A SARS commentary

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Most of Canada viewed the severe acute respiratory syndrome (SARS) epidemic from a distance. Not that those of us outside Toronto were uninvolved – global and national information inundated us; multiple, often simultaneous, teleconferences were repeated daily for information sharing, local contingency plans and national guideline development; and questions from patients, friends and relatives about travel were incessant. This cannot compare, of course, to the magnitude and intensity of the experience of our Toronto colleagues who were actively involved in outbreak management and, in many cases, at personal risk. At this writing, the outbreak is controlled. It may be folly to analyze an experience which remains fluid, but some initial observations seem relevant.

The first thought when SARS was reported was that the next pandemic influenza epidemic had arrived. Reports of “bird-flu” in Hong Kong and parts of Europe reinforced this reaction. While initial laboratory testing and the progress of the epidemic rapidly dispelled this possibility, some of the SARS experience is immediately relevant to pandemic influenza assumptions and planning. For instance, it was expected that pandemic influenza would arise in Asia, and that Canada would have several months warning between initial identification of the new virus strain and its North American arrival. SARS certainly arose in Asia, but was not recognized as a global infectious disease emergency until Canada’s largest city, Toronto, was already part of the epidemic. Infrastructure limitations and the lack of transparency in identification and response to the disease in some parts of Asia, together with the realities of international travel, make any expectation of “lead time” less convincing for future planning.

Pandemic influenza planning has always assumed that resources for delivery of care would be rapidly overwhelmed. From early in the SARS outbreak, health care workers providing patient care, assisting in the epidemiological investigation or introducing and monitoring control measures experienced considerable stress. Physicians, nurses and public health officials worked long hours for days or weeks with little rest, often in an environment of personal risk or with concern for their colleagues. Fatigued individuals are inefficient, and more likely to make errors. Assistance from the rest of Canada was request-

ed, and some was provided. However, across Canada, assistance that could be made available was limited because local capacities for infectious diseases, infection control and public health were thin. The limited resources elsewhere in Canada were also necessary for local response planning for SARS and maintaining daily health services. Toronto managed the several hundred suspect and probable SARS cases, but the SARS numbers were substantially less than anticipated for an influenza outbreak. A more widespread epidemic, a larger number of patients, or a more prolonged duration of the outbreak may not have been manageable. A surge capacity for public health, clinical care and microbiology for extraordinary national situations such as the SARS outbreak is needed. The development of this capacity will require critical evaluation of the recent experience and strategic planning for the future.

The etiologic agent of SARS, a novel coronavirus, was identified promptly through the virtual global laboratory network. However, the story is incomplete – at this writing we do not know the virus origin nor the characteristics that promote human transmission and virulence, nor do we understand infectivity throughout the clinical course. The early triumph in the identification of the etiologic agent was of little practical assistance in managing the epidemic. A rapid and reliable test for accurate diagnosis has not been developed, although intensive investigation is continuing. The clinical case definitions for SARS, appropriately, cast a wide net, and many cases of illness due to other respiratory pathogens were included. The epidemic seems to have been controlled, however, without a reliable diagnostic test or an exact knowledge of transmission characteristics.

This SARS epidemic has served notice that the risks of global transmission through air transportation are not theoretical. The potential for rapid dissemination through global travel and trade has been a consistent theme in recent discussions of emerging infections. Despite previous experience, with HIV or West Nile virus, for instance, methods to ameliorate the risks of global spread of illness have not been effectively addressed. With SARS we have seen travel advisories, quarantines, temperature screenings of airline passengers, symptom checks by customs officials and yellow and cherry cards. For much of the world this is a first experience with interventions to prevent potential disease transmission facilitated through global travel.

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The *laissez-faire* mentality of travel has changed, perhaps permanently. How this will translate into actions for the long term is not clear. Some restrictions or monitoring may persist and the more rapid implementation of travel controls is likely with any new health threats. The vulnerability of our social and economic fabric to just one infected global traveler has been well demonstrated.

And what about the World Health Organization (WHO) travel advisory for Toronto? The advisory was extended to Toronto, we were told, because of concerns about community transmission of illness and reports of exportation of SARS cases from Toronto to other countries, sometimes with subsequent local transmission. Health Canada, together with the Ontario government and the City of Toronto, protested, when the advisory was broadcast, that the epidemic in Toronto was well under control, in fact, virtually over. Canadian authorities, in most cases, had insufficient information to assess reported SARS cases exported from Toronto to the United States, the Philippines or other countries. Dismay at the impacts of the WHO advisory for Toronto and Canada led to some suggestions of darker political motives. From this distance, however, it appears communication was not optimal. Was correct information about the progress of the epidemic reaching the appropriate individuals in a timely fashion? Surely there are lessons here for any public health crisis with a global dimension. Global communication, to WHO and other relevant groups, requires the consistent sharing of precise, current and understandable information. Individuals at the epidemic front line, often fatigued and responding to the urgency of immediate clinical care issues, may not appreciate the importance of providing such information to people at a distance, who are, in effect, observers. Or were there not resources for appropriate data management? The interaction between the Canadian team and the Centers for Disease Control and Prevention (CDC) in the United States appears to have functioned quite smoothly. From the beginning of the outbreak, Health Canada had an individual at CDC, and CDC had one in Toronto, to promote effective communication between the public health authorities in the two countries. Identifying a team of individuals – one assumes including Health Canada, local and international representatives – to monitor progress and provide a forum for global exchange seems necessary. The interactions between Canadian authorities and the WHO that culminated in the advisory need to be reviewed to identify missed opportunities or alternate models that limit the likelihood of similar experiences in the future.

Timely, accurate and hard information was also essential for distant observers contributing to local contingency planning for SARS. There are expected limitations in knowledge for any new agent, including therapy and transmission, but as new information becomes available it must be shared in “real time” by a knowledgeable and critical source. With SARS, rumors abounded, conflicting information was heard, numbers

changed daily and the press was often the first source of information. The Toronto team, the Hong Kong practitioners, and the CDC in the United States did a good job in ensuring that the clinical presentations of the illness were rapidly characterized for the wider medical community. The daily updates in numbers were helpful, although the continual flux between “suspect”, “probable” and “under-investigation” cases, between “prevalent” and “incident”, created confusion. A consistent, authoritative messenger would have improved clarity in the message. Initial reports about community spread in religious groups and infection of health care workers on SARS units created substantial unease outside Toronto. Early, analytical sharing of what was known and what was conjecture with these events would have been helpful. A daily report updating laboratory observations for specimen results, tests under investigation, therapeutic studies and correlation of laboratory and clinical observations would also have been of value. Often, messages from outside Canada – CDC and WHO in particular – were most helpful in understanding developments in these issues. These observations are not criticisms, but suggestions for issues to address in a review of our SARS experience so that the response to the next episode will be improved. Ultimately, the need for accurate and timely information flow requires excellent epidemiology on the ground and close monitoring, with resources to support these activities. This would seem to require a dedicated laboratory/clinical/epidemiology team to monitor, interpret, and report progress.

There is much to learn from the SARS experience. One lesson already apparent is the limitations of our current public health system – fragmented, understaffed and lacking adequate expertise to deal with global infectious disease threats. This follows years of lack of leadership, serial reorganization and inadequate resources. Provincial and federal governments have different responsibilities in the Canadian health care system, but national and global public health is poorly served by multiple, sometimes competing, jurisdictions with duplication of activities. An integrated Canadian public health program, which achieves both national and provincial goals, is necessary. This will require effective national leadership, resources and communication. The need is not just for money and buildings, but for a long term investment in human resources and leadership development.

Infectious diseases will remain unpredictable. We have now been reminded about the extraordinary economic and political consequences of epidemic infections. For SARS, continued vigilance to identify reintroductions promptly and institute effective control measures is necessary. Our recent experience must also be critically reviewed in detail, both internally and externally. These reviews should, in part, interpret the SARS experience within a future vision of a renewed public health system. In the short term, we can express our admiration and appreciation to everyone who contributed to the triumph of successful control in Toronto – including many of our infectious diseases and microbiology colleagues.