



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Public image and governance of epidemics: Comparing HIV/AIDS and SARS

Stella R. Quah

Department of Sociology, National University of Singapore, ASI 03–06, 11 Arts Link, Singapore 117570, Singapore

Abstract

A comparative analysis of the 2002–2003 infectious disease outbreak, severe acute respiratory syndrome (SARS), and the HIV/AIDS epidemic that has affected the world over the past two decades reveals the significant role of socio-cultural beliefs and attitudes in the shaping of people's lifestyles and approaches to the control and prevention of epidemics. The main research question is: what can we learn from the SARS experience about effective prevention of HIV/AIDS? The sources of data include population figures on the development of these epidemics and findings from two sociological studies of representative samples of Singapore's multi-ethnic population. The comparative study illustrates the impact of cultural beliefs and attitudes in shaping the public image of these two different infectious diseases; the relevance of public image of the disease for effective prevention and control of epidemics.

© 2006 Elsevier Ireland Ltd. All rights reserved.

Keywords: Epidemics; HIV/AIDS; SARS; Public image of disease; Risk-taking; Asia; Medical sociology

1. Overview of the situation

Traditionally, the human suffering inflicted by long-term epidemics have tended to find expression in literature and the fine arts thus becoming a visible part of the collective memory and shaping the public image of the disease. For example, the impact of the bubonic and pneumonic plague or “Black Death” had a major influence on painters of the Gothic Period [1]; tuberculosis is featured in Eugene G. O'Neill's *Long Day's Journey into Night*; Franz Kafka's *Diaries*; Thomas Mann's *The Magic Mountain* [2]; Victor Hugo's *Les Misérables*; Dickens' *Nicholas Nickleby*, Brontë's *Wuthering Heights*; Verdi's *La Traviata* [3]. Among

epidemics in the past three decades (HIV/AIDS, SARS, mad cow disease, and avian flu among others), only HIV/AIDS has lasted long enough to inspire artistic expressions in literature [4–7], theatre [8], dance [9], and film [10] mostly used as vehicles for HIV/AIDS preventive education programs particularly in Africa [8–12].

One of the pioneer studies in prevention was published in 1939 by Zinsser [13]. Ever since, a community of experts worldwide has been dedicated to prevention [14–20]. However, despite the struggle to convey a more accurate and humane public image of AIDS in the past decade, the stigma attached to HIV/AIDS still persists as a formidable obstacle to prevention efforts [21–23]. Figures on the spread of the disease suggest we are losing the battle against HIV/AIDS

E-mail address: socquahs@nus.edu.sg.

especially in developing countries [3,24–27]. In China alone, the estimated number of deaths due to AIDS as of December 2003 (latest figures available), ranged from 21,000 to 75,000 and 840,000 persons infected with HIV/AIDS. The figures for Thailand, the second most affected East Asian country, are 34,000–97,000 deaths, and 570,000 persons infected with HIV (Appendix A, Table A.1).

In contrast to the dismal HIV/AIDS situation, the 2002–2003 outbreak of severe asymptomatic respiratory syndrome or SARS, offers a completely different picture for the analysis of preventive efforts. Although SARS, like HIV/AIDS, was unknown in the medical world and hit unexpectedly, there are some significant differences, particularly in their etiology, epidemiology, natural history and clinical outcomes of the two diseases. HIV/AIDS is asymptomatic for 7–10 years after infection so that HIV-positive persons may continue to spread the disease unknowingly. The main mode of HIV/AIDS transmission is through direct contact with infected body fluids or blood (sexual intercourse, use of infected needles by drug users and receiving contaminated blood transfusions). SARS is caused by the SARS coronavirus and characterized by airborne transmission. SARS develops very rapidly, with an average incubation period of 5 days or a range of 2–10 days after contact. Within 1 week of the illness patients show typical influenza-like symptoms such as fever, malaise, and headache with cough and diarrhoea getting worst in the second week of infection. It has been determined that “transmission occurs mainly during the second week of illness”. These external signs facilitate prompt action: exposed patients may be placed under fever surveillance twice a day “in an isolation facility or ward for at least 10 days after the last exposure to the source case(s)” [28]. In the span of 9 months SARS infected 8096 persons, caused 774 deaths (Appendix A, Table A.2) and became a widespread visible threat through the serious disruption of normal daily activities of individuals and major sectors of the economy such as transportation, commerce, industrial production, and tourism [28–30]. The first probable SARS case was reported in China on 16 November 2002 and the infection spread to 28 other countries around the world but the largest number of locally transmitted infections and deaths were reported in China, Hong Kong, Taiwan, Canada, and Singapore (Appendix A, Table A.2). Despite the fact that SARS caught the world

unprepared, hit at great speed, and it is very difficult to eradicate [31], the outbreak was contained within 9 months, a relatively brief period of time (Appendix A, Table A.2).

Despite the *medical* differences (in etiology, epidemiology, natural development and clinical outcomes) between these two epidemics, I argue and attempt to demonstrate in this study that we may advance our knowledge on preventive strategies by conducting a systematic comparison of important *social* aspects of HIV/AIDS and SARS.

2. Relevant concepts

What can we learn from the SARS experience about effective prevention of HIV/AIDS? More specifically, why were the efforts to contain and prevent the spread of a new epidemic like SARS successful while it has taken 25 years so far to contain the spread of HIV/AIDS and no effective solution is yet in sight? Social science research has identified over the past decades a complex array of factors and conditions associated with disease prevention in individuals (micro-level analysis) as well as collectivities (macro-level analysis) but the factors and conditions vary for different diseases and there may be many other factors yet to be identified. Still, contrasting the two epidemics in terms of social attitudes and beliefs at the micro-and macro-levels, will help us to elucidate some of the major obstacles to HIV/AIDS prevention. Therefore, this paper focuses on only three possible factors: the impact of perceived severity and susceptibility to infection and the public image of the epidemic (micro-level factors); and the governance of epidemics (macro-level factor).

Sociology and social psychology offer some interesting explanations of the sluggishness of preventive health behavior in individuals [32,33]. Among ten theories identified as the “most often used” today [34], the top two explanatory models are the Social Cognitive Theory (SCT) and the Health Belief Model (HBM) [34,35]. Both social theories are useful in the analysis of preventive action: they focus on the individual’s capacity to make his/her own decisions, and the recognition that there are multiple and varied factors involved in a person’s health-related actions. The SCT explains people’s health-related actions primarily in terms of their

expectations of the outcome, their confidence in the success of their actions, and their ability to perform the action; but perhaps the most relevant aspect of the SCT is its consideration of the individual's environment as one of the important determinants of his/her behavior [36].

The HBM proposes that the likelihood of a person taking preventive action increases if he/she believes in his/her personal susceptibility to the illness and in the severity of the illness; perceives the preventive action as beneficial; believes that there are no barriers to action or that barriers can be overcome; believes in the net gain – benefits exceed barriers or costs – of taking preventive action [33,37,38]. A comprehensive review of studies applying the HBM [37] found the variables perceived susceptibility and perceived severity to be closely correlated and to have significant influence upon a variety of preventive behaviors. The combination of both perceived severity and perceived susceptibility labeled “*perceived threat*” has been found to be a more significant explanatory variable than severity and susceptibility used separately [37]. The HBM variable influencing the perception of effective prevention of HIV/AIDS in three ethnic communities is perceived severity or seriousness of the disease, together with the perception of personal responsibility for contracting the disease [39]. I ascertained perceived severity of HIV/AIDS in terms of the respondents' subjective perception of the likelihood of death using the close-ended question “When you think about AIDS, how serious do you feel it is? This approach is basically the same as that of Janz et al. [38] who define perceived severity as “One's belief of how serious a condition and its sequelae are”. Strecher et al. had offered earlier [37] a wider definition of perceived severity: “personal evaluations of the probable biomedical, financial and social consequences of contracting HIV and having AIDS”. Although there are slight variations in the wording of the question asked in interviews and in the definition of perceived severity, the general consensus in the literature is that this conceptual construct, often together with perceived susceptibility, is essential in the analysis of people's motivation to take preventive action. Nevertheless, as preventive health behavior is influenced by a multiplicity of factors, the HBM, SCT and all the other top eight theories [34] are limited as they offer only partial explanations of health-related behavior, but they are complementary.

3. Research question and assumptions

I include social constructs from the HBM and the SCT and some relevant contextual social factors, to explore the research question “What can we learn from the SARS experience about effective prevention of HIV/AIDS”? Combining the analysis of individuals' responses with their collective implications, I attempt to demonstrate that perceived severity together with perceived susceptibility and the public image of the two epidemics help to explain some of the difference in prevention effectiveness. I test two related assumptions: (1) a higher perception of disease severity and personal susceptibility to SARS as compared to HIV/AIDS, contributed to the higher effectiveness of SARS prevention efforts; (2) the second assumption is two-fold: (a) in contrast to SARS, the overall negative social ‘image’ of HIV/AIDS as a disease associated with particular types of individuals tends to weaken people's perception of susceptibility; (b) correspondingly, low perceived susceptibility tends to discourage public support for robust preventive efforts at the community level. These assumptions require elaboration.

3.1. Severity and susceptibility

Following the HBM, the first assumption to be tested is that a person's perception of the severity of the disease and his/her perceived susceptibility to that disease are likely to motivate him/her towards taking preventive action. All things being equal, such a commitment to prevention would weaken or be altogether absent when perceived severity and/or susceptibility are low or nil. The perceived severity of HIV/AIDS was ascertained through the question “When you think about AIDS, how serious do you feel it is? Four alternative response categories were provided (see Tables 1 and A.3). For the logistic analysis, the responses were dichotomized into high perceived severity ((1) “very serious, causes death”), and low perceived severity ((0) “not very serious” or “not serious at all” and “don't know”). Perceived susceptibility to HIV/AIDS was ascertained by the level of agreement to the statement “AIDS doesn't happen to people like me” (Tables 1 and A.3).

In the study of SARS, perceived susceptibility was ascertained through the question “How likely do you think it is for you to contract SARS”? Respondents

Table 1
HIV/AIDS study variables

Characteristics	Number	%
Total sample	660	100.0
Independent variables		
Socio-demographic factors		
Gender		
Male	396	60.0
Female	264	40.0
Age		
49 years old or younger	493	74.7
50 years old or older	167	25.3
Ethnicity		
Indian	65	10.0
Malay	174	26.4
Chinese	418	63.3
Marital status		
Single	178	27.0
Married	449	68.0
Divorced/separated/widowed	33	5.0
Religion		
Muslim	189	28.6
Christian	79	12.0
Other religion	392	59.4
Social class factors		
Occupation		
Service sector occupation	101	15.3
Other occupation	559	84.7
Personal income		
Below S\$ 500 per month	469	71.0
S\$ 500 or higher per month	191	29.0
Education		
<11 years of education	578	87.6
11 years or more	82	12.4
Attitudinal factors		
Do you usually worry about falling sick?		
No	463	70.2
Yes	197	29.8
Future orientation ^a		
Low (below average)	318	48.2
High (above average)	342	51.8
Sense of control over one's life ^a		
Low (below average)	299	45.3
High (above average)	361	54.7
Life satisfaction ^a		
Low (below average)	231	35.0
High (above average)	429	65.0
Perceived severity of AIDS ^a		
Low	95	14.4
High	565	85.6
Perceived susceptibility to HIV/AIDS ^a		
Low	452	68.5
High	208	31.5

Table 1 (Continued)

Characteristics	Number	%
Belief in effective HIV/AIDS prevention ^a		
No	113	17.0
Yes	547	83.0
Dependent variable		
Perception of people living with HIV/AIDS (perceived stigma) ^a		
“Deviants”	171	26.0
“Risk-takers”	376	57.0
“Victims”	37	5.5
No label attached	76	11.5

^a The details of these scales are given in Table A.3. The scale scores were dichotomized based on the mean score as shown here, to meet the requirements of logistic regression analysis.

expressed their belief in their personal susceptibility by indicating whether they saw the likelihood of contracting SARS as “very likely”, “likely”, “not very likely”, “not likely at all”, or did not know (Table 2). The perception of severity of SARS was measured by the question “If you have contracted SARS, what is the likelihood of survival”? The four response categories were “very likely”, “likely”, “not very likely” and “not likely at all” (Table 2).

3.2. The public image of the diseases

The second assumption is that in contrast to SARS, the overall negative public ‘image’ of HIV/AIDS as a disease associated with particular types of individuals tends to weaken people’s perception of susceptibility and, correspondingly, tends to discourage public support for robust preventive efforts at the community level. The individual’s ‘image’ of the disease shapes his/her perception of seriousness and susceptibility and thus contributes to his/her motivation to take preventive action. That ‘image’ of the disease and of persons affected, however, is shaped to a large extent by prevailing values and normative beliefs in the community and it is subject to change over time. This process is suggested by many sociological theories including social networks and social support theory [40], rational choice theory [41], and the SCT. The SCT offers the concept “reciprocal determinism” [36] that proposes a dynamic interplay of “the person, behavior, and the environment”.

Table 2
SARS study variables

Characteristics	Number	%
Total sample	1201	100.0
Independent variables		
Socio-demographic factors		
Gender		
Male	599	50.0
Female	602	50.0
Age		
59 years old or younger	1056	88.0
60 years old or older	144	12.0
Ethnicity		
Indian	82	7.0
Malay	172	14.0
Chinese	900	75.0
Marital status		
Single	314	26.0
Ever-married	887	74.0
Place of birth		
Singapore	947	78.9
Other	254	21.1
Preferred language		
Mandarin	326	27.0
Other	875	73.0
Social class		
Educational level		
Primary six or lower	230	19.2
Secondary one or higher	971	80.8
Personal monthly income		
Below S\$ 1000	495	41.2
S\$ 1000 or higher	706	58.8
Health behavior		
Smokes		
Yes	171	14.2
No	1030	85.8
Exercises regularly		
No	511	42.5
Yes	690	57.5
Preventive measures taken at home over the 3 days preceding the interview ^a		
Five or less preventive measures taken	832	69.3
Six or more preventive measures taken	369	30.7
Attitudes on crisis management and SARS		
“Preventive measures have adversely affected my personal choice and freedom in life”		
Agree (1)	536	44.6
Disagree (0)	665	55.4
“People should be willing to make some personal sacrifices”		
Agree	1145	95.3
Disagree	56	4.7
“People have mostly been socially responsible”		
Agree	1033	86.0
Disagree	168	14.0
“Have had the chance to express my personal views and concerns to the authorities if I wanted to”		
Agree	930	77.4
Disagree	271	22.6

Table 2 (Continued)

Characteristics	Number	%
“It is appropriate to reveal the names and identities of SARS patients to the public”		
Agree	474	39.5
Disagree	727	60.5
“If you did not develop symptoms of SARS after having <i>close contact</i> with someone diagnosed with SARS, would you agree to be quarantined for 10 days”?		
Agree	1097	91.3
Disagree	104	8.7
“If you did not develop symptoms of SARS after having <i>non-close contact</i> with someone diagnosed with SARS, would you agree to be quarantined for 10 days”?		
Agree	860	71.6
Disagree	341	28.4
Perceived susceptibility: “How likely do you think it is for you to contract SARS”? ^b		
Nil susceptibility	211	17.6
Some or high susceptibility	990	82.4
Perceived severity: “If you have contracted SARS, what is the likelihood of survival”? ^c		
Low severity	1052	87.6
High severity	149	12.4
Perceived health status: “How would you rate your health in the past one week”?		
Excellent/very good	612	51.0
Good/average/poor	589	49.0
Feels comfortable		
No/just a little	294	24.5
Very/quite	907	75.5
Feels relaxed		
No/just a little	358	29.8
Very/quite	843	70.2
Feels contented		
No/just a little	374	31.1
Very/quite	827	68.9
Feels happy		
No/just a little	314	26.1
Very/quite	887	73.9
Has negative feelings (frightened, nervous, anxious, indecisive, confused)		
Negligible	713	59.4
Intense	488	40.6
Dependent variable		
Appraisal of health authorities’ crisis management ^d		
Negative (below average)	290	24.1
Positive (above average)	911	75.9

^a Eight preventive measures were considered as part of the respondents’ “activities during the past 3 days”: covering the mouth with paper tissue or handkerchief when sneezing or coughing; covering the mouth with bare hand when sneezing or coughing; washing hands after sneezing or coughing; using soap or liquid hand-wash when washing hands; wearing a mask over the mouth; using serving utensils (chopsticks or spoons) for shared food when joining others for meals; when touching objects that may possible carry the SARS virus (e.g., door handles, buttons in lifts), taking preventive measures (e.g., pressing lift buttons with tissue paper); washing hands as soon as possible after touching objects that may possibly carry the SARS virus (e.g., door handles, buttons in lifts).

^b The original response categories for perceived susceptibility (that is, the perceived likelihood of contracting SARS) were: “very likely”, “likely”, “not very likely”, “not likely at all” and “don’t know”. For the logistic regression analysis the latter group, 17.6% of respondents who had no idea on their susceptibility to SARS, were contrasted with all other respondents who did have an assessment of their likelihood of getting infected.

^c The original response categories for perceived severity (that is, the likelihood of survival) were “very likely”, “likely”, “not very likely” and “not likely at all”. For the logistic regression analysis, these responses were dichotomized into low perceived severity (survival “very likely/likely”) and high perceived severity (survival “not very likely”/“not likely at all”).

^d The respondents’ appraisal of the health authorities’ crisis management was ascertained by their assessment of the distribution of information in terms of accuracy, clearness, sufficiency, timeliness, and trustworthiness in a scale from very negative (score 1) to very positive (score 6). The scale had high reliability ($\alpha = 0.813$) and the mean score was 4.83 (S.D. = 0.617).

In my view, the dynamic interaction of the individual's health-related behavior and the environment is better explained by the individual's subjective perception of the situation (for example a crisis or stressor) and the social context of the situation, as proposed by symbolic interaction and family stress theory [42]. Thus, my assumption that a person's motivation to take preventive action may also be manifested in his or her cooperation with community-based preventive measures is explained clearly by the application of the conceptual premises on community responses to stressor events formulated by Reiss and Oliveri [43]. The public's perception of the scope of the problem was highlighted by these authors as part of their concept "community's punctuation of an event". They defined the community's punctuation of an event or perceived scope as "when the problem begins and when it ends and who is involved". They proposed that the community and its leaders would be more inclined to invest concerted efforts to solve a problem if three conditions are met: accountability, duty, and competence [43]. That is, the community and its policy-makers would be most inclined to mobilize assistance and preventive efforts when these three conditions are met: the persons affected are perceived as not being accountable for the problem; they are regarded as having the duty to request outside help; they are considered as lacking the competence to solve by themselves the problem affecting them. I suggest that these three conditions shape the public image of SARS and HIV/AIDS and add to our understanding of the disparity in prevention effectiveness of these two epidemics at the community level.

The public image of HIV/AIDS was ascertained through one open-ended question about persons living with HIV/AIDS: "What kind of people do you think are most likely to get AIDS"? The analysis of responses revealed three types of stereotypes or 'images': 'risk-takers', 'deviants', and 'victims'. Only a small group of respondents had not particular image of people living with HIV/AIDS (Table 1). The public image of SARS may be ascertained indirectly through the respondents' perception of a sense of social responsibility and willingness to make some personal sacrifices in combating the disease. Those perceptions reflect people's collective sense of accountability and duty and their recognition of the need for expertise to handle the crisis. Referring the respondents to the measures implemented to

prevent the spread of SARS, they were asked their level of agreement (strongly agree to strongly disagree) with these statements: "People should be willing to make some personal sacrifices"; "People have mostly been socially responsible"; "If you did not develop symptoms of SARS after having close contact with someone diagnosed with SARS, would you agree to be quarantined for 10 days?"; "If you did not develop symptoms of SARS after having non-close contact with someone diagnosed with SARS, would you agree to be quarantined for 10 days"? (Table 2).

3.3. Governance and epidemics

The condition of "competence" identified by Reiss and Oliveri [43] as discussed above, has to do with expertise in handling the crisis, and thus brings in a final concept of relevance to this discussion: governance. Governance is another socially significant aspect of HIV/AIDS and SARS as a strong political will at the national level is needed to invest state resources, and to utilize knowledge and technology creatively for their detection and prevention. But these epidemics are also global problems that challenge national boundaries and the conventional idea of state sovereignty and governance, and test international cooperation, because of their mode of transmission and the increasing movement of people across countries for leisure, trade, and study among other activities. Given the easiness and speed of their international transmission, these epidemics have unwittingly pushed forth a new phenomenon that Fidler [30] calls "global health governance" that is, "the proposition that governance of public health issues must include not only state actors but also non-state actors". Examining the international impact of SARS, this international law expert concluded that "To govern an increasingly borderless world, requires, in essence, increasingly borderless governance" [30].

The analysis of the SARS crisis management in Singapore suggests that effective containment and prevention of infectious disease outbreaks requires dedicated and transparent governance at both levels, national and global. And to be successful, global governance requires timely and effective response and collaboration from sovereign nations. But as I shall discuss later, the governance approach to SARS differs substantially from that applied to HIV/AIDS.

4. Methods

First, a word of caution: I reiterate that this study is by necessity limited and exploratory because the two epidemics, HIV/AIDS and SARS, are very different microbiologically and epidemiologically as indicated in the introduction; and there is a 10-year gap between the two surveys. The SARS study was conducted as the outbreak progressed in May 2003, 10 years after the HIV/AIDS study. Nonetheless, despite these methodological difficulties, I believe it is important to scrutinize available information on both epidemics in the hope of increasing our understanding of the dynamics of preventive action against HIV/AIDS. While the two epidemics are different in many respects, they are both serious public health threats that require a collective response [26,30] as indicated earlier.

Two general types of data are discussed here: population figures and data from personal interviews. The international population figures on the impact and spread of HIV/AIDS and SARS are taken from WHO's published reports [25,28,31,44–46]. The analysis of behavior and attitudes of individuals is based on data from two separate studies I conducted in Singapore as principal investigator.

The data on HIV/AIDS are from a 1993 study of attitudes and preventive behavior regarding HIV/AIDS based on a survey of personal interviews with a representative stratified random sample of 660 adults aged 21 and older following a structured questionnaire. Respondents were from the Chinese, Malay, and Indian communities, the three largest ethnic groups in Singapore. The sample characteristics and the details on measurement of the variables included in this analysis are described in Tables 1 and A.3. The data discussed in this paper are part of a larger study on preventive health behavior regarding cancer, heart disease, and HIV/AIDS supported by a research grant from the National University of Singapore. Further methodological details are provided elsewhere [39]. The new findings discussed in this paper were obtained through logistic regression analysis.

The data on behavior and attitudes on SARS are from a 2003 study based on telephone interviews with a representative stratified random sample of 1202 adults aged 21 and older, following a structured questionnaire. The three main ethnic groups in Singapore (Chinese, Malay, and Indians) were proportionally represented.

The interviews were conducted within the span of 6 days, from 5 to 10 May, while the country was facing the SARS epidemic. Telephone interviews were the only data collection option because it was imperative at the time to follow the public health advice to restrict personal contact to home and the workplace, whenever possible. The main characteristics of the sample and the attitudinal measurements applied are presented in Table 2. Further methodological details of this study are described elsewhere [29]. The new findings presented in this paper were obtained through logistic regression analysis. While the data refer to three ethnic communities in Singapore the findings illustrate the impact of social attitudes upon the governance of epidemics in a high density global city.

Acknowledging the multiplicity of factors that may play a role in shaping the success or failure of illness prevention and containment of epidemics, this study deals only with a small number of variables. The analysis of data in both studies comprised two stages: an initial scrutiny of the main assumed correlations and attitudinal scales using partial correlation and factor analysis; logistic regression to explore the likelihood of occurrence of stereotypical images of people living with HIV/AIDS, the dependent variable in the HIV/AIDS study; and likelihood of public support of the SARS crisis management, the dependent variable in the SARS study. Logistic regression is a very useful tool to explore the probability of occurrence of the dependent variable over the probability of it not occurring and the outcome is provided as odds ratios. The odds ratio is the odds of one variable occurring to the odds of another [47,48].

The logistic regression analysis of the public image of HIV/AIDS comprised three sets of variables: socio-demographic variables (gender, age, ethnicity, marital status and religion); social class factors (occupation, personal monthly income, and educational level); attitudinal factors proposed by the HBM and the SCT (tendency to worry about falling ill; future orientation; sense of personal control of one's life; life satisfaction; perceived severity of HIV/AIDS; perceived susceptibility to HIV/AIDS; belief in effective prevention of HIV/AIDS) and perception of HIV/AIDS. A description of these variables is provided in Table A.3.

Five sets of variables were included in the logistic regression analysis of the public support of the SARS crisis management: socio-demographic variables (gen-

Table 3
Logistic regression model predicting people's appraisal of health authorities' management of the SARS crisis

Variables in the model	Estimated odds ratios [exp(B)]			
	(a) Total sample	(b) Seniors	(c) Less educated	(d) Malays
Socio-demographic factors				
Gender: female (1)	1.093	0.976	1.089	1.054
Age: 60 years old or older (1)	0.686		0.583	0.734
Ethnicity: Chinese (1)	1.262	3.656	2.184	
Marital status: single (1)	1.083	0.118	1.291	0.721
Place of birth: Singapore (1)	0.765	0.416	0.356	1.136
Preferred language: Mandarin (1)	1.722**	2.353	1.667	
Social class factors				
Education: primary six or lower (1)	1.016	1.199		0.532
Personal income: below S\$ 1000 (1)	0.750	0.284	0.434	0.586
Health behavior				
Smokes (1)	0.591**	0.463	0.277**	0.628
Exercises regularly (1)	1.236	0.636	1.156	1.372
Less than five preventive measures taken in past 3 days (1)	1.271	2.990	2.345*	2.954**
Attitudes				
Preventive measures adversely affected personal choice and freedom (agree = 1)	0.766	0.295*	0.678	0.852
People should be willing to make some personal sacrifices (agree = 1)	1.821*	4.947	0.521	1.417
People have mostly been socially responsible (agree = 1)	2.524****	3.954	7.482***	3.293**
Have had the chance to express my personal views (agree = 1)	1.575***	1.246	0.930	2.280
It is appropriate to reveal identities of SARS patients (disagree = 1)	0.734*	0.279**	0.690	0.520
Agree to be quarantined for 10 days after having close contact and no symptoms of SARS (1)	1.525	1.946	1.636	1.151
Agree to be quarantined for 10 days after having non-close contact and no symptoms of SARS (1)	1.084	2.076	1.075	1.292
Awareness of personal susceptibility to SARS (no awareness = 1)	0.617***	0.345	0.447	0.386**
Perceived severity (high = 1)	1.059	0.816	0.874	0.916
Perceived health status (excellent/very good = 1)	1.004	1.375	0.883	1.402
Feels comfortable (1)	1.492	1.692	11.851***	1.164
Feels contented (1)	1.096	2.860	0.263*	0.873
Feels relaxed (1)	0.919	0.555	0.648	0.222
Feels happy (1)	1.277	5.170	1.613	8.181***
Has negative feelings (1)	1.185	2.275	0.500	1.361
Nagelkerke R^2	0.139	0.437	0.338	0.290
Variance predicted correct (%)	77.7	84.0	80.0	80.2

Notes: total sample, 1201; seniors, 144; less educated, 230; Malay, 172.

* Statistically significant at $p=0.04-0.05$.

** Statistically significant at $p=0.01-0.039$.

*** Statistically significant at $p=0.001-0.009$.

**** Statistically significant at $p=0.0001$ or lower.

der; age; ethnicity; place of birth; marital status); social class (educational level and personal monthly income); health behavior variables (smoking, exercising regularly, and preventive measures against SARS taken over the 3 days preceding the interview); attitudes suggested by the HBM including perceived susceptibility and

perceived severity; and attitudes on SARS crisis management. To meet requirements of the logistic regression analysis the response categories of the question on perceived susceptibility were dichotomized contrasting the respondents who expressed an estimation of their likelihood of infection on the one hand, with respon-

dents who have no awareness of their susceptibility to SARS, on the other hand. The response categories for perceived severity were dichotomized into “high” severity (survival not very likely or not likely at all) versus “low” severity (all other responses including “don’t know”). The complete list and explanation of all the variables are presented in Table 2.

5. Findings and discussion

The discussion follows the two related assumptions presented earlier.

5.1. Severity and susceptibility

The first assumption to be tested is that a higher perception of disease severity and personal susceptibility to SARS as compared to HIV/AIDS, contributed to the higher effectiveness of SARS prevention efforts. International figures (Appendix A, Tables A.1 and A.2) show that the SARS outbreak was contained within 9 months of its onset while the HIV/AIDS epidemic continues undefeated after nearly three decades. Would people’s sense of susceptibility to these diseases and their severity contribute to that difference? The survey data from Singapore on the two epidemics provide a tentative yet useful indication of the differential perception of severity and susceptibility. Only 31.5% of the respondents expressed high susceptibility to HIV/AIDS (Table 1) compared to 82.4% of respondents in the case of SARS (Table 2). The corresponding figures on the expression of high perceived severity are 85.6% of the respondents in the case of HIV/AIDS (Table 1) and only 12.4% of the respondents in the case of SARS (Table 2).

The findings from the analysis of the belief in effective HIV/AIDS prevention in the total sample (Appendix A, Table A.4) indicate that people who believe that HIV/AIDS is very serious and fatal (high perceived severity) are significantly more inclined than those with low perceived severity to believe there are effective ways of preventing the disease. This belief in effective prevention of HIV/AIDS is also found among people with high future orientation, those who are inclined to worry about falling ill; it is expressed by men more than women. The Nagelkerke R^2 coefficient of 0.435 suggests that 43.5% of the overall variation in the belief in effective prevention of HIV/AIDS is

predicted by the variables in the model. The model predicted correctly the belief in effective HIV/AIDS prevention 86.9% of the time.

In the case of SARS, preventive measures were being implemented as the outbreak progressed. The interviews took place in the midst of the crisis as the country and the region were coping with this completely new threat. No clear indication of effective prevention was in sight but through a steep learning process several effective preventive measures were being identified and the information transmitted from the experts to the public daily through various mass media including radio, newspapers, the Internet, regular television, and a dedicated television channel set up specifically for that purpose. This special situation may explain the respondents’ very low perceived severity of SARS and their very high sense of susceptibility to it as ways of transmission encroached into people’s daily life, for example: droplets from the sneezing or coughing of an infected person, and the touching of infected commonly used objects such as eating utensils, buttons in elevators, and door handles [29,49].

5.2. The public image of the diseases

The second assumption to be explored here is that in contrast to SARS, the overall negative social ‘image’ of HIV/AIDS as a disease associated with particular types of individuals tends to weaken people’s perception of susceptibility and, correspondingly, tends to discourage public support for robust preventive efforts at the community level. As suggested earlier, this assumption may be examined using Reiss and Oliveri’s [43] concept “community’s punctuation of an event” and the three conditions – accountability, duty, and competence – these authors identified as requirements for the community’s positive response. In the case of HIV/AIDS and SARS the focus is the community’s endorsement of disease prevention and containment plans and their active collaboration in prevention efforts.

When does the problem begin and when does it end and who is involved? The answers to these questions mark the community’s punctuation of crises and show that the punctuation of the SARS outbreak was rather different from that of HIV/AIDS. The punctuation of the SARS outbreak as a crisis was very clear. SARS was imported into Singapore at the end of February, 2003, when an infected vacationer returned home

from Hong Kong where she caught the infection while staying at the same Hong Kong hotel where a doctor from Guangzhou, China who had treated SARS patients there, was residing [50]. The unknown cause and nature of the disease deterred the assignment of blame or accountability. SARS patients were not held accountable for their illness. Nor were they assumed to have the expertise to solve the problem on their own although it soon became a duty for people with the publicized symptoms to seek immediate expert medical help [29,51]. The findings from the SARS study in Table 2 show that 75.9% of the respondents made a positive appraisal of the health authorities' management and control of the SARS crisis; 77.4% had the chance to express their opinions to the authorities; 91.3% were prepared to be quarantined for 10 days after close contact with an infected person and 71.6% would agree to be quarantined even if there was non-close contact. Further indications of the public's willingness to collaborate in preventive efforts against SARS were the very positive attitudes of the majority of respondents: although about one of every two agreed that preventive measures taken against SARS "have affected my personal choice and freedom in life", most respondents (95.3%) agreed that "people should be willing to make some personal sacrifices" to contain the epidemic and 86% felt that "people have mostly been socially responsible".

The findings from the logistic regression analysis of the SARS study data confirm that this sense of social responsibility was a fundamental manifestation of the community's positive and compassionate 'image' of SARS patients and it was significantly associated with their endorsement of the health authorities' management of the crisis in the total sample as well as among people with lower education, and ethnic minorities such as the Singaporean Malays (Table 3). Among the 1202 respondents, the endorsement of the health authorities' crisis management was particularly supported by people who perceived the community as being socially responsible; those who believed that the crisis justified making some personal sacrifices (especially with regard to movement outside their homes, restricting or changing their travel patterns, and abiding by quarantine regulations); those felt that they had the chance to be part of the effort and express their personal opinions; people who had formed an opinion on their personal susceptibility to the infection (in contrast to those

who had no or very little information on SARS). The Nagelkerke R^2 coefficient of 0.139 suggests the factors in the model explain 13.9% of the variation in endorsement of the crisis management in the total population. The analysis of the same factors was repeated among three specific subgroups that have shown less positive appraisal of crisis management: the senior cohort (respondents aged 60 and older), the lower educated (people with only primary or lower education), and Malays. As illustrated in Table 3, even among the lower educated and the Malay, the sense of social responsibility was significantly associated with their endorsement of preventive efforts (dependent variable). However, perceived susceptibility to SARS did not influence significantly the appraisal of crisis management by the seniors and the less educated but it did among Malays in the expected direction: persons who have no idea of their susceptibility (no awareness of it) were most likely to give a negative appraisal of crisis management. No significant impact of perceived severity upon people's appraisal of crisis management was detected in the total sample or any of the three subgroups. Overall, the Nagelkerke R^2 coefficients indicate that, compared to the total sample, variables in the model helped explain a larger proportion of the variance in the dependent variable among subgroups such as seniors (43.7%), the less educated (33.8%) and the Malay community (29.0%) about 80% of the time. These figures point to the importance of variations the perception of and responses to crises among different segments of the population given their differences in life experiences, in knowledge and level of information on the problem, and in cultural values and beliefs, among other factors.

As indicated earlier, from the contextual perspective proposed by Reiss and Oliveri [43] the public image of a crisis or stressor (e.g., an infectious disease epidemic) refers to the public's perception of its scope and its social acceptability. In terms of the scope of the problem – when it begins and when it ends – the quiet and prolonged way in which the HIV virus enters and destroys the immune system represents a major challenge for the mobilization of public interest and support of testing. Visible signs of the disease tend to appear only in the late stages. The opposite occurred with respect to SARS. Two separate studies of the awareness of health threats in the United Kingdom confirm these findings on impact of the public image of the problem and punctuation or scope of the event: British

lay respondents and journalists were inclined to see AIDS as a “far-flung” risk of no immediate relevance to their lives [62,63].

Regarding social acceptability, if the stressor is seen by the community as the consequence of socially unacceptable behavior, one would expect collective apathy or reluctance or opposition to the investment of public funds and efforts to contain and solve the problem. The findings in Tables 2, 3 and A.4 suggest that this appears to be the case with HIV/AIDS. The public image of HIV/AIDS tends to be shaped by normative expectations or stereotypes in the community. The large majority of the respondents (88.5%) associated a particular lifestyle with the contracting of the disease thus forming negative images of people living with HIV/AIDS. As shown in Table 1, over half of the respondents (57%) saw them as “risk-takers”: people who engage in activities that put them at risk of infection such as having multiple sexual partners or procuring the services of commercial sex workers. Another 26% of the respondents associated them with people who engage in ‘deviant’ activities such as commercial sex workers and injecting drug users who exchange infected needles. A small group (5.5%) considered them as “victims” of “fate” or “bad luck” or accidental infection. Only 11.5% of the respondents did not have an opinion or image of people living with HIV/AIDS. Practically all in this group had no information on HIV/AIDS.

Table 4 presents some of the factors that contribute to the formation of a particular ‘image’ of people living with HIV/AIDS. The odds of seeing them as ‘victims’ (column b) were significantly higher among older people, those who do not think HIV/AIDS is a serious and deadly disease; and those who do not believe there is an effective way of preventing the illness. Interestingly, the same features are exhibited by the small group who did not put a label on people living with HIV/AIDS (column a): they tend to be older, unaware of the severity of the disease, and unaware of any effective preventive measures. The odds of perceiving HIV/AIDS sufferers as ‘risk-takers’ that is, associating a ‘risk-taking’ life style with HIV/AIDS infection (column c), decreased by 45% among men; increased significantly among people who worry about falling ill and those who believe that there are effective ways of preventing the disease. The most negative ‘image’ or lifestyle associated with HIV/AIDS infection is that labeled ‘deviants’ (column d). The odds of having this

image of HIV/AIDS sufferers increase significantly among women in contrast to men; among younger people in contrast to people who are 60 or older; among those believe the disease is very severe, and among people who do not worry much about falling ill. The Nagelkerke R^2 coefficients indicate that the variables in the model explain 45.6% of the overall variation in emphasis on the ‘victim’ image; 19.5% of the emphasis on the ‘risk-takers’ image; 16.9% of the emphasis on the ‘deviant’ image, and 58.1% of the variance on the absence of a stereotypical image of HIV/AIDS sufferers. This variable is explained correctly by the variables in the model 92.7% of the time (Table 4). These findings fit the international pattern: the presence of stereotypical images of people who get infected with HIV/AIDS is not restricted to a particular country [23,61].

5.3. Governance and epidemics

State regulations on infectious diseases such as notification and surveillance systems have been in place for more than a century in many countries [30,52] and today they are followed by all state members of the United Nations including Singapore [53]. But the official approach to the control and prevention of HIV/AIDS differs widely from that of SARS and the difference has to do with the public image of the disease discussed in the preceding sections.

The experience of SARS in Singapore provides an interesting illustration of the positive synergy between national governance and global health governance. The main features of the state’s crisis management approach illustrate the situation well. Those features were: (a) transparency; (b) public education; (c) multi-pronged approach; (d) legislation.

In contrast to the situation in China and some other affected countries at the onset of the epidemic [54,55], the SARS situation in Singapore was characterized throughout by transparency on the part of the health authorities in their reporting and distribution of a continuous flow of information to the public on new infections and deaths, locations, and contact tracing efforts and approaches. It was believed that an informed public can collaborate better and participate more effectively in containing the spread of the disease than a public kept ignorant of the seriousness of the situation. News reports on the progress of the epidemic were transmit-

Table 4
Logistic regression model predicting respondents' perception of people living with HIV/AIDS

Variables in the model	Estimated odds ratios [exp(B)]			
	(a) No labels	(b) "Victims"	(c) "Risk-takers"	(d) "Deviants"
Socio-demographic factors				
Gender: female (1)	0.696	0.949	0.450****	2.682****
Age: 50 years old or older (1)	3.330***	2.346**	1.179	0.415***
Ethnicity: Chinese (1)	3.299	0.622	1.117	1.089
Marital status: single (1)	0.579	0.692	1.396	0.805
Religion: Muslim (1)	2.708	0.784	0.917	1.247
Social class factors				
Occupation: service sector (1)	1.644	0.989	0.890	1.177
Personal income: <S\$ 500 (1)	1.645	1.410	0.787	1.012
Education: 11 years or higher (1)	0.000	0.765	0.749	1.456
Attitudinal factors				
Worry about falling sick: yes (1)	0.441	1.115	1.509*	0.582**
Future orientation: high (1)	1.045	0.903	1.003	0.963
Personal control: high (1)	0.652	0.682	1.334	0.892
Life satisfaction: high (1)	0.920	1.038	0.942	1.041
Perceived severity: high (1)	0.192****	0.234****	1.534	4.055***
Perceived susceptibility: high (1)	0.918	1.313	0.902	1.107
Believe in effective prevention (1)	0.070****	0.085****	4.535****	1.941
Nagelkerke R^2	0.581	0.456	0.195	0.169
Variance predicted correct (%)	92.7	89.0	68.3	75.0

Notes: total sample size, 660.

* Statistically significant at $p=0.04-0.05$.

** Statistically significant at $p=0.01-0.03$.

*** Statistically significant at $p=0.001-0.009$.

**** Statistically significant at $p=0.0001$ or lower.

ted to the public through all printed media, radio and television in all the four official languages (Mandarin, Malay, Tamil and English). Exceptional measures were taken to reach as many people as possible throughout Singapore: broadcasting was resumed temporarily in some of the Chinese dialects that had not been used in TV for nearly two decades; a new dedicated TV channel was set up, SARSTV. Singapore was the only country affected by SARS to set up this public service [56]. Informing the public on the development of the epidemic went hand-in-hand with public health education whereby public information on the current state of knowledge on the disease was constantly updated at various levels of sophistication, from medical and epidemiological data in specialized publications [57,58] to newspaper articles explaining how the coronavirus attacks a healthy cell, to cartoons illustrating the proper use of masks, of serving utensils, and to take one's temperature correctly with a thermometer, and how to wash hands thoroughly, among other things.

It was evident to the authorities and the population that the SARS epidemic affected the daily life activities of every citizen and demanded drastic changes in lifestyle. This realization led to the implementation of a multi-pronged approach to deal with the crisis. All relevant ministries, statutory boards and other organs of the state were mobilized and non-governmental organizations and the private sector joined the effort. This approach was in fact a typical response in Singapore as "ministries and government agencies had honed emergency preparedness to a fine art" [49]. Part of that preparedness was the use of legislation including quarantine laws and other preventive measures. For example, Section 10 of the Infectious Diseases Act was amended with effect from 27 April 2003 requiring "medical or dental practitioners to obtain information from their patients and transmit such information to the Director [of Medical Services] to investigate the outbreak or prevent the spread of an infectious disease such as SARS"; a new "Patient Declaration

Form” was used for this purpose during the outbreak [51].

While transparency, public education, the implementation of a multi-pronged approach, and the use of legislation were characteristics of the national government’s response internally, there was also transparency and close collaboration of Singapore with the WHO and other international organizations. In his global analysis of the epidemic, Fidler highlights this feature: “Singapore was initially scheduled to be removed from the [WHO’s] list of SARS-affected areas on 11 May; but, on that date, Singapore reported a new case of SARS to WHO, an indication of Singapore’s commitment to open reporting and cooperation with WHO” [28]. A sovereign state’s abiding to international guidelines, even at the expense of its own economic interests, illustrates the importance of “global health governance” to deal with infectious disease epidemics and similar health threats in the 21st century.

The control and prevention of HIV/AIDS has followed a different approach. Fidler [30] correctly highlights “the conceptual and policy shifts” from standard procedures applied to infectious diseases by the WHO and public health experts. The International Health Regulations (IHR) “are the only set of international legal rules binding on WHO member states concerning the control of infectious diseases” [30]. Yet, in Fidler’s view, one distinguishing feature of the official international approach to deal with the HIV/AIDS epidemic was that public health experts and the WHO did not follow the IHR’s classical “Westphalian” model – that emphasizes state sovereignty and non-intervention – to deal with infectious diseases “but rather turned to international human rights law to provide governance norms for the fight against this new plague” [30]. This conceptual shift was unique. The approach to HIV/AIDS was “the first time in history [that] preventing discrimination towards those affected by an epidemic became an integral part of a global strategy to prevent and control an epidemic of infectious disease” [59,30]. Danziger [26] suggests that this conceptual shift was promoted and supported by the “neoliberal democratic ideology” prevalent in Western countries by the end of the 20th century and enthusiastic enough to lead some countries to abandon the compulsory surveillance methods and “placing protection of individual rights on a par with (or even above) the protection of the public health”.

Apart from the ideological angle, the WHO’s concern with human rights and particularly with the matter of discrimination of people living with HIV/AIDS has its roots in actual manifestations of social stigma associated with the presumed lifestyle of the first persons affected by the disease. In June and July, 1981, five young homosexual men were diagnosed with pneumocystis carinii pneumonia and 26 young homosexual men with Kaposi’s sarcoma “a rare form of cancer which had until then been associated with elderly Americans”; added to the spectrum of AIDS features in the early 1980s was the confirmation that one of the main forms of transmission is sexual intercourse [26]. The spread of the epidemic has been so extensive geographically as well as socially, that people living with HIV/AIDS today come from all walks of life. But as the figures in Appendix A, Table A.1 indicate, the highest prevalence of HIV are still found among some distinct lifestyle groups including commercial sex workers and injecting drug users. The survey data discussed in the preceding sections suggest that the public image of HIV/AIDS reflects the prevalence figures among some specific groups; a large majority of respondents saw HIV/AIDS sufferers as following their lifestyle by personal choice. Thus, their image remains negative despite public education efforts by the WHO, non-state organizations and non-governmental organizations. An additional aspect is the slow pace of development of the disease: people may be infected for many years without developing any symptoms and may thus continue unwittingly to infect others [26].

The global governance approach to protect people with HIV/AIDS from discrimination involves avoidance of disclosure of one’s health condition and of routinely or compulsory name-linked testing and other features of standard infectious disease surveillance. Danziger [26] sees this position as “possessive individualism” that demands testing to be done only if the person has consented freely and has received full information on the consequences through the process of informed consent. Moreover, Danziger points out that with the current stage of knowledge on HIV/AIDS, “there is little or no gain for a HIV-infected person to be tested and identified as HIV-positive” [26]. This reasoning creates a dilemma because experts agree that standard infectious disease surveillance is indispensable for the effective prevention and control of infectious diseases [3,14–20,30,52] that is, the beneficiaries of

effective control and prevention are the rest of the community. According to Danziger [26] the dilemma has been sorted out internationally by an apparent consensus of stakeholders to consider HIV/AIDS as “a crisis of human rights” and not as a “public health crisis”. However, with the epidemic proceeding unrelentingly, there are signs of concern. A recent development in Singapore is illustrative of the range of opinions on this matter: The Ministry of Health announced on 15 July 2005 that “spouses of patients with HIV will be informed of their partner’s illness, regardless of whether the infected person agrees” [60]. The newspaper report cited the case of four women who discovered they had HIV when they did their blood test during their pregnancies. The husband of one of them had been diagnosed with HIV since 2001. Previously, patients were counseled and informed consent was required. Now the doctor needs only to keep the patient “appropriately informed”. The spouses will be informed “in a sensitive manner” by trained personnel of a new HIV Prevention Unit. The Infectious Diseases Act will be invoked as is the case with all other infectious diseases [60]. The Singapore shift towards a version closer to standard surveillance of HIV/AIDS is indicative of its concern for the rights of the infected person as well as the rights of the patient’s partner, and of all other persons involved. The global governance of HIV/AIDS prevention needs to address the public image of the disease and the impact that such an image has upon efforts to mobilize the community in prevention efforts. For as long as HIV/AIDS is seen as a problem of particular lifestyles (that is, of specific types of people), prevention efforts such as condom use and testing are bound to have limited impact.

6. Conclusion

The analysis was based on data from two separate studies of Singapore residents’ attitudes and behavior. Given the differences in questions asked during the respective interviews, the 10-year difference between studies and the significant differences in the etiology, nature, and development of the two infectious diseases, the findings must be treated with caution. That said, the availability of data from the two studies offered a good opportunity for this exploratory comparison of attitudes towards and the public image of HIV/AIDS and

SARS in search of a better understanding of the social obstacles to effective prevention against HIV/AIDS.

This exploratory comparison was guided by two main assumptions. The first assumption was that a higher perception of disease severity and personal susceptibility to SARS as compared to the level of perceived susceptibility to and severity of HIV/AIDS, contributed to the difference in effectiveness of prevention efforts. The data from the Singapore study support that assumption partially and revealed a new aspect of the problem. Perceived susceptibility was high for SARS but relatively low for HIV/AIDS. The opposite was found for perceived severity. The findings suggest that among the complex set of factors that motivate people to take preventive measures, perceived susceptibility to the disease (your subjective assessment of the likelihood of becoming infected) is more relevant than perceived severity of the disease. The data show a strong tendency for people to consider HIV/AIDS as peculiar to certain types of people different from themselves. Thus their belief that their chances of being infected with the HIV virus are remote is not surprising. These findings on low perceived susceptibility and high perceived severity are also meaningful in the context of the second assumption tested.

The second assumption explored in this study was two-fold: (a) that in contrast to SARS, the overall negative social ‘image’ of HIV/AIDS as a disease associated with particular types of individuals tends to weaken people’s perception of susceptibility; (b) that correspondingly, low perceived susceptibility tends to discourage public support for robust preventive efforts at the community level. The findings verify and clarify these assumptions. Only 3 out of every 10 respondents expressed high perceived susceptibility to HIV/AIDS compared to 8 out of every 10 in the case of SARS. But, as mentioned above, it was also found that the perceived severity of HIV/AIDS was significantly higher than the perceived severity of SARS. More importantly, the labeling of people living with HIV/AIDS as ‘risk-takers’ or ‘deviants’, was expressed by nine out of every 10 of the respondents who believed HIV/AIDS was an incurable disease (high perceived severity) and believed that the disease is mostly linked to one’s lifestyle choice. The challenge for health authorities is to enhance the population’s perceived susceptibility to HIV/AIDS. The first step in this direction is the widespread distribution of accurate, clear and consis-

tent information on the ‘silent’ nature of the disease in its early stages.

The second part of this assumption was on the mobilization of the community’s endorsement and active participation in the control and prevention of the epidemics. I have discussed the elements involved including the community’s punctuation of the crisis and the aspects of accountability, duty, and competence. In the case of epidemics, competence is typically found at the community level and this brings us to the question of governance: how does a government deal with the health crisis represented by an infectious disease epidemic? Much has been learned over the centuries around the world but each new epidemic brings new dangers. The SARS outbreak tested the state’s level of emergency preparedness and commitment to transparency particularly in Asian countries, but it also highlighted the need for global governance of health threats that cut across national boundaries. In contrast, the HIV/AIDS epidemic still represents a challenge in terms of public health, political ideology, human rights, and social discrimination. The lack of success in the control and prevention of the epidemic highlights the fact that after nearly three decades the global governance of HIV/AIDS is still a work-in-progress. The urgency of the problem is well recognized by most world leaders and specialists with some experts warning that “new threats to [world] stability and secu-

rity may emerge as the pandemic escalates” because, among other reasons, large numbers among police and armed forces in many countries and UN peacekeeping forces are getting infected [27]. The current global governance of HIV/AIDS requires critical scrutiny, as well as active exploration of solutions – among all types of stakeholders with differing ideological and social perspectives – to the slackness of preventive efforts against the two main behaviors that are sustaining the epidemic: “high-risk sexual activity and drug use” [27]. One aspect of that critical scrutiny is the systematic and comparative analysis of HIV/AIDS global governance with the global governance of other infectious disease epidemics that have been successful. In sum, the findings on the SARS and HIV/AIDS experiences suggest that health authorities need to navigate effectively the local and global obstacles to prevention by: (a) enhancing the public’s understanding of the etiology of HIV/AIDS, its modes of transmission and effective preventive measures; and (b) correcting the lay public’s inaccurate perception of personal susceptibility and ‘the punctuation of the event’.

Appendix A. Epidemiological situation of HIV/AIDS and SARS and study variables

Tables A.1–A.4.

Table A.1

Epidemiological situation of HIV/AIDS in selected East Asian and Southeast Asian countries, 2004^a

Country	Estimated number of people infected with HIV as of December 2003	Proportion of total adults 15–49 affected (low-high estimate)	Estimated number of deaths due to AIDS as of December 2003 (low-high estimate)	Category of people with highest HIV prevalence in 2003 ^b
China	840000	0.10–0.20	21000–75000	IDUs (44–85%)
Thailand	570000	0.80–2.80	34000–97000	SWs (33%)
Vietnam	220000	0.20–0.80	4500–16000	IDUs (63%)
Indonesia	110000	0.01–0.20	1100–4100	IDUs (34%)
Malaysia	52000	0.20–0.70	1000–3600	NA
Japan	12000	0.01–0.09	400–900	SWs ^c
Philippines	9000	0.01–0.09	<500	SWs ^d
Korea (Republic of)	8300	0.01–0.09	<200	SWs ^e
Singapore	4100	0.10–0.50	<200	NA

^a Source: figures reported by the World Health Organization for 2003 by country in WHO [44].

^b Country-specific data reported by WHO indicate three main categories of infected adults: injecting drug users (IDU), sex workers (SWs), and people infected through blood transfusions (BTs).

^c The rate of SWs’ infection for Japan is not available but WHO reports that in 2000, 78% of newly diagnosed cases were acquired through sexual contact.

^d The rate of SWs’ infection for Philippines is not available. However, WHO estimates that 90% of HIV infections are sexually transmitted and the prevalence of sexually transmitted diseases among SWs is around 40%.

^e The rate of SWs’ infection for South Korea is not available. However, WHO estimates that 96% of HIV infections are sexually transmitted.

Table A.2
Worldwide epidemiological situation of SARS, 2002–2003^a

Country	Cumulative number of cases	Number of deaths	Date onset	
			First probable case	Last probable case
China	5327	349	16 November 2002	3 June 2003
Hong Kong	1755	299	15 February 2003	31 May 2003
Taiwan	346	37	25 February 2003	15 June 2003
Canada ^b	251	43	23 February 2003	12 June 2003
Singapore	238	33	25 February 2003	5 May 2003
Vietnam	63	5	23 February 2003	14 April 2003
United States ^c	27	0	24 February 2003	13 July 2003
Philippines ^d	14	2	25 February 2003	5 May 2003
Other countries ^e	75	6	26 February 2003	1 April 2003
Total	8096	774		

^a Source: World Health Organization [45].

^b Only two locations in Canada had local-transmission cases: the Greater Toronto Area and New Westminster in the Greater Vancouver Area (WHO [46]).

^c All the 27 cases reported in the United States were imported cases.

^d In the Philippines, all reported local-transmission cases were from Manila (WHO [46]).

^e Twenty-one other countries had from 1 to 9 SARS cases: Australia, Macao, France, Germany, India, Indonesia, Italy, Kuwait, Malaysia, Mongolia, New Zealand, Ireland, South Korea, Romania, Russia, South Africa, Spain, Sweden, Switzerland, Thailand, and United Kingdom.

Table A.3
Measurement of attitudes and summary statistic—HIV/AIDS study

Measurements	Summary statistics
<p>Internal-external locus of control (personal control over own life)</p> <p>Sometimes I feel I don't have enough control over the direction that my life is taking</p> <p>In my case, getting what I want has little or nothing to do with luck</p> <p>What happens to me is my own doing</p> <p>It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyway</p> <p>When I make plans, I am almost certain I can make them work</p> <p>Many times I feel I feel that I have little influence over the things that happen to me</p> <p>Response categories: strongly agree; agree; undecided; disagree; strongly disagree</p> <p>Original scores range from 1 to 5, with higher scores indicating higher internal (personal) control over one's life. A dichotomized version was used for logistic regression (low, below 19.5; high, 19.5)</p> <p>Source: Robinson JP, Shaver PR. Measures of psychological attitudes. ISR: Ann Arbor, MI; 1973. p. 227–34</p>	<p>Mean, 19.5; S.D., 3.59; sample size, 660; reliability coefficient Cronbach's alpha = 0.612</p>
<p>Life satisfaction scale</p> <p>I feel I have less worries in my life than most people I know</p> <p>I don't seem to have enough time to relax nowadays</p> <p>It is harder for me to cope with life's pressures than for most of the people I know</p> <p>Response categories: strongly agree; agree; undecided; disagree; strongly disagree</p> <p>Original scores range from 1 to 5, with higher scores indicating higher life satisfaction. A dichotomized version was used for logistic regression (low, below 9.84; high, 9.84 and higher)</p> <p>Source: Robinson JP, Shaver PR. Measures of psychological attitudes. ISR: Ann Arbor, MI; 1973</p>	<p>Mean, 9.84; S.D., 2.1; sample size, 660; reliability coefficient Cronbach's alpha = 0.479</p>

Table A.3 (Continued)

Measurements	Summary statistics
<p>Future-orientation</p> <p>With things as they are today, any intelligent person ought to think about the present and not worry about the future</p> <p>Any person with the ability and willingness to plan for the future has a good chance of being successful</p> <p>Problems can always be solved if one has prepared for eventualities</p> <p>Planning for the future is a waste of time because things are always changing</p> <p>Response categories: strongly agree; agree; undecided; disagree; strongly disagree</p> <p>Original scores range from 1 to 5, with higher scores indicating higher future-orientation. A dichotomized version was used for logistic regression (low, below 14.6; high, 14.6 and higher)</p> <p>Source: Robinson JP, Shaver PR. Measures of psychological attitudes. ISR: Ann Arbor, MI; 1973</p>	<p>Mean, 14.5; S.D., 2.45; sample size, 660; reliability coefficient Cronbach's alpha = 0.595</p>
<p>Perceived severity of AIDS</p> <p>When you think about AIDS, how serious do you feel it is? For example, do you believe that AIDS is</p> <p><i>Very serious</i> because it can cause death and has no cure</p> <p><i>Serious</i> but has some partial cure</p> <p><i>Only mildly serious</i> because does not cause death</p> <p><i>Not serious at all</i></p> <p>Scores range from 4 (very serious) to 1 (not serious at all). For the logistic regression analysis these response categories were dichotomized: (1) "very serious" vs. (0) all other responses</p>	<p>Mean, 0.856; S.D., 0.351; sample size, 660</p>
<p>Perceived susceptibility to HIV/AIDS</p> <p>"AIDS doesn't happen to people like me"</p> <p>This statement is part of a series involving cancer, heart disease and AIDS.</p> <p>Respondents were asked to tell the interviewer if they strongly agree (SA), agree (A), disagree (D) or strongly disagree (SD) with each statement</p> <p>Scores range from 1 (SA) to 5 (SD), with higher scores indicating higher perceived susceptibility</p> <p>For the logistic regression analysis these response categories were dichotomized: (1) "SA/A" vs. (0) all other responses</p>	<p>Mean, 0.315; S.D., 0.464; sample size, 660</p>
<p>Belief in effective HIV/AIDS prevention</p> <p>"Is there an effective way of protecting yourself from AIDS?"</p> <p>The responses were scored as "YES" (1) vs. "NO" (0)</p>	<p>Mean, 0.828; S.D., 0.376; sample size, 660</p>
<p>Dependent variable: perception of people living with HIV/AIDS</p> <p>"What kind of people do you think are most likely to get HIV/AIDS?" During the personal interviews this open-ended question was preceded by identical questions for cancer and heart disease. Factor analysis of the responses revealed three categories or 'images': (a) "victims" of "fate" or "bad luck" or accidental infection; (b) "risk-takers": people who engage in activities that put them at risk of infection such as having multiple sexual partners or procuring the services of commercial sex workers; (c) people who engage in 'deviant' activities such as commercial sex workers and injecting drug users who exchange infected needles. A fourth category comprises a small group of respondents who did not label people living with HIV/AIDS. Each of the four categories is examined using separate logistic regression analyses (see Table 4)</p>	

Table A.4
Logistic regression model predicting respondents' belief in effective HIV/AIDS prevention^a

Variables in the model	Estimated odds ratios [exp(B)]
Socio-demographic factors	
Gender: female (1)	0.439***
Age: 50 years old or older (1)	0.743
Ethnicity: Chinese (1)	0.388
Marital status: single (1)	1.291
Religion: Muslim (1)	1.784
Social class factors	
Occupation: service sector (1)	0.715
Personal income: <S\$ 500 (1)	0.661
Education: 11 years or higher (1)	1.732
Attitudinal factors	
Worry about falling sick: yes (1)	2.289**
Future orientation: high (1)	3.362****
Personal control: high (1)	1.583
Life satisfaction: high (1)	1.224
Perceived severity: high (1)	9.518****
Perceived susceptibility: high (1)	1.318
Nagelkerke R^2	0.435
Variance predicted correct (%)	86.9

^a See Table A.3 for the description of measurement of belief in effective prevention. Total sample size: 660.

** Statistically significant at $p=0.01-0.03$.

*** Statistically significant at $p=0.001-0.009$.

**** Statistically significant at $p=0.0001$ or lower.

References

- [1] Beckett SW. The history of painting. Washington, DC: DK Publishing and National Gallery of Art; 1994.
- [2] Sontag S. Illness as a metaphor and AIDS and its metaphors. London: Penguin; 1990.
- [3] Harrison M. Disease and the modern world. 1500 to the present day. Cambridge, UK: Polity Press; 2004.
- [4] Boulé JP. HIV stories: the archaeology of AIDS writing in France, 1985–1988. Liverpool: UP; 2002.
- [5] Krüger M. Narrative in the time of AIDS: postcolonial Kenyan women's literature. *Research in African Literatures* 2004;35(1):108–29.
- [6] Kuhnheim JS. The evil of the 20th century: poetry and AIDS. *Revista de Critica Literaria Latinoamericana* 2003;29(58):115–29.
- [7] Hodgen J. On finding in a book of poems by Norman Dubie, a 25-year-old letter from the bookbinder to my cousin now dead of AIDS. *American Poetry Review* 2003;32(2):41.
- [8] Bourgault LM. Playing for life: performance in Africa in the age of AIDS. Durham: Carolina Academic Press; 2003.
- [9] Trouwborst B. Choreographer Mark Siczak's 'living with AIDS' with the dance-factory in Ghana. *Ballettanz* 2002;11:74–5.
- [10] Corber RJ. Nationalizing the gay body: AIDS and sentimental pedagogy in 'Philadelphia'. *American Literary History* 2003;15(1):107–33.
- [11] Yanka K. Narrative in times of crisis: AIDS stories in Ghana. *Journal of Folklore Research* 2004;41(2–3):181.
- [12] Arnoldi MJ. Playing for life: performance in Africa in the age of AIDS. *Research in African Literatures* 2005;36(1):121–2.
- [13] Zinsser H. Rats, lice and history. London: Penguin; 2000.
- [14] Evans AS, Brachman PS. Emerging issues in infectious disease epidemiology. *Journal of Chronic Diseases* 1986;39(12):1105–24.
- [15] Garfield E. Mapping the world of epidemiology. 1. The disease detectives. *Current Contents* 1988;35:3–11.
- [16] Stephenon J. Disease detectives are turning to molecular techniques to uncover emerging microbes. *Journal of the American Medical Association* 1996;3:176.
- [17] Waggoner PE, Aglor DE. Epidemiology: a science of patterns. *Annual Review of Phytopathology* 2000;38:71.
- [18] Richardson K. 21st century detectives—the laboratory professional in the prevention of infectious disease. *Laboratory Medicine* 2000;31(5):256–62.
- [19] Tomes N. The making of a germ panic, then and now. *American Journal of Public Health* 2000;90(2):191–8.
- [20] Vastag B. Disease detectives celebrate 50 years of successful sleuthing. *Journal of the American Medical Association* 2001;285(15):1947–9.
- [21] Berkman A, Garcia J, Munoz-Laboy M, Paiva V, Parker R. A critical analysis of the Brazilian response to HIV/AIDS: lessons learned for controlling and mitigating the epidemic in developing countries. *American Journal of Public Health* 2005;7(95):1162–72.
- [22] Emler CA. Measuring stigma in older and younger adults with HIV/AIDS: an analysis of an HIV stigma scale and initial exploration of subscales. *Research on Social Work Practice* 2005;15(4):291–300.
- [23] Paxton S, Gonzales G, Uppakaew K, Abraham KK, Okta S, Green C, et al. AIDS-related discrimination in Asia. *AIDS Care* 2005;17(4):413–24.
- [24] Kim JY. The 3 by 5 initiative. Treat three million people living with HIV/AIDS by 2005. In: Plenary address by Director of HIV/AIDS, WHO at the seventh international congress on AIDS in Asia and the Pacific; 4 July 2005, <http://www.who.int/3by5/news49/en/print.html>.
- [25] World Health Organization [WHO] position statement on condoms and HIV prevention; 2004, http://www.who.int/hiv/pub/prev_care/statement/en/index.html.
- [26] Danziger R. The HIV/AIDS epidemic: public policies and possessive individualism. In: Whitman J, editor. *The politics of emerging and resurgent infectious diseases*. London: Macmillan; 2000. p. 130–46.
- [27] Garrett L. The lessons of HIV/AIDS. *Foreign Affairs* 2005;84(4):51–64.
- [28] World Health Organization. WHO guidelines for the global surveillance of severe acute respiratory syndrome (SARS). Updated Recommendations October 2004. Geneva: Department of Communicable Disease Surveillance and Response, WHO; 2004.

- [29] Quah SR, Lee HP. Crisis prevention and management during the SARS outbreak, Singapore. *Emerging Infectious Diseases* 2004;10(2):364–8.
- [30] Fidler DP. SARS, governance and the globalization of disease. New York: Palgrave; 2004.
- [31] World Health Organization. WHO global conference on severe acute respiratory syndrome (SARS)—where do we go from here? Geneva: WHO; 2003, http://www.who.int/csr/sars/conference/june_2003/materials/report/en/print.html.
- [32] Gochman DS, editor. Health behavior. Emerging research perspectives. New York: Plenum; 1988.
- [33] Gochman DS, editor. Handbook of health behavior research, vol. 1. Personal and social determinants. New York: Plenum; 1997.
- [34] Glanz K, Rimer BK, Lewis FM. Health behavior and health education. Theory, research and practice. 3rd ed. New York: Jossey-Bass; 2002.
- [35] Smedley BD, Syme SL, editors. Promoting health: intervention strategies from social and behavioral research. Washington, DC: National Academy Press; 2000.
- [36] Baranowski T, Perry CL, Parcel GS. How individuals, environments, and health behavior interact. Social cognitive theory. In: Glanz K, Rimer BK, Lewis FM, editors. Health behavior and health education. Theory, research and practice. 3rd ed. New York: Jossey-Bass; 2002. p. 165–84.
- [37] Strecher VJ, Champion VL, Rosenstock IM. The health belief model and health behavior. In: Gochman DS, editor. Handbook of health behavior research, vol. 1. Personal and social determinants. New York: Plenum; 1997. p. 71–91.
- [38] Janz NK, Champion VL, Strecher VJ. The health belief model. In: Glanz K, Rimer BK, Lewis FM, editors. Health behavior and health education. Theory, research and practice. 3rd ed. New York: Jossey-Bass; 2002. p. 45–66.
- [39] Quah SR. Ethnicity, HIV/AIDS prevention and public health education. *International Journal of Sociology and Social Policy* 1998;18(8):1–26.
- [40] Heaney CA, Israel BA. Social networks and social support. In: Glanz K, Rimer BK, Lewis FM, editors. Health behavior and health education. 3rd ed. San Francisco: Jossey-Bass; 2002. p. 185–209.
- [41] Coleman JS, Fararo TJ, editors. Rational choice theory: advocacy and critique. Newbury Park, CA: Sage Publications; 1992.
- [42] Boss P. Family stress management. A contextual approach. 2nd ed. Thousand Oaks, CA: Sage Publications; 2002.
- [43] Reiss D, Oliveri ME. Family stress as community frame. In: McCubbin HI, Sussman MB, Patterson JM, editors. Social stress and the family: advances and developments in family stress theory and research. New York: The Haworth Press; 1983. p. 61–83.
- [44] World Health Organization [WHO]. Global atlas of infections – epidemiological fact sheet – 2004 update. Geneva: WHO; 2005, <http://www.who.int-WHO-GlobalAtlasofInfections/index.html>.
- [45] World Health Organization. Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003. Geneva: WHO; 2005, http://who.int/csr/sars/country/table2004_04_21/en/print.html.
- [46] World Health Organization. Summary table of areas that experienced local transmission of SARS during the outbreak period from 1 November 2002 to 31 July 2003. Geneva: WHO; 2005, http://who.int/csr/sars/areas/areas2003_11_21/en/print.html.
- [47] Sanders D, Brynin M. Ordinary least squares and logistic regression analysis. In: Scarbrough E, Tanenbaum E, editors. Research strategies in the social sciences. A guide to new approaches. Oxford: Oxford University Press; 1998. p. 29–52.
- [48] Cambell MJ, Machin D. Medical statistics. Chicago: John Wiley & Sons; 1999.
- [49] Chua MH. A defining moment. How Singapore beat SARS. Singapore: Stanford Press; 2004.
- [50] Chiu W, Galbraith V. Calendar of events. In: Loh C, Civic Exchange, editors. At the epicentre. Hong Kong and the SARS outbreak. Hong Kong: Hong Kong University Press; 2004. p. xv–xviii.
- [51] Tay CSK. Infectious diseases law & SARS. Singapore: Times Editions; 2003.
- [52] Whitman J, editor. The politics of emerging and resurging infectious diseases. London: Macmillan; 2000.
- [53] Cutter JL, Lim WY, Ang LW, Tun Y, James L, Chew SK. HIV in Singapore—past, present and future. *AIDS Education and Prevention* 2004;16(Suppl. A):110–8.
- [54] Zhao J. The SARS epidemic under China’s media policy. *Media Asia* 2003;30(4):191–6.
- [55] Lee AYL. Online news media as interactive community bulletin boards. Coverage of SARS in the greater China regions. *Media Asia* 2003;30(4):197–204.
- [56] Aquilia P. The SARS channel in Singapore. *Media Asia* 2003;30(4):206–15.
- [57] Quarantine Epidemiology Department. Severe acute respiratory syndrome (SARS). *Epidemiological News Bulletin* 2003;29:3 [full issue] [Singapore].
- [58] Quarantine Epidemiology Department. Update on SARS in Singapore. *Epidemiological News Bulletin* 2003;29:4 [full issue] [Singapore].
- [59] Mann JM. Human rights and AIDS: the future of the pandemic. In: Mann JM, Gurskin S, Grodin MA, Annas GJ, editors. Health and human rights: a reader. London: Routledge; 1999. p. 216–26.
- [60] Khalik S. HIV patients’ spouses will now be told. New rule overrides patient confidentiality in order to protect the vulnerable. *The Straits Times* 2005;15:3.
- [61] Lichtenstein B. AIDS as a social problem. The creation of social pariahs in the management of an epidemic. In: Ritzer G, editor. Handbook of social problems. A comparative international perspective. London: Sage Publications; 2004. p. 316–34.
- [62] Joffe H, Haarhoff G. Representations of far-flung illnesses: the case of Ebola in Britain. *Social Science & Medicine* 2002;54:955–69.
- [63] Washer P. Representations of SARS in the British newspapers. *Social Science & Medicine* 2004;59:2561–71.