

## Chapter 11

# VIRUSES WITHOUT BORDERS: International Aspects of SARS

The SARS outbreak illustrates Marshall McLuhan's prediction that the world would become a 'global village'. It took smallpox centuries just to cross the Atlantic; a few weeks after arriving in Hong Kong from Guangdong, SARS had already spread to 30 countries on five continents. As of July 2003, the direct clinical toll of SARS was already about 8,500 probable SARS cases and more than 800 deaths worldwide. The global economic and social toll has been nothing short of staggering.

The story of SARS in Canada has had international dimensions from the outset. In both Ontario and British Columbia, SARS was imported by Canadians returning from Asia. Conversely, it appears that only three individuals developed SARS after leaving Canada, with onward transmission only by one person who went to the Philippines.

In this chapter we focus on three key international aspects of the SARS outbreak. First, we see again that Canada must have the reporting systems, collaborative mechanisms, and resources in place for other members of the family of nations to be satisfied that we can meet our obligations to contain outbreaks. Second, SARS was the first instance in which the World Health Organization [WHO] issued travel advisories. Not only were the evidentiary foundations for WHO intervention weak, but there are more general concerns about the basis for and effect of travel advisories, including Health Canada's own practices in this regard. Third, the federal government needs to review its measures for disease screening and health-related support at ports of entry to Canada. Airport screening measures, in particular, appear to have little yield.

## 11A. International Background

### 11A.1 Health Canada's Role

*"National boundaries no longer offer isolation or protection from infectious diseases, toxic chemicals, and hazardous products."*

—Lac Tremblant Declaration, 1994

As noted in Chapter 3, in 1992 the Institute of Medicine—a division of the National Academies of Sciences in the United States—released a report describing the growing concerns about the resurgence of infectious diseases.<sup>1</sup> A little less than two years later, Health Canada's Laboratory Centre for Disease Control convened a three-day meeting at Lac Tremblant. Forty leading scientists gathered to discuss and debate the Institute of Medicine report and consider its implications for Canada. Their conclusions were reflected in the "Lac Tremblant Declaration," that recommended the development of national strategies for the surveillance and control of new and resurgent infectious diseases. These recommendations recognized the ongoing emergence of infectious diseases in Canada, such as Lyme Disease (1975), Legionnaires' disease (1976), HIV/AIDS (1981), *E. coli* O157:H7 (1983), hepatitis C (1989), and Hantavirus (1993).

Although some within the federal government accepted the pressing need for a national plan, the available resources were insufficient to allow a comprehensive approach. The Institute of Medicine report and the Lac Tremblant meeting did contribute to the development of the Office of Special Health Initiatives, organized within the Laboratory Centre for Disease Control at Health Canada. Focusing on global mobility and its implications for infectious disease spread, the Office of Special Health Initiatives developed the Travel Medicine and Migration Health programs and the Montebello Process, which

offered advice to other government departments concerning screening of immigrants for infectious diseases. After a Health Canada reorganization in 2000, these activities were incorporated into the new Centre for Emergency Preparedness and Response.

Through its membership in WHO, Canada accepted the obligation to report nationally on only a few diseases (e.g., plague, yellow fever and cholera). As noted in Chapter 9, WHO has been updating its regulations and is developing new standards for surveillance and control of communicable disease. Even in the absence of such international standards, however, multiple observers had already identified a threat to the domestic control of infectious diseases from the lack of a truly national surveillance and reporting system. SARS has now sharply illustrated the international realities that make it untenable for each province or territory to choose when and what infectious disease data to report to other jurisdictions, including the federal government. Measures already recommended throughout this report should, if adopted, rapidly remedy this situation.

### International Collaborations

Collaboration among nations is beneficial to Canada in part by ensuring that the nation has intelligence on emerging disease trends so that citizens and our health systems can be informed and act accordingly. Health Canada works closely with WHO in the area of infectious diseases. Canadian representatives sit on the advisory boards of WHO's Communicable Diseases cluster and the Global Outbreak Alert and Response Network [GOARN]. WHO relies extensively on Health Canada's Global Public Health Intelligence Network [GPHIN]\*, a unique early-warning system mentioned in several previous chapters. GPHIN continuously scans Internet media sources for reports of infectious disease outbreaks around the world. Three Health Canada staff members are seconded to WHO to provide technical advice, support, and training opportunities, but not explicitly to improve liaison. As well, Health Canada's Population and Public Health Branch [PPHB] includes a number of WHO Collaborating Centres, enabling alliances to improve epidemiologic and laboratory response to international issues.

Health Canada has close ties with the US Centers for Disease Control and Prevention [CDC], and the two bodies have engaged in many collaborative programs over the years. Health Canada plays an important role in international working groups, such as those that have recently been created to prepare for the possibility of deliberate transmission of infectious diseases (i.e., bioterrorism). The federal Minister of Health or one of her delegates also represents Canada in other international forums—the Asia Pacific Economic Cooperation forum, for example, recently hosted a meeting of health ministers in Thailand to discuss SARS. Finally, to assist developing countries, Canada provides technical advice and support through Health Canada and to a lesser extent, through the Canadian International Development Agency [CIDA]. As noted in Chapter 10, except in HIV/AIDS, CIDA's health portfolio is modest and includes no involvement in emerging infectious diseases. We believe that Canada's international outreach on emerging infectious diseases should be strengthened, thereby providing meaningful support to developing nations and unique learning opportunities for those preparing for careers in public health.

Other international collaborations that have developed as a result of individual contacts and interests among Health Canada staff include the Caribbean Epidemiology Centre, and joint surveillance of enteric pathogens in some Central and South American countries facilitated through the Pan American Health Organization [PAHO].

Unfortunately, Health Canada lacks an overarching strategy for international collaboration and has not prioritized international activities. Recognizing this weakness, PPHB has been collating its international activities over the past six months to inform strategic development. A deficiency that will need to be addressed as part of this process is the lack of an emerging infectious diseases strategy with strong international elements. SARS has illustrated that our borders do not protect us from disease and that we are constantly a short flight away from serious epidemics. Strengthening the capacity of other nations to detect and respond to emerging infectious disease is important from the point of view of enlightened self interest as well as a global responsibility for a country with Canada's resources.

\* A partnership between WHO and Health Canada, the GPHIN is a unique, early-warning, Internet-based system that provides preliminary public health information about global health risks on a real-time, 24/7 basis. From multiple information sources, including global media outlets, GPHIN gathers and disseminates relevant public health information on disease outbreaks. Basic reports are processed by a computer and then human analysts review each report for relevance and accuracy. From approximately 18,000 total monthly reports received, approximately 3,000 are accessed by WHO, which selects the most urgent for verification with the affected country. GPHIN reports approximately 40% of the outbreaks known to WHO. In addition to infectious disease reports, GPHIN covers environmental contaminants, natural disasters, nuclear safety, product recalls and safety, therapeutics, and bioterrorism. Identified news is electronically disseminated to users, who include government and public health officials in Canada and around the world.

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## 11A.2 World Health Organization

In 1948, the United Nations created the World Health Organization. With 192 member countries, WHO's governance structure includes the World Health Assembly (all member states), an Executive Board (32 health experts), and a Secretariat (3,500 staff) headed by a Director-General. In addition to the headquarters in Geneva, WHO operates six regional offices. The organization's global budget is about US\$1 billion; a portion of this derives from annual contributions from member countries. Canada's contribution for 2003 was over US\$10 million.

Over the last half century, WHO has generally focused on infectious diseases commonly found in developing countries—malaria and tuberculosis, for example. While WHO has engaged in global surveillance of these diseases and has directed specific responses (e.g., immunization campaigns), until recently it lacked the ability to respond to and manage outbreaks. Prior to 2000, WHO employed a relatively passive approach to the international notification of outbreaks of infectious diseases by member states. Data from developing nations were often several years old before their release. Even more importantly, when affected by outbreaks that could potentially have international economic impact (e.g., a reduction in tourism), countries sometimes failed to notify WHO.

The combination of the 1992 Institute of Medicine report on emerging infectious diseases with outbreaks of pneumonic plague in India in 1994 and Ebola in the Congo in 1995 prompted WHO to develop a strategy for more proactive responses. It had (and still has) specified only that plague, yellow fever, and cholera must be reported to WHO by member nations. While formal surveillance efforts are only now being expanded, the partnership with Health Canada to create the GPHIN represented WHO's first step towards a worldwide early warning system for outbreaks. As noted, GPHIN provides global surveillance capacity and bypasses the traditionally slow passage of information from local agencies to national governments and then to WHO. WHO also established the GOARN, a collaboration of over 118 institutions that responds to WHO requests for rapidly mobile teams of experts in infectious disease control within 24 hours of a request by a member state. GOARN has demonstrated its ability to deploy relatively large international teams of epidemiologists, clinicians, statisticians, and logistics personnel in response to outbreaks such as Ebola virus in Gabon and Uganda, severe influenza in Madagascar, and plague in Algeria. Last, during the SARS epidemic, WHO has begun issuing travel advisories for the first time, acting—without explicit authorization by member states—as a trans-national clearinghouse to assess the safety of international travel and, by extension, the effectiveness

of outbreak management efforts in different countries. The Committee heard some concern expressed about a situation in which nations such as Canada are expected to 'report to' the WHO, and what this precedent portends for member states more generally.

## 11B. International Response to SARS

### 11B.1 WHO Response to SARS

WHO issued an unprecedented global health alert on SARS on March 12, 2003. By this time, SARS had already spread from Hong Kong and Guangdong province of China to Viet Nam, Singapore, Thailand, and Canada.

Very early in the outbreak, WHO established contact with affected countries and offered epidemiologic, laboratory, and clinical support. By March 17, 2003, WHO was coordinating an international multi-centre effort that united 11 laboratories in ten countries to identify the causative agent and develop a diagnostic test. Meanwhile, GOARN teams in Hanoi and Hong Kong were collecting clinical and epidemiologic data as well as helping manage the outbreak; Canada participated actively in the GOARN effort in Hong Kong. Through its regional office in Manila, WHO established logistics bases and supply chains to ensure the rapid provision of protective equipment and medicines.

SARS provided a new challenge for WHO's Communicable Disease Surveillance and Response group—it was a non-focal, multi-country outbreak of a hitherto-unknown disease. As we learned in Chapter 6, close international collaboration on laboratory and epidemiologic aspects was successfully brokered by WHO primarily through teleconferences. It also established a secure web page to facilitate international collaboration.

WHO first issued case definitions for SARS on March 15, 2003. At that time, a suspect case was anyone with fever and respiratory symptoms such as cough or shortness of breath. A probable case was someone with close contact with a person diagnosed with SARS and a history of travel to a SARS-affected area, or a suspect case with x-ray findings of pneumonia. These definitions were refined over the following weeks to more accurately detect and exclude cases. Revised definitions issued on May 1 required the fulfillment of four criteria for a suspect SARS case: fever; cough or shortness of breath; an epidemiologic link (close contact with a suspect or probable case; recent travel or residence in an area where local transmission has occurred); and the absence of an alternative diagnosis. A probable SARS case had all the

features of a suspect case plus x-ray, laboratory, or autopsy findings consistent with SARS. WHO was forced to maintain a clinical/epidemiologic definition because no validated, widely available laboratory test for SARS had yet been developed.

We have previously reviewed various criticisms of the SARS case definitions. Even the symptoms that were included in the definition may not have been the most appropriate; an evaluation of the criteria looking specifically at the clinical presentations of Hong Kong patients was published in the *British Medical Journal* on June 21, and it found that the WHO criteria would miss nearly 75% of cases when applied to people presenting early in their course of illness. A further concern has been that the WHO case definition did not distinguish between Toronto, as a so-called “SARS-affected area,” and specific exposure sites that were publicized by both provincial and federal public health officials. As noted in Chapter 5, this sometimes led other countries to treat individuals who had visited Toronto or even transited through Toronto’s Pearson Airport as potential SARS cases. Other provinces and territories worked with the more specific Health Canada definition rather than viewing everyone from the Greater Toronto Area [GTA] with respiratory symptoms and a fever as a possible SARS case.

Criteria for a new disease inevitably must evolve as information about the disease cumulates. Some confusion was therefore inevitable. However, WHO’s criteria meant that records of exported cases used in the WHO assessment for the Toronto travel advisory included individuals who would not have met the Canadian case definition. Rapid contact with countries diagnosing “cases” from Canada usually led to an understanding on both sides. More generally, discrepancies between the WHO definition and those used by individual countries were a recurrent source of confusion in the media.

Only in June at the WHO Global Meeting on SARS in Malaysia did it become clear that many countries had adopted their own case definitions. Surprisingly, this practice was sanctioned by WHO itself. The Committee believes that further attention is needed to determine the respective roles of a body such as WHO and its member states in defining a new disease such as SARS.

### **11B.2 International Experiences**

While the focus in Canada was on the domestic SARS situation, several Asian countries faced even greater challenges in containing their outbreaks. Each outbreak was ultimately controlled through isolating cases, tracing and quarantining contacts, and maintaining vigilance in surveillance efforts. Although SARS seemed

to affect the same populations—mainly health care workers, hospital patients, and household contacts—irrespective of country, there were several key differences in how the outbreaks were managed in the various jurisdictions.

Singapore’s experience is illuminating as its outbreak was similar in magnitude to that faced in Toronto (see Figure 1). Singapore is a city-state with a population of just over four million, comparable to the GTA. In Singapore, a single hospital was designated as the “SARS hospital,” caring for all SARS patients. This hospital liaised with public health in a seamless operation to perform all contact tracing within 24 hours of suspect or probable SARS cases being admitted—a clear contrast with the situation in Toronto.

Those who were placed under quarantine in Singapore received compensation either directly or indirectly from the government. In Canada, only certain employees were eligible for benefits, while those who were self-employed or who did not qualify for benefits suffered from lost income. In Singapore, quarantine orders were issued by a private security company with twice daily calls by videophone. The very few violations that occurred resulted in the use of electronic tracking bracelets. In Toronto, public health staff struggled with massive human resource shortages; at times, they were able to call quarantined individuals only once every three days.

Singapore also benefited from strong leadership with a single point of command-and-control. In fairness, Singapore as a city-state is organized in a much less complex fashion than Canada, where three levels of government were involved in the SARS outbreak. Nonetheless, Dr. Tony Tan, Singapore’s Minister of Health, was clearly in charge. He held daily press conferences each morning, where he shared not only facts but also uncertainties and potential worst-case scenarios, along with actions that Singaporeans could and should take to protect themselves and others. In Canada, multiple public health officials, clinicians, and politicians appeared at various times on news broadcasts, variously generating anxiety with mixed messages or over-reassuring the public.

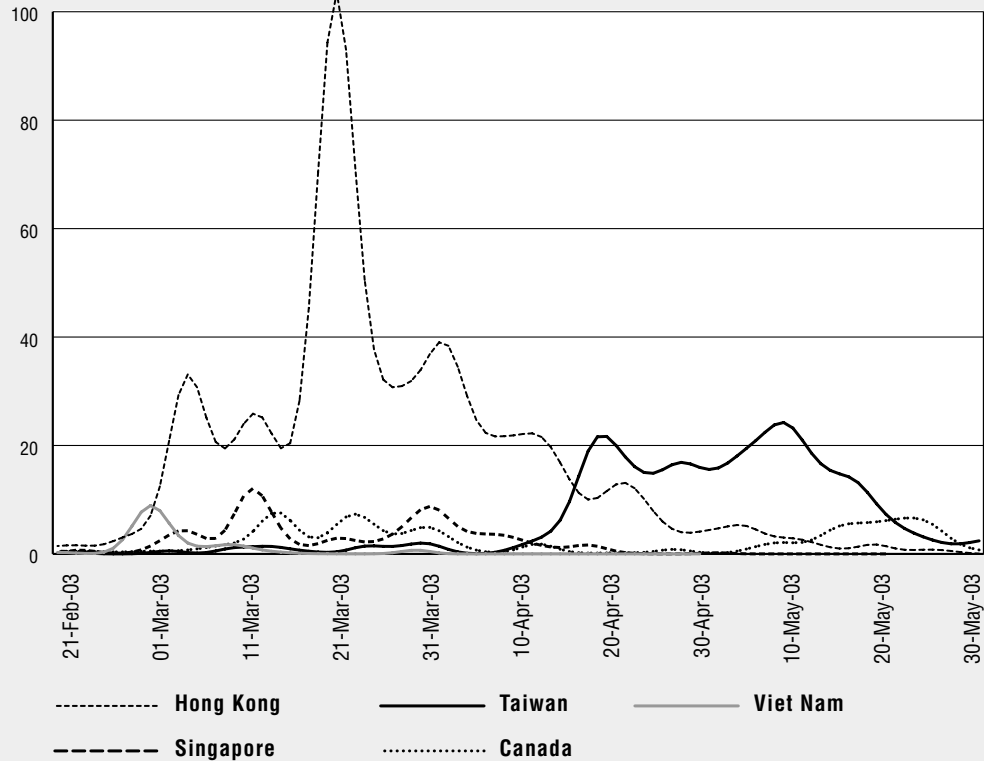
Singapore also conducted active surveillance for fevers and pneumonias among all hospital inpatients, searching for any cases that may have been missed. We believe that the ineffectiveness of such programs in Toronto hospitals contributed to SARS II. Differences in human resources were also evident: Singapore’s 1400-bed Tan Tock Seng Hospital had 40 staff carrying out active surveillance, while most hospitals in the GTA, as noted in Chapters 7 and 8, had insufficient staff for ordinary infection control, let alone comprehensive syndromic surveillance.

**FIGURE 1**

**Statistically estimated SARS infection curves of affected areas (except for People's Republic of China).**

**y axis: expected number of daily new infections, calculated from the SARS epidemic curves by dates of onset of symptoms published by the World Health Organization; x axis: dates of new infections**

Source: Ping Yan, Health Canada



## 11C. Canadian-International Communication and Liaison

### Liaison

Liaison with, and transmission of information to and from other countries and international organizations are important functions in the public health system at all times. These tasks are crucial when a public health crisis emerges. Soon after SARS arrived in Canada, Health Canada and the Atlanta-based CDC exchanged one staff member to act as liaison officers. This arrangement lasted several weeks and greatly facilitated interactions between the two bodies. Similarly, a staff person from the Communicable Disease Surveillance Centre of England and Wales was posted to Health Canada's Emergency Operations Centre in Ottawa for a week-long stint.

However, the bulk of SARS cases were in Asia, and experts there were gaining invaluable experience. Many observers felt that Canadian officials failed to connect closely enough with officials in Hong Kong, Singapore and China. One exception occurred when WHO asked scientists from the National Microbiology Laboratory [NML] and the Workplace Health and Public Safety Program to provide technical advice to Hong Kong, specifically at Amoy Gardens, an apartment block where hundreds of residents

were infected through a defective sewage system, and also at the Metropole Hotel, the epicentre of the outbreak in Hong Kong. Overall, however, Canada missed out on valuable opportunities to learn from other countries. In contrast, those involved in managing the Singapore outbreak followed the Canadian situation closely. Provincial and municipal representatives from Canada visited Beijing when the Chinese government extended an invitation in the lull between SARS I and SARS II, and Health Canada officials visited Singapore only after the global outbreak was essentially over.

### Communication

Although Health Canada regularly transmitted information to WHO during the SARS outbreak, it was unable to supply as much detail as was formally requested.<sup>2</sup> The absence of formal reporting processes between municipal, provincial, and federal governments contributed greatly to deficiencies in data acquisition and sharing. Some experts told the Committee that Canada was simply unable to maintain the confidence of WHO due to incomplete accounting of the outbreak and control measures as well as obvious inter-jurisdictional tensions.

Health Canada officials have stated that they repeatedly asked the Province of Ontario for more detailed information regarding the cases of SARS. A document outlining the initial proposed data elements and the reason for collecting the information was sent to the Ontario Ministry of Health and Long-Term Care [OMHLTC] on April 5, 2003. Besides Health Canada, both WHO and the other provinces and territories within Canada were requesting detailed information. The federal perspective is that Ontario continued to submit incomplete data during the first part of the outbreak, and federal officials often gained new information from Ontario's daily press conference rather than through intergovernmental channels. As noted in Chapter 2, the perspective from the Public Health Branch of OMHLTC is sharply different. During the second phase of the SARS outbreak, it is clear that the disagreements over data flow had largely abated.

The accounts of SARS in Chapters 2 and 5 have demonstrated that the local public health units and the provincial Public Health Branch were overwhelmed by the enormous workload during the SARS outbreak. Simply creating the requisite agreements for sharing data is not enough; capacity must be built at all levels of the public health system to permit a more coordinated response to outbreaks with adequate analysis and reportage.

Although Health Canada designated spokespeople in English and French for SARS, the problem of mixed messages occurred federally as well as provincially. For example, the Canadian Embassy to the United States later complained about the multiple and at times divergent messages coming from Health Canada and the Department of Foreign Affairs and International Trade. They suggested that the departments find a way to centralize incoming and outgoing information, including press releases.

Submissions to the Committee from the travel industry also raised concerns about communications on SARS, indicating significant gaps and inconsistencies with respect to information on SARS available to passengers and staff. Airports were overburdened with calls from the public looking for health-related travel information yet they could not get a coordinated message on SARS from health officials. Some airports and transport carriers retained the services of a medical expert to educate staff on infectious diseases, both to help them do their jobs and to quell their concerns and fears.

The role of the travel industry in communications efforts should also be recognized. Airports indicated that they provided communications equipment and services to Health Canada, provided updates to the airport community by way of bulletins and video records, and also organized and hosted meetings for stakeholders. A number of travel industry stakeholders have called for the establishment of a communication strategy for infectious diseases which includes contact points for the travel industry.

## 11D. Travel Advisories

### 11D.1 WHO Advisories

On April 2, 2003, WHO issued a travel advisory recommending the postponement of all but essential travel to Hong Kong and China's Guangdong province. This was the first time the international agency had ever issued such an advisory; previously, only individual countries had issued travel advisories.

On April 23, 2003, WHO added Toronto, Beijing, and China's Shanxi province to the list of areas that travellers should avoid. The advice against non-essential travel to Toronto was scheduled to be in place for three weeks before reappraisal. As we noted in Chapter 2, the reaction of Canadian officials was swift and angry, with politicians and public health officials from multiple levels of government travelling to Geneva to provide documentation that Toronto's outbreak was under control and to request that WHO remove the travel advisory. On April 29, less than a week after the initial announcement, WHO lifted its Toronto advisory.

Recognizing the threat of an emerging infectious disease, WHO apparently felt a need to support and protect less developed countries. The SARS global health alert was predicated on the risk of transmission of the disease to countries that would not have the infrastructure to cope with SARS, and the advisories reinforced this warning. However, the effects of the travel advisories have been profound on the economies of targeted countries. Canadians were particularly frustrated by the difference in concurrent categorization of Toronto by the CDC and WHO, with WHO issuing a more severe warning. Some have suggested that WHO should confine itself to informing countries of the epidemiologic situation in member countries and not issue travel advisories.

The controversies surrounding the WHO travel advisory were augmented by the content of the travel advisory criteria and the communication process leading up to the announcement of the advisory. The criteria seem arbitrary and were developed during the outbreak without a formal consultation process or serious scientific debate. The criteria referred to “prevalent cases” (which apparently included persons with SARS still in isolation), categorically assessed as more or less than 60, more or less than 5 new cases per day on a three day rolling average, and local transmission. The export of SARS to other countries was also considered.

None of these criteria has ever been validated as reasons for issuing a travel advisory. The 60-case threshold has been described as arising “out of the blue”. One senior Health Canada official who acted as the liaison with WHO and criticized the criteria, was under the impression that the criteria were still in draft form even as WHO used them to impose the advisory on Toronto and other regions. There are conflicting accounts as to whether warning was given in a telephone call about the impending travel advisory in a conversation among WHO, PAHO, and Health Canada staff about the “affected area” criteria. In any event, within 24 hours of that conversation, a travel advisory had been issued. While there were some brief recriminations between public health officials, one positive effect of the advisory was to create a welcome unity of response among all levels of government.

The Committee can find little rationale for the criteria or the timing of the WHO travel advisory. If WHO is to continue issuing advisories, clear criteria and a process for notice must be developed by agreement among member states.

### **11D.2 Health Canada Advisories**

In Canada, travel advisories are issued by Health Canada’s Travel Medicine Program, which assesses the risk for Canadians travelling abroad through information obtained from WHO, GPHIN, the Department of Foreign Affairs and International Trade, and other sources. Three levels of advisories are used: routine advice (i.e., no advisory), defer all non-essential travel, and defer all travel. This system has existed for many years, and advisories have been issued on outbreaks of new and known diseases, as well as natural disasters and hazards, such as bushfires in Australia.

During the SARS outbreak, the major concern was the extent of community spread and the risk that community spread might pose to the Canadian traveller. In addition, as it became clear that hospitals were sources of transmission of SARS, Health Canada became concerned that Canadian travellers with pre-existing medical conditions might have to seek medical care in seriously affected SARS countries, thereby incurring the risk of exposure.

Health Canada used information from WHO on affected area status, and combined this with information collected by GPHIN and other sources to produce a score that was then translated into an advisory. In this scoring system, Health Canada used WHO’s categorical labels that were based on the transmission pattern in a particular city or province. These were translated into numbers and averaged for a country, and then an advisory for the country would be generated.

The Committee can find no evidence to suggest that Health Canada’s own scoring system has a much firmer grounding than the WHO criteria. By using the WHO “affected area” definitions, Health Canada incorporated criteria into its travel advisories that it criticized when WHO applied them to Toronto. This system was used throughout the outbreak, and led to the issuance of travel advisories for other jurisdictions such as Hong Kong. As one can see in the Table 1, the travel advisories issued by WHO and Health Canada diverged, with the Canadian advisories at times more severe than those of WHO. This and other conflicts between WHO and Health Canada advisories sparked an expression of concern by the Department of Foreign Affairs and International Trade. Canadian missions abroad also were questioned as to the reason why travel advisories from Canada differed to those of WHO.

In short, while many Canadian officials have been critical of WHO over the lack of evidence for its travel advisory criteria, Canada’s own practices should be revisited, ideally in the context of a multilateral re-assessment of the basis, nature, goals, and impact of advice to travellers.

## **11E. SARS and Travel Issues**

As early as March 15, 2003, WHO issued an emergency travel advisory warning travellers and airline crews to be alert for symptoms consistent with SARS, and they outlined basic procedures for airlines in the event that a passenger or aircrew member became symptomatic in-flight. Later, after its annual World Health Assembly

**T A B L E 1**

**Comparison of travel advice against Hong Kong by WHO and Health Canada**

<b>Date</b>	<b>WHO</b>	<b>Health Canada</b>
25 March	Recommends no travel restriction to any destination including Hong Kong.	Recommends that people planning to travel to Hong Kong should defer all travel until further notice.
2 April	As a measure of precaution, WHO recommends that persons traveling to Hong Kong consider postponing all but essential travel. This recommendation applies to travelers entering Hong Kong, not to passengers directly transiting through the Hong Kong international airport.	Recommends that people planning to travel to Hong Kong should defer all travel and alternate routing be considered, when possible, if a traveler is transiting through Hong Kong.
13 May		Recommends that people planning to travel to Hong Kong should defer all travel and recommend alternate routing be considered, when possible, if a traveler is transiting through Hong Kong.
15 May		Based on the evidence that the SARS situation had peaked and is confined to certain well defined areas in Hong Kong, Health Canada recommends to defer all elective or non-essential travel to Hong Kong.
23 May	Removes the recommendation that people should postpone all but essential travel (i.e., no travel restriction).	
30 May		Due to the continued concern about limited spread of SARS Health Canada recommends to defer all elective or non-essential travel to Hong Kong.
16 June		Due to the continued concern about limited spread of SARS Health Canada recommends to defer all elective or non-essential travel to Hong Kong.
23 June	Hong Kong removed from the list of areas with recent local transmission, i.e., the chain of human-to-human transmission is considered broken, thus eliminating the risk of infection for both local residents and travelers.	No further mention of any travel restriction against Hong Kong.

meeting in May, WHO's SARS Resolution urged member states to apply their guidelines regarding international travel.

**11E.1 Quarantine Act**

Under the *Quarantine Act* and Regulations, the federal government exercises its responsibility to help protect Canadians from diseases which might pose a threat to public health through the international movement of people, goods and conveyances (e.g., airplanes, ships, vehicles, etc.). The *Quarantine Act* and Regulations give quarantine officers at Canadian ports of entry and exit the authority to require that a person suspected of having a disease listed in the Act or another dangerous disease

undergo a medical examination and to detain that person if necessary. The Act lists four contagious diseases: cholera, plague, yellow fever and smallpox. In keeping with WHO's urging that member nations take the necessary steps to address the SARS outbreak, Health Canada has amended the *Quarantine Act* Regulations. The amendments include adding SARS to the *Quarantine Act's* Schedule of infectious and contagious diseases; prescribing an incubation period for SARS (20 days); providing quarantine officers with the authority to compel airline carriers on relevant incoming and outgoing flights to distribute SARS health information and questionnaires to all persons on board; and extending the list of airports where an aircraft arriving in Canada must report, before landing, cases of illness or death on board the aircraft.



## 11E.2 Quarantine Officers

In 2002, Health Canada informed airport authorities that it would be transferring airport quarantine responsibilities to Canada Customs. Customs staff were never trained to do the job. When SARS arrived, Canada had only a tiny contingent of quarantine officers prepared to screen passengers arriving from Asia. A few Health Canada nurses were rapidly trained and dispatched to Toronto and Vancouver to act as quarantine officers by March 18. Later, more officers were deployed to international airports in Montreal, Calgary, and Ottawa. The responsibilities of the quarantine officers have traditionally included assessing passengers and cargo from aircraft, ships, trains, cars, etc., and detaining any person or object suspected of being infected.

During the SARS outbreak, the handful of quarantine officers performed screening, handed out information to travelers, and responded to requests from flight crews, customs, and immigration officers for assistance in the assessment of sick persons on aircraft. Normally in March, 12 to 14 flights arrive from Asia daily, and with the average capacity on each flight being 315 passengers, over 27,000 passengers required screening each week. With the drop in tourism due to SARS during April and May, the volume was reduced to about 19,000 per week. In any case, the quarantine officers were quickly over-extended and eventually needed additional assistance, which was provided by local public health authorities and Health Canada's regional First Nations and Inuit Health Branch office.

Airport authorities made submissions expressing concern about Health Canada's ability to mobilize knowledgeable quarantine staff to the airports, to provide logistical support, and to manage communications to their own staff, the airports, air carriers, and the public. Airport authorities clearly felt that Health Canada quarantine staff were sent into the situation with limited briefing and little or no supporting materials.

## 11E.3 Screening Measures and Provision of Health Information

Screening of incoming air passengers was started as an initial response to prevent importation of SARS. (Appendix 11.1 provides a chronology of airport screening in Canada.) Passengers from Asia were "visually screened" and greeted with yellow Health Alert Notices providing instructions on how to self-monitor for SARS symptoms;

they were also required to provide contact information to allow public health officials to trace them in the event that a fellow passenger was diagnosed with SARS. Posters with pertinent information about SARS were placed in strategic locations around the airports.

On March 27, 2003, WHO recommended that areas with local transmission of SARS institute measures to screen departing travelers. Health Canada responded by providing cherry-coloured Health Alert Notices identical to those being provided for incoming travelers.

In May, as part of the understanding that led WHO to rescind its travel advisory, the federal government agreed to institute further exit screening of air travelers. The information cards for both arriving and departing travelers were revised to include a set of screening questions\* in an effort to detect symptomatic individuals. Anyone who answered "yes" to any of the questions was interviewed by Health Canada screening nurses; and any possible SARS cases would be promptly isolated and transferred to health facilities for further evaluation. WHO also suggested that the use of thermal scanners be considered. One machine was graciously loaned to Canada by Singapore, and others acquired as part of a pilot project to test the technology. These machines were installed in Toronto and Vancouver to detect travelers with fever.

In submissions to the Committee, airport authorities in both Vancouver and Toronto were critical of Health Canada's organizational ability and operational capacity in managing travel screening. The Vancouver International Airport Authority submission to the committee noted, for example, that Health Canada officials repeatedly referred to a "contingency plan" that "had never progressed beyond the draft stage and appeared to (have been) abandoned." They also noted that the language barriers of many travelers were not appropriately addressed; information should have been provided in Chinese as well as English and French.

As of August 27, 2003, an estimated 6.5 million screening transactions occurred at Canadian airports to aid in the detection and prevention of SARS transmission. Roughly 9,100 passengers were referred for further assessment by screening nurses or quarantine officers. None had SARS. Over 3.2 million arriving passengers were screened using yellow cards; compliance was close to 100% because of the mandatory review by Customs officials. Over 990,000 outbound passengers were screened at Toronto's Pearson international airport using cherry cards. Audits

\* Do you have a fever? Do you have one or more of the following symptoms: cough, shortness of breath or difficulty breathing? Have you been in contact with a SARS-affected person in the last 10 days?

conducted by Health Canada staff demonstrated that there was also a high rate of compliance with cherry cards; over 90% of departing international passengers indicated that they had received the cards and had been asked health-related questions at check-in by airline staff.

The pilot thermal scanner project included most inbound and outbound international passengers at Toronto's airport, and all passengers on inbound flights from Asia, as well as a sample of three outbound international flights daily at Vancouver's airport. Almost 2.4 million passengers were screened by late August, the vast majority in Toronto. Only 832 required further assessment, and again none were found to have SARS. More detailed statistics are provided in Appendix 11.2.

In other countries, the yields for airport screening measures were similarly low. An evaluation of airport screening in Beijing revealed that despite screening over 275,000 travelers between April 24 and June 20, only 0.2% were determined to have fever. None had SARS. In Singapore, 30,000 passengers were screened each day, with about 60 of those assessed further. Again, none had SARS. Only in Hong Kong did airport screening yield any SARS cases—after screening millions of travelers with thermal scanners, two SARS cases were found.

These results are not surprising. Screening for a rare disease like SARS in a large population (i.e., millions of travelers) is both difficult and ineffective with an extremely low likelihood of actually detecting cases. Also, travel screening fails to detect those who may be incubating the disease—these individuals would still be symptom-free. Screening healthy people for infectious diseases should be based on certain premises: that a disease is present in the general population, that it can be detected by screening measures, and that there is a high risk of transmission by asymptomatic individuals. None of these conditions were met by SARS. In the absence of such features, screening healthy people is expensive, possibly highly intrusive, and can create a false sense of security or needless anxieties.

The claim that screening bolsters business confidence has been promoted by various countries at international forums. Given the available data, screening appears to be more about conformity than logic or evidence, with no country prepared to take the first step of abandoning these measures. Furthermore, any measures implemented at airports should theoretically be replicated at ports and at land border crossings. In Canada, with 18 land border crossings with the US, this was impossible. Instead, replicating the CDC's action, information cards were provided to an estimated 200,000 vehicles per month entering Canada.

Formal screening may be difficult to justify, but provision of timely and practical health information to travelers is much less expensive and based on the defensible assumption that the vast majority of persons are rational and well-intentioned, and can make intelligent risk assessments. The benefit of providing health information to travelers has been demonstrated in at least one anecdotal report of a person who arrived in British Columbia from an affected area and was subsequently diagnosed as having SARS. He developed symptoms one to two days after arrival, isolated himself as instructed on the yellow Health Alert Notice, and was admitted to hospital where isolation precautions were strictly followed. There was no secondary spread from this case.

#### **11E.4 Protocols for Airlines and Cruise Ships**

At one point early in the SARS outbreak, a traveler who exhibited SARS-like symptoms arrived in Vancouver; Health Canada invoked the *Quarantine Act* to stop the aircraft from departing until it had been properly decontaminated. However, Health Canada officials were unable to advise the airline as to the requirements for adequate decontamination because they were still unsure of the cause of SARS. Protocols for aircraft and airlines were not developed until the end of April. These outlined the appropriate cleaning agents and protective measures to be used when decontaminating an aircraft that had carried a potential SARS case. Health Canada's protocols for screening, handling of SARS cases, and cleaning cruise ships were released in mid-June.

Related problems encountered during the SARS outbreak were jurisdictional disagreements between federal and local officials, as well as between local health authorities, with regards to airports and ports situated within the geographic boundaries of local health units. For example, University of British Columbia [UBC] Hospital in Vancouver was designated as the facility for SARS patients; however, the airport was located in the suburb of Richmond and therefore part of a different health region. Travelers with SARS-like symptoms were allegedly examined in the parking lot to determine whether they should be transported to the UBC Hospital or to the local Richmond Hospital.

In all these instances, business processes can be developed to anticipate difficulties and ensure the faster implementation of containment, decontamination, or referral protocols.

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## 11F. Recommendations

Having regard to the international issues reviewed above, the Committee recommends that:

- 11.1 **The Government of Canada should take the lead, along with an international consortium of committed partners, in the detection of global emerging diseases and outbreaks. This should be done through enhancements to the Global Public Health Intelligence Network and similar programs.**
- 11.2 **The Canadian Agency for Public Health should have a mandate for greater engagement internationally in the emerging infectious disease field, including the initiation of projects to build capacity for surveillance and outbreak management in developing countries.**
- 11.3 **The Canadian Agency for Public Health should be the institution responsible for direct communication with the World Health Organization, the US CDC, and other international organizations and jurisdictions. The Agency should disseminate within Canada information received from international organizations and jurisdictions on global health threats, and in turn, it would inform the World Health Organization and other jurisdictions of relevant Canadian events. During outbreak situations, the Agency would perform the role of liaising between Canadian and international organizations and jurisdictions to maximize mutual learning.**
- 11.4 **The Government of Canada should review its travel screening techniques and protocols with a view to ensuring that travel screening measures are based on evidence for public health effectiveness, while taking into account the financial and human resources required for their implementation and sustained operation. The Government of Canada should also initiate a multilateral dialogue with other nations that are currently engaged in SARS travel screening to determine whether and when some or all of these measures should be modified or discontinued.**
- 11.5 **The Government of Canada should seek the support of international partners to launch a multilateral process under the auspices of the World Health Organization that would set agreed-upon standards of evidence for the issuance of travel advisories and alerts by member states. The multilateral process should also seek to determine the role of WHO**
- in issuing travel advice, and to establish a procedure for providing advance notice for possible alerts and advice. The notice process should provide a mechanism for consultation with and a response by the target country.**
- 11.6 **The Government of Canada should ensure that an adequate complement of quarantine officers is maintained at airports and other ports of entry, as required. Fully trained and informed quarantine officers should be available at airports to deal with health threats, to provide information to and educate airport staff, customs officials, and airline personnel concerning the recognition of illness and measures to be taken to contain risk. Close collaboration with airport authorities and airline personnel to clarify responsibilities in the event of a health threat is necessary.**
- 11.7 **The Government of Canada should ensure that incoming and outgoing passengers are provided with health information about where and when health threats exist, including any precautionary measures to take, how to identify symptoms of the disease, and what first steps to take in case of suspected infection. A partnership with the travel industry would facilitate this process so that information could be provided at the time of bookings. The current Health Canada web site containing information for travelers should be made more prominent and its existence promoted.**
- 11.8 **All federal/provincial/territorial/municipal response plans should include port/cruiseship- and airport/airplane-specific protocols for infectious diseases as well as protocols for employee protection guidelines and decontamination of aircraft, ships, and/or facilities. Jurisdictional issues concerning travel and health need to be resolved through the plan. The plan should be developed with input and buy-in from local health officials, response agencies, ports, airports and the relevant companies in the shipping and airline industries.**

## References

1. Institute of Medicine, "Emerging Infections: Microbial Threats to Health in the United States", January 1, 1992. Accessed on Aug 4 2003 at <http://www.iom.edu/report.asp?id=4572>.
2. World Health Organization, Weekly Epidemiologic Record, 2003, 78 (14): 102-105.

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## Appendix 11.1 A Chronology of SARS Travel Screening

### *Chronology - SARS Screening (2003)*

- February 24 SARS arrives in Canada carried by individual returning from Hong Kong
- March 12 WHO issues global alert on “mysterious virus-pox” epidemic in China
- March 13 Health Canada notified of several cases of atypical pneumonia in Ontario
- March 18 Quarantine Officers deployed. HC begins distribution of “Health Alert Notices” to travelers arriving in & returning to Canada from Asia at Pearson and Vancouver airports
- March 21 Yellow health information cards distributed to major airports in Canada
- March 24 HC deploys personnel to Dorval for increased screening of incoming passengers
- March 27 WHO recommends SARS-affected areas with known transmission to institute measures to identify international passengers with symptoms. Also issues recommendations to airlines regarding suspected cases in-flight
- April 3 Distribution of cherry cards for passengers departing Pearson on international flights implemented – expands to Toronto Island Airport and train stations April 7
- April 9 In-flight distribution of Yellow cards and contact forms begin on 9 airlines with flights from Asia
- April 23 WHO travel advisory in place for Toronto, lifted April 30
- May 7 Thermal scanner on loan from Singapore operational at Pearson
- May 14 Toronto removed from WHO’s list of areas with local transmission. Returned to list May 26 and removed again on July 2
- May 16 Distribution of revised Yellow health alert cards (with questions) begins at Toronto and Vancouver for international travellers on all Asian airlines bringing passengers into Canada and Air Canada (flights from Asia)
- May 16 Distribution of revised Cherry cards (with questions) for outbound flights begins at Toronto for 5 international airlines. Six Thermal Scanners set up in Vancouver airport for all incoming international travelers (subsequently reduced to 5 due to malfunctioning equipment)
- May 23 Six Thermal scanners set up in Toronto Pearson airport for all incoming and outgoing international travelers
- June 2 Start distribution of Cherry cards for all outbound international airlines from Toronto
- June 6 Yellow card screening in place for all international flights into Toronto and Vancouver and at 18 land-border crossings from the U.S.
- June 10 HC’s protocol for cruise ships posted online
- June 12 Amendments to the *Quarantine Act* and Regulations come into effect
- June 14 Yellow card screening in place for all international flights arriving in Toronto, Vancouver, Calgary, Montreal and Ottawa

## Appendix 11.2 SARS Screening Measures - Daily Report August 27, 2003 (end-of-day)

Measure	Location	Daily Report			Cumulative Report			Comments
		Screened	Further Assessed	Results	Screened	Further Assessed	Results	
Cherry Cards - outbound	Toronto	10,074	7	all cleared	992,720	792	all cleared	All international flights flying from all terminals now using "Cherry Card" process.
								August 8-12 audit findings of 1,302 passengers: 93% of people surveyed (1,210) at Pearson responded they received a cherry card. 80% responded they had been asked health-related questions at check-in. Follow-up with airlines not fully complying.
Yellow Cards - inbound	Toronto	15,217	33	all cleared	1,091,709	3,158	all cleared	All international flights arriving daily in Toronto (70+ airlines), Vancouver (100+ airlines), Ottawa (13+ airlines), Calgary (20+ airlines), Dorval and Mirabel (23+) have yellow-card screening in place. Vancouver data to date only reports Asian airline arrivals. We are compiling past records to update this information for all airlines.
	Vancouver	4,118	24	all cleared	1,137,526	2,111	all cleared	
	Vancouver	2,774	16	all cleared	282,425	888	all cleared	
	Vancouver	6,602	15	all cleared	629,599	1,103	all cleared	
	Ottawa	1,188	2	all cleared	61,768	236	all cleared	
	<b>Yellow Card Subtotal</b>		<b>29,899</b>	<b>90</b>		<b>3,203,027</b>	<b>7,476</b>	all cleared
<b>TOTAL ALL CARDS</b>		<b>39,973</b>	<b>97</b>	<b>all cleared</b>	<b>4,195,847</b>	<b>8,268</b>	<b>all cleared</b>	
Scanners (pilot project)	Toronto	25,291	4	all cleared	2,051,141	791	all cleared	2 companies operating: FLIR (3) and Thermal Imaging Inc (3), all static: <ul style="list-style-type: none"> <li>Terminal 1 (2 machines - inbound and outbound)</li> <li>Terminal 2 (2 machines - inbound and outbound)</li> <li>Terminal 3 (2 machines - inbound and outbound)</li> <li>Hrs of operation per airline schedules. Shifts covering 8:30 a.m.- 9:00 p.m.</li> </ul>
	Vancouver	4,714	1	all cleared	310,745	41	all cleared	2 companies operating: Mikron (3) FLIR (3): <ul style="list-style-type: none"> <li>1 FLIR machine is hand-held.</li> <li>Hrs of operation per airline schedule. Shifts covering 7:00 a.m.-11:00 p.m.</li> </ul>
<b>TOTAL ALL SCANNERS</b>		<b>30,005</b>	<b>5</b>	<b>all cleared</b>	<b>2,361,886</b>	<b>832</b>	<b>all cleared</b>	Scanner leases have been extended to Sept. 16th.
Video	All airlines (with the exception of Air Canada and Philippine Airlines) are showing the video.	7 of 9 airlines from SARS-affected areas flying into Toronto & Vancouver have copy of video						Videos were sent to Air Canada on July 31. Videos were sent to Philippine Airlines on July 7th. We have received confirmation from Air Canada that they will start showing the videos beginning August 9. Philippine Airlines received their copies via the Canadian Consul office in late July. They expect to be playing them by mid-August.
Land Borders	Approximately 200,000 vehicles per month are receiving yellow cards at 18 land-border crossings							
GRAND TOTAL ALL SCREENING MEASURES =	5,753,185							
5,753,185	represents the total passenger screening transactions: some people will have been screened twice (with cherry/yellow cards and then with thermal temperature scanners)							

