid flows of people coming into the country for business, work, study or leisure be deemed as "overexposing" Singaporeans to the SARS virus? Exactly who becomes labelled an "outsider" at this time and how much will openness continued to be valued now constitute security issues which Singapore must address. Although the local–foreign interface will always remain in the minds of policy-makers and interested medical and social scientists, given the intrusive nature of SARS measures and its disruptive effects on the daily routines of the populace, it is expected that tensions will also be played out within the local arena among Singapore citizens. It is to these issues and questions that the following sections will explore.

3.2. Social responsibility, surveillance and control

Social responsibility is a rhetoric that has often been used in Singapore to marshal the people towards the same goal. Chua [31] suggests that the successes arising from this approach has given the People's Action Party (PAP) political legitimacy in Singapore and at least in part accounted for its re-election time and again. The ideological framework of "national survival" which sees threats emanating from outside of Singapore (as discussed above) as well as from within (e.g., Singaporeans who broke quarantine orders) helps to discipline society. During the height of the outbreak, political leaders talked about the "war" against SARS and fighting at the "battlefront" [32] in an attempt to rally Singaporeans to work co-operatively with the state. What is the public reaction to this discourse?

In the neo-liberal context of contemporary societies like Singapore, Fischer and Poland [33] assert that community policing in public health is no longer as coercive, interventionist and visible. Instead, discipline and regulation is less punitive and unspectacular but nevertheless, persistent and penetrating [34,35]. Formal processes emanating from the state take a back stage while self-regulatory civil and individual mechanisms come forward in the governance of public health. Using knowledge and raising issues related to risk and responsibility, individuals and communities can be

moved to act independently or as a group to manage and reduce harm [33]. Unlike the obvious actions of governments, self-regulation amongst "responsibilised" subjects [33, p. 188] assumes ideological significance because this new interpretation of regulation is more progressive, involving voluntary action and not just state legislation alone. Private, civil and commercial institutions and agencies form the non-state segment for action. However, in a country where state influence is as strong as it is in Singapore, how much confidence does the leadership place on self-regulation? Raising public consciousness is presumably insufficient because state continued to impose surveillance strategies and use legislation to enforce compliance.

Enforcement poses less of a problem when it is carried out in public spaces as the state's jurisdiction in the policing of these spaces is seldom questioned in Singapore. However, when surveillance and control begins to intrude into private spaces, it becomes more problematic. Using the argument that medical privacy is not absolute in the case of infectious diseases [36], surveillance and control throws into relief many issues concerning human rights, freedom as well as equality. Since new technologies such as detection devices and cameras help to transcend space, we ask how much infringement can be tolerated.

3.3. Safe and unsafe spaces

For humans, spaces are not isotropic or homogeneous, but laden with meaning such that behaviour becomes affected by perceptions of these spaces. In geography, much has been written about spaces which are avoided such as skid row streets [37] or spaces that have a great deal of meaning to an individual, e.g., a sense of place associated with home [38]. Likewise, in epidemiology, it is possible to examine spatial avoidance of places which are associated with disease. Fear, especially of the unknown, can strongly influence behaviour. In this study, we uncover the extent to which fear of SARS affected the spatial behaviour of the people as they constructed "safe" and "unsafe" locations in their minds.

4. Methodology

Ideally, in-depth qualitative interviews would be effective in teasing out the nuances in public opinion on

SARS. However, there was the ethical issue of exposing interviewers to infection and time and money constraints which prevented us from conducting in-depth interviews over the telephone. Taking into account all these considerations, we opted for the telephone questionnaire survey as this would give us a good *overview* of public opinion which formed the beginnings of a more in-depth study currently underway (and incomplete) in 2004.

After an initial pilot study in early June 2003, the actual telephone survey was conducted in mid-June to end-July 2003 on Singaporeans and permanent residents. A sample frame could not be purchased from Department of Statistics as telephone numbers were required and this would infringe upon the privacy of individuals. We also did not generate a sample frame based on random telephone numbers as the misses would be too problematic given the time and costs constraints faced. We compromised on the snowball method to construct the sample. A team of 69 trained surveyors were asked to use their contacts to get the sample profile assigned to them. Concern about possible biases arising from the use of the snowball method was minimised because the surveyors were instructed to fill their quota according to the sample profile (varying by gender, age, educational background and ethnicity) we gave them. We were also careful in ensuring that the surveyor team was itself diverse. We purposely selected university students of different ethnic and socio-economic backgrounds. The questionnaire was translated into Mandarin and Malay and the interviews were conducted in these languages and English. Dialect was sometimes used. Indian respondents mostly spoke English or Malay, a common phenomenon in multilingual Singapore.

The questionnaire survey comprised 19 questions in total with sections on the demographic characteristics of the respondents; the implications of SARS on Singapore's open economy and society; surveillance and control as preventive measures taken to curb SARS; and the spatial avoidance behaviour of the public. Respondents were asked whether they agreed with the measures that were implemented and if they avoided certain places. Many of the issues addressed in the questionnaire are reflective of forum discussions and other reports in the local newspapers. As the study was conducted close to the height of the SARS outbreak, we did not find statistically significant variations across

socio-demographic variables. This tallies with the findings of Quah and Lee [39] who reported variations only for the preventive measure of washing hands. More women and people aged above 35 took this preventive measure.

A total of 650 surveys were completed of which 634 were successful. The profile of the respondents closely reflects that of the total national population (Table 2). Some amount of subjectivity was expected as the respondents knew the interviewers but proper training ensured that objectivity was adhered to as far as possible and the interviewers did not detract from the questionnaire, accounting somewhat for the low rejection rate. This method was advantageous because the interviewers could reconfirm or clarify where inconsistencies crept up. The data were entered into SPSS for analysis.

In addition, secondary sources of information were also used. Newspaper reports and public inputs in the form of letters to the press provided valuable sources of information on public discourse.

Table 2
Profile of sample (%) (*N* in brackets)

	Sample	Singapore
Ethnicity		
Chinese	82.8 (525)	79.0
Malay	10.1 (64)	12.0
Indian	6.3 (40)	7.6
Others	0.8 (5)	1.4
Total	100 (634)	100
Gender		
Male	48.7 (309)	49.9
Female	51.3 (325)	50.1
Total	100 (634)	100
Age		
20–29	21.0 (133)	20.4
30–39	25.9 (164)	26.1
40–49	24.9 (158)	24.5
50–59	13.4 (85)	14.1
60 and above	14.8 (94)	14.8
Total	100 (634)	100
Education		
No qualification/primary	30.0 (190)	31.7
Secondary	34.9 (221)	35.5
Upper secondary/diploma	21.1 (134)	21.1
Tertiary	14.0 (89)	11.7
Total	100 (634)	100

Source: survey data; [40].

5. Discussion

5.1. Global interconnections during SARS

As Singapore works towards global city status, global linkages figure prominently in the imagination of the average Singaporean. On the one hand, there was widespread support to curb the inflow of people who could carry the threat of SARS into Singapore. On the other, Singaporeans are practical enough to realise that total exclusion would have adverse effects on the economy and on jobs. This ambivalence over the "good" and "bad" about globalisation was revealed in the findings.

For instance, the high-traffic Malaysian border raised practical issues of surveillance because of its sheer volume and frequency. Open borders suddenly become problematic as Singaporeans constructed visions of the "enemy" infiltrating into the country. Singapore was by no means the only country with such a perception. Thailand threatened to turn back fliers who showed flu-like symptoms at its airports. Malaysia imposed a visa freeze on people from PRC, Vietnam, Canada, Hong Kong and Taiwan. PRC hit back by banning tour groups to Malaysia, Thailand and Singapore. At the height of SARS, many companies in Singapore imposed an informal non-essential travel ban on its management and technical staff. This measure is consistent with travel advisories about SARS-affected locations such as PRC, Taiwan, Hong Kong and Toronto. In our survey, 80% of the respondents were willing to stop travel to SARS-affected countries for business or leisure.

There were other nuanced imprints on globalisation. While both foreign talent and foreign workers are necessary to the sustenance of a labour-short economy, the former is encouraged to root in Singapore while the latter is subject to measures which ensure their transience in the city-state [41]. The cosmopolitanism in Singapore's vision of a global city is obviously not an all inclusive one and when SARS presented a health problem, this discrimination became more embedded into the social landscape of Singapore. Although almost 78% of the respondents said that it was discriminatory to confine newly arrived foreign contract workers (the less and (un)skilled) while employment pass holders (the professionals) were only asked to impose their own self-quarantine, the majority (83%) still agreed with the use of this measure as a way to combat SARS.

In the end, one wonders if these exclusionary policies, which are for the most part supported by Singaporeans, relegate foreign contract workers to the equivalent of the "human flotsam and jetsam" mentioned by McNeill [42, p. 120]?

Besides the foreign workers, PRC students studying in Singapore also felt the brunt of SARS. Since there were over 23,000 PRC students at that time [43], the state implemented a policy to prevent these students from going on home visits or leaving the country during the outbreak. Their existing student visa would be revoked and they would have to apply for a new one. In addition, they would have to pay a $1000 deposit. In spite of the general consensus that the infectious disease was dangerous, 42.7% of Singaporeans felt that revoking the visa was harsh. Nonetheless, the majority of 50.6% still stood by the idea that the visas ought to be revoked for students who insist on returning to PRC.

Where SARS had negative economic impacts, Singaporeans were less stringent about protecting the borders. For instance, it was then-Prime Minister Goh Chok Tong who led the drive to get ASEAN (Association of Southeast Asian Nations) countries to work out cross-border controls at an ASEAN summit on SARS which was convened in Bangkok in late April 2003. This included dialogue with PRC, Japan and South Korea [44]. As the tourism sector was one of the most badly hit sectors, Singapore's national carrier, Singapore International Airlines (SIA) dropped airfares in an attempt to bring back the tourists while at the same time, cutting the number of flights by 20% to save on costs [45]. Awareness of the volatility of Singapore's economy to external forces led 84.5% of our respondents to agree with our question about whether airlines were correct to lower their airfares to bring tourists back into Singapore.

Besides the airlines industry, the Meeting, Incentive, Convention and Exhibition (MICE) sector which is touted to be the best in Asia and fifth in the world was also badly affected. Other related industries that depended on global tourist movements such as retail, food and entertainment were also severely affected [46]. While it was the intention of the state to cushion the economic impacts of SARS, at ground level, the measures had limited impact. Compared to Vietnam, PRC and Hong Kong where the loss to GDP by tourism was only 15, 25 and 41%, respectively, in 2003, Singapore's loss was 43% [47].

Travel bans, monitoring inbound tourist traffic by the use of thermal scanners, limiting business travel and making foreigners working or studying in Singapore feel excluded represent a closing of borders and the erection of guards against external threats. Where inter-country movements were once embraced, SARS surfaced the issue of security threats coming from without [22]. Spaces were once again carved by political boundaries governed by disciplinary regimes so as to articulate discourses of "safety" and "protection" within localised contexts. As is the case with many protocols to protect the world's environment, when SARS hit, countries acted "local" even if they thought "global".

5.2. Social responsibility in the Singapore context

The analysis of social responsibility in public health begins with an examination of the social construction of the disease. SARS is suggested above as contagious and dangerous. The term "super-spreader" was used in the Singapore context on index cases. Index case Patient A who eventually recovered had her encounter with the disease featured on television [48]. Her name was identified in the newspapers, generating a great deal of debate. Her "wrongdoing" was to bring SARS into Singapore and to have caused the death of loved ones. The psychological trauma she went through was also recounted in the programme but the damage was already evident. She had caused harm and she felt marginalised by Singapore society. She was not the only one to feel ostracised. A physician whose clinic was listed by MOH as one of the places two SARS patients had visited, talked about feeling victimised: "When I go out, people point at me and give me funny looks" because they wondered why she had not sent her patients immediately to Tan Tock Seng Hospital [49]. The local newspapers also reported that healthcare workers, nurses in particular, were avoided by Singaporeans [50,51] when they boarded public transportation, e.g., the Mass Rapid Transit System. They could be easily identified as they wore nurses' uniforms. Some hospitals attempted to overcome this problem by making the nurses change into street attire before they left the hospital. Indeed how the body is represented and read has significant bearing on surveillance and the use of space in the context of SARS. Lim [52] also showed that Singaporeans feared discrimination and were

ambivalent about naming quarantined individuals to non-family members. As surmised by a newspaper correspondent, "SARS is SARS, single syllabled and sibilant. The name hisses with the clarity of a deadly snake" [53, p. 16].

Compared to other diseases such as AIDS, bird flu, mad cow disease and other recent epidemiological outbreaks, SARS had a far higher level of exposure in this small island state. There was a mobilisation of resources of a magnitude which is rare in the country's history. Government, health workers, NGOs and volunteers, private sector, schoolchildren, the military and the police were all mobilised in the battle against SARS. The unknown created a landscape of fear and brought the problem to crisis proportions. There was less concern about bird flu and mad cow disease as it was believed that the authorities could block the entry of animal carriers and that Singapore being a non-rural society would be immune. AIDS was conceived as a lifestyle threat but SARS was different because the carriers were human and so little was known about the disease.

We found much support for negative social constructions in our Singapore survey. In the study, the majority (59.1%) worried about SARS. Of these 375 respondents, over 90% worried about fatality and contagion (Table 3). Alarm was thus fairly extensive in Singapore. Many also agreed with the state's call to contain the disease by exercising social responsibility on a daily basis. This included washing their hands (of which 88.8% of the total sample of 634 agreed), exercising and getting enough rest (85% of total sample). Only 59.1% felt they should wear a mask although very few actually did (unlike Hong Kong and PRC) because weather conditions make it impractical. The cognitive dissonance tallies with the findings of Quah and Lee [39] who found that only healthcare workers consistently wore masks because of their high exposure to infection.

The high proportion of "responsibilised" citizens willing to co-operate has a fairly long history in Singapore. In the past, Singaporeans were urged by the PAP to submit to state policies as they were for the common good of the people. Ethnic, religious and class differences were put aside so that all can reap the benefits of economic progress in the nation-state [31,54]. The "war" rhetoric used on SARS echoed a similar approach to galvanise Singaporeans to work towards a common goal during this period of "crisis". No less than 10 cabinet and junior ministers gathered together to meet 1800 grassroots, business and youth leaders in mid-2003. The leaders called upon Singaporeans to "do [their] part" [55]. According to then-Prime Minister Goh Chok Tong, "there is no excuse for anyone in Singapore not to know the part he has to play . . . All of us as ordinary citizens . . . have a part to fight SARS" [55, p. 1]. Putting people and government at the same level renders the disease a "national challenge" as the state is "half the shop" and people the other half (then-Deputy Prime Minister Lee Hsien Loong cited in [55, p. 1]). It therefore came as no surprise that we found as high as 93% of the total sample in the survey was willing to self-quarantine if the need arose. In addition, about 77.4% was willing to reduce movement within their workplace or school to lessen the chance of getting the disease.

Tensions, however, do exist especially if the policing impinged on peoples' private spaces or threatened to make private spaces public. For example, 60.9% protested against the broadcast of names to the public of those who are under such orders. One-third (33.1%) of the total respondents were against the installation of web cameras and tag surveillance of those under home quarantine orders. While this is certainly not a majority, for those whose private spaces were actually infringed upon, the reactions were quite negative. In a letter to the forum page of the local newspaper, a complainant under quarantine asked "the relevant authorities [to]

Table 3
Singaporeans' perception of SARS (%)

	Agree	Disagree	Neutral/do not know	Total
SARS can be fatal	97.9	1.9	0.3	100
There is no test kit that can accurately detect someone with SARS	86.9	8.5	4.5	100
SARS is contagious	96.5	2.4	1.1	100
SARS spreads quickly across countries	91.5	6.9	1.6	100

Source: Survey data.

enlighten" why CISCO (the commercial police force assigned to carry out quarantine orders) personnel had to call at his home at "the ungodly hours of 2.00 A.M. on the first day and 2.30 A.M. on the second" [56, p. 14].

Other complaints about over surveillance included the inflexibility of schools in monitoring the temperatures of their students. Many parents complained that their children were turned away because their temperature was above the standard 37.5 °C. Some medical practitioners reasoned that children often had temperatures above this as they tended to be more active. Consequently, teachers became more flexible. Nevertheless, a problem had emerged as parents found it difficult to make alternative child care arrangements. In our survey, almost a quarter (24.4%) felt that the closure of schools was unnecessary. This problem was quickly tackled when Ministry of Manpower (MOM) sent a circular to the civil service to be flexible about allowing one member of such households to stay away from work. Private enterprise followed suit. Last in the examples of overpolicing is the "No Visitor Rule" in hospitals. Eighteen percent of the respondents expressed unhappiness with the rule. Many felt that their loved ones would be neglected in terms of support and that this policy was excessive. Ultimately, the state had to respond and video links were made available to disgruntled individuals.

The numbers discussed in the preceding two paragraphs are by no means large but they help reveal the cognitive dissonance regarding public health policies. So long as the measures did not infringe on personal spaces or inconvenienced an individual too substantially, there was support. Where this was absent, the complaints were forthcoming, causing the state to fine-tune its measures.

5.3. SARS and spatial barriers

Some sense of territoriality has been alluded to in the previous paragraphs. This section discusses the practice of space differentiation by Singaporeans during the outbreak. Spatial boundaries can be very specific as a means to manage risk as was the case of selecting Tan Tock Seng as the "SARS hospital". The Pasir Panjang Wholesale Market was the other location which was closed off by the police as a result of an infection discovered there. Besides boundaries that distinguish the "inside" from the "outside", spaces were also sectionalised as a precaution. The National University of Singapore and other tertiary institutions divided their campuses into zones which could be isolated in case of an outbreak. Many companies in the private sector which felt that they could not withstand or afford disruptions in their businesses (e.g. broking houses) implemented crisis plans which included the breaking up of their officers into two or more locations. Work from home and telework were also temporary strategies employed until normality returned.

In our survey, we asked respondents how the outbreak of SARS had affected their movement across space. We asked if they purposely avoided the SARS hospital and other hospitals where SARS cases were also reported (this included Singapore General Hospital, Kandang Kerbau Hospital and National University Hospital; SARS patients were transferred to Tan Tock Seng except where their medical condition did not permit). We also asked about the Pasir Panjang Wholesale Market and about Changi Airport where SARS was likely to be "imported" into the island. A spatially proximate public location to the SARS hospital was also included in the survey, e.g., Novena Square Shopping Centre opposite Tan Tock Seng Hospital. From Table 4, the majority of the respondents avoided hospitals as a whole (72.2%) with 15.5% singling out the SARS hospital. Pasir Panjang Wholesale Market is a popular place to make bulk purchases for wet groceries like vegetables, meats and fruits. Not only are hawkers and restaurateurs found there, even housewives make their way to the centre on a daily basis. Due to the high volume of human traffic, the location was closed for 15 days while disinfection was carried out. Two-thirds of the respondents (62.5%) said they avoided this place. High-risk locations like polyclinics, private clinics, the airport and buildings in close spatial proximity to possible "epicentres" were also mapped onto respondents' avoidance zones. One-quarter of the respondents (24.9%) said they avoided travel by taxi. This arose because a taxi driver was infected by a SARS patient he had unsuspectingly ferried. This taxi driver eventually died but it was only in the autopsy that the connection was made. As a consequence, taxi companies in Singapore had to disinfect their taxis twice a day and the drivers were asked to open their windows instead of turn on the air-conditioning in their vehicles. Taxi drivers took their temperatures twice a

Table 4
What was avoided during SARS (%)

Locations where infections were reported	
Tan Tock Seng Hospital	15.5
Singapore General Hospital	4.3
National University Hospital	3.5
Kandang Kerbau Hospital	1.9
Pasir Panjang Wholesale Market	62.5
High-risk locations	
All hospitals[a]	72.2
Polyclinics	53.2
Private clinics	32.2
Changi Airport	30.6
Novena Square Shopping Centre	36.3
Travel in airplanes	30.3
Dental clinics	40.4
Low-risk locations	
Public housing estates town centres	12.9
Neighbourhood markets and hawker centres	10.6
Restaurants	16.9
Orchard Road shopping belt	18.0
Government buildings	11.2
Public transportation	
Travel in MRT and public buses	12.0
Travel in taxis	24.9
Others	
Meeting friends and relatives	8.0

Source: Survey data.

[a] If respondent selected "All hospitals", he/she could not select the named hospitals.

day and had labels pasted onto a prominent location to say that they were "OK". Perceptions of SARS did indeed affect the spatial behaviour of respondents, creating an intricate geography of "safe" and "unsafe" areas.

6. Conclusion

Biomedical understanding of SARS was limited when the outbreak begun. Until more knowledge could be gathered, WHO recommended conservative actions in order to be on the safe side. Singapore's vulnerability as an open economy and society, in the minds of the leaders, left them no choice but to take this approach. Draconian measures described above were implemented with little hesitation as to their social implications. From travel bans to outright penalties against foreigners working or studying in Singapore,

SARS erected physical as well as mental borders against the globalising aspirations of this city-state.

In addition, the high level of public consciousness raised to secure co-operation led to general agreement and support for the many initiatives taken by the state, as well endorsement of the speed with which the problem was tackled. Singaporeans put up with the spatial barriers erected and voluntarily avoided high-risk places as these were conceived as potentially dangerous spaces. Nonetheless, the politics of containment revealed that discrimination, exclusion and protection of privacy remain social issues of some contention. As much as Singaporeans worried about the SARS threat, they also expressed discontent with intrusions into their privacy.

There are several lessons to be learnt from the SARS outbreak. In the immediate term, steps can be taken to deal with future threats similar to SARS. In Singapore, the government has already ascertained that one hospital is not sufficient for control of infectious diseases. Containment as a strategy has worked and will continue to be employed. However, the old priority of cost efficiency is being reviewed because many infections had been passed in eight-bedder wards [57].

In the longer term, the social disruptions need to be properly considered. Singapore's specific local context in terms of its historical experience may not be suitable for other countries. Taiwan also implemented the ring fence concept by putting a quarantine order on a hospital but nurses and doctors were unhappy with their confinement and 25 staff fled [58]. Similarly PRC reported instances of rioting against the setting up of quarantine centres in two provinces [59]. The politics of containment must examine receptivity to legislative decisions in the light of the historic and cultural specificity of the location. Transparency is something of a recent phenomenon in PRC politics [60]. The sluggish response of Hong Kong was blamed on the desire to maintain business as usual in this international hub [61]. In the case of Taiwan, Ho [62] attributes excessive politicisation, e.g., laying blame on PRC and on opposition as the main problem for ineffective management of the disease. While most would subscribe to greater transparency and better co-ordination between government bodies at a national level as well as with WHO and CDC (Centre for Disease Control and Prevention), ultimately the response to infectious diseases will depend on social values, social conditions and political

contingencies. In the case of Singapore, we have objectively shown that there was fairly widespread support for measures other countries were unwilling to adopt. The SARS episode revealed that compliance *is* effective *and* necessary for the containment of infectious diseases. The limited amount of questioning, the rapid rate of adoption and the smooth carry through of many of the policies came down to two things in Singapore: strong social discipline and the crisis mentality of the people. Whether these are replicable elsewhere is another paper but certainly this unique situation has helped Singapore come out of the crisis.

Acknowledgements

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