



Emergency Response System Under Duress: The Public Health Fight to Contain SARS in Toronto (B)

Introduction

On March 26, 2003, Ontario Premier Ernie Eves declared the SARS outbreak an emergency under the province's Emergency Management Act. Emergency responders launched an intensive effort to isolate everyone with the disease, to quarantine everyone who had been exposed to it, and to protect hospital workers from contracting it. After a month-long battle, culminating in a tense, Easter week vigil, the public health community heaved a collective sigh of relief, convinced that the worst was over—that SARS was all but extinguished in Toronto. Unfortunately, they were wrong. There was to be another chapter to the story.

[At the end of this case, see Exhibit 1, Timeline of the Toronto SARS Outbreak; Exhibit 2, Acronyms; Exhibit 3, People Named in this Case Study; Exhibit 4, The Epi Curve of the Toronto SARS Outbreak.]

Ontario's Role

Between March 13 and March 26, Ontario Public Health and the larger Ontario Ministry of Health and Long-term Care, both headquartered in Toronto, were well aware of the SARS outbreak, but had played a backstage role in it. The Ministry had leaned on the Scarborough-Grace Hospital to close on March 23, and had declared SARS a "reportable" illness under the province's Health Protection and Promotion Act on March 25. (This required hospitals and health care providers to report any and all cases of SARS to their local public health department. It also

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allowed public health units to track infected people and issue isolation and quarantine orders to prevent the spread of the disease.) The Ministry had also collected SARS data from TPH and public health units from several adjoining communities and had passed it on to Health Canada, which in turn passed it on to the WHO.

Once hospital workers began to come down with SARS, Colin D'Cunha, Ontario's chief medical officer of health and public health commissioner, had participated in a daily telephone conference with decision-makers in the affected public health units and infectious disease experts at the hospitals to share information about the latest developments and to try to figure out what to do next. On March 25, Ontario Public Safety Commissioner Jim Young, who believed he should be playing a role in the outbreak—both as safety commissioner and as the province's chief coroner—asked D'Cunha if he might join these teleconferences and D'Cunha readily agreed. Young had, in the past, managed such provincial emergencies as plane crashes, ice storms, power failures, and so forth. From this vantage point, what Young heard in the March 25 conference call made him nervous. The group was intelligent, well informed, well intentioned, and everybody was doing his or her best to think constructively about the problem, he says, but in his view, the group was neither bold enough nor quick enough in its decision-making:

What you have to do in an emergency is—you have to have structure enough to make decisions quickly. You can't sit there and ponder decisions all day. You have to have a meeting, make decisions, let everybody go out and do them, and then have another meeting.

"It seemed to me the situation was getting a whole lot worse, not better," he continues. Not only was the number of people visibly sick with SARS growing, but also there was an unknown number of people infected but not yet symptomatic. After sitting through a second group conference call the following day, Young says, "I hung up the phone and went and saw Colin [D'Cunha], and said, 'Colin, I think this is growing too fast. This is an *emergency*, and it should be treated and managed as an emergency.'" That meant the province needed formally to declare the SARS outbreak an emergency, under the terms of the Emergency Management Act, he argued. Doing so would give the province the flexibility to take swift and decisive action if necessary—confining individuals who refused to abide by quarantine orders, for instance; closing down borders; commandeering buildings; handing down orders to doctors and to hospitals. He suggested that he and D'Cunha each urge their respective ministers—the solicitor general in Young's case, and the health minister in D'Cunha's—to advise Ontario Premier Ernie Eves to make the declaration, posthaste. D'Cunha was quick to agree.

In fact, it did not prove difficult to persuade the solicitor general, the health minister, or Premier Eves to take this action. They were elected officials—laymen, without expertise in infectious diseases. Faced with the spread of a mysterious, often fatal illness—and faced with the observable alarm of public health and infectious disease experts who had been grappling with the outbreak thus far—no one wanted to under-react. Health Minister Tony Clement recalls thinking,

“If they’re going to accuse me of anything after this is over, it’s better to say, ‘He did too much’ rather than ‘He did too little.’ So I was very quick with my recommendation to the Premier that we declare the state of emergency. He got a full briefing from myself and Colin at the time, and it was decided within an hour.”

And Yet ... Who’s in Charge?

On March 26, Health Minister Clement announced that Premier Eves had formally declared the SARS outbreak an emergency. This automatically activated the Provincial Operations Centre—a well-equipped central gathering area that facilitated information exchange and cooperative decision-making among the 12 Ontario ministries deemed pertinent to the emergency at hand. But who was to manage the emergency day-by-day and moment-by-moment? All things equal, this responsibility would have fallen to the Health and Long-term Care Ministry. The ministry did have—on paper—a plan for addressing emergencies. In the aftermath of the September 11, 2001 terrorist attacks in the United States, each major division of the Health and Long-term Care Ministry had been directed to write up its own plan, describing what it would do in an emergency, but the result, says Allison Stuart, then director of the ministry’s Hospitals Division, was “a patchwork quilt, with no overall sense of strategy.” Like every other Ontario ministry, the Health and Long-term Care Ministry had also created an internal “Ministry Action Group,” which was supposed to take action on behalf of the ministry in a crisis. Each of the ministry’s major divisions was represented at the MAG. The group had met about four times a year to participate in tabletop exercises that postulated the occurrence of a province-wide emergency—for example, an overturned train—and asked each MAG to come up with a response plan.

In reality, however, the MAG had never been a priority within the ministry, says Stuart. It was not, for the most part, made up of senior administrators, but of a rapidly changing stable of junior staff members, reluctantly pressed into service and uncertain what they were supposed to do. In addition, the MAG’s meeting space—while adequate for a tabletop exercise—was not adequate for a real emergency. It was small, ill equipped, and located in a building about a half hour subway ride from Queens Park, the seat of provincial government in downtown Toronto. “Their MAG was smaller than [my office],” says Young, “with one table, one phone, and nobody who knew how to run an emergency.”

Young had managed many kinds of emergencies in the past, but he had never managed a public health emergency. Although he was a medical doctor by training, he was not expert in infectious diseases or public health matters. Premier Eves therefore decided to make Young and D’Cunha “co-chairs” of the emergency response, in charge of developing a workable decision-making system under the mantle of the POC. In terms of the chain of command, they would report to Health Minister Clement, who would report to Eves. This kind of joint management approach

“can work,” Young muses, “or can *not*-work. The major problem with it is—what if your approaches are different and you’ve got different personalities? And how do you break ties [in the event of a disagreement]?” He adds, “It wasn’t a problem initially. We each had areas we looked after.” Over time, though, conflicts would emerge.

Opening Salvos in the War on SARS

As soon as Eves had declared a provincial emergency on March 26, Young called a 7:00 p.m. meeting of the front-line decision makers in the SARS outbreak—doctors and administrators from TPH and the Mt. Sinai Infectious Disease Department along with D’Cunha and Stuart from the Health and Long-term Care Ministry. Young asked the group to explain to him where the outbreak stood. “Initially,” recalls Toronto Medical Officer of Health Sheela Basrur, “there had been an assumption by those who were relatively new to the situation—in other words the provincial folks—that we could establish a planning structure, get some advice, consider what the best approach would be, and then issue something as guidance to local hospitals.” The reaction from the local public health and hospital personnel was fast and adamant, she continues: this would not be sufficient.

Something had to be done *tonight* for *tomorrow*, because we did not know how far this had spread, and the fish were already swimming away from the net. Waiting another day to see how big the net should be was going to miss more fish than it caught.

So the group sat together until 4:00 a.m., hammering out a set of emergency operating instructions—the first of many—for Toronto area hospitals.

One of the group’s first decisions was to make these mandatory directives rather than advisory guidelines. “If you sent out ‘guidelines’ to 100 hospitals and 100 hospital administrators and then 100 doctors got ahold of them, there’d be 400 ways of doing it by the end of the day—if they did it at all,” Young says. “The administration would think they were doing one thing, and the doctors would think another, and the nurses would get on with the job and do it their way.”

Whether the province actually had the legal authority to issue mandates to the hospitals was somewhat blurry under provincial law. “The hospitals aren’t owned by municipalities, they aren’t owned by private industry. They’re stand-alone nonprofits,” says Young. But this did not deter him:

The funding for them, almost entirely, comes from the province. And so we had the ability to turn around in an emergency and say, “Well, we’re going to take some of your independence away.” ... You assume you have the legal responsibility and ability to do it, but if it’s hazy, you err on the

side of doing what you have to do anyway, and then you let the courts sort it out afterward. Did we have the authority? I'd like to think we did.

The group agreed to impose a rather draconian set of restrictions on all the hospitals in the Greater Toronto Area (which included York, Durham, and Peel Counties) plus Simcoe County, just north of the GTA. The directives were faxed or e-mailed to the 44 hospitals in these affected areas on the morning of March 27.

The First Set of Directives. Under the directives, each hospital was required to invoke its “Code Orange” emergency plan—that is, to activate a pre-existing blueprint for closing down the hospital to all but “essential” care. The hospital could continue to receive patients needing urgent medical care (unless, for its own specific reasons, a hospital had closed its Emergency Department and Intensive Care Unit). But many elective services would be either suspended or limited to the most serious medical conditions.

In addition, there were a number of additional directives aimed at infection control. Among the most important:

- Tightly restricted access to the hospital—limited to staff with identification, and patients needing emergency care. Visitors would not be permitted to enter except in certain specific cases—for instance, parents of an admitted child, close relatives of a terminal patient, the partner of a woman giving birth.
- Everyone entering the hospital was to be screened—that is, staff must be posted to take their temperatures and ask about recent health symptoms and possible contacts with people at high risk of having SARS.
- Every hospital was to create a SARS unit. That meant emptying an existing ward by discharging or moving patients and ensuring that each room had a negative pressure ventilation system, or the equivalent.
- All hospital personnel—whether or not they were directly involved in patient care—were to wear an “N95” mask, isolation gown, gloves, and protective eyewear or face shield. (N95 masks were designed to filter out smaller particles than, for instance, standard surgical masks. Thus, they were said to be 95 percent effective in screening out airborne viruses. The masks had not often been used in the health care field, although they were used when caring for tuberculosis patients. The masks originally had been created for construction workers—for instance, people who did plasterwork, or spray-painted cars.)

- Part-time staff that had worked at Scarborough-Grace after March 16 were prohibited from working their scheduled shifts in other hospitals.
- Patient transfers from outside the area into Toronto area hospitals were stopped, and transfers from one hospital to another in Greater Toronto/Simcoe were limited to urgent cases.

Four days later, on March 31, the provincial decision-makers decided to extend the screening and other infection precautions to all 160 hospitals in the province. Only the hospitals in the Greater Toronto Area and Simcoe County were instructed to implement the more extreme “Code Orange” provisions, however.

A Jury-Rigged Management Group

The POC Executive Committee. Because the Health Ministry MAG was deemed incapable of serving as an executive decision-making body in the provincial emergency-response to SARS, Young and D’Cunha created and co-chaired a group they called the Provincial Operations Centre “Executive Committee,” initially made up of key provincial and municipal decision-makers in the response effort (or their designees). The Executive Committee began as a group of about eight people—the hospital doctors treating SARS patients, infectious disease and emergency medicine experts, and representatives from Toronto Public Health. Over time, however, more and more officials petitioned to join the committee and its membership swelled to two dozen. The newcomers included infection control nurses, broader representation from local public health agencies, assorted academic experts, occupational health doctors, and family physicians. Because many of its members were also managing the outbreak response, the POC Executive Committee quickly developed a *modus operandi* that allowed its members to participate but also attend to other pressing duties. The committee met each morning at 10:00 a.m.¹ to review the events of the last 24 hours, raise concerns, and, when necessary, make a major decision about the course of the emergency response.

Early on, for example, the committee debated the question of whether the province should try to contain the SARS disease in a single designated hospital, and to transfer all present and future SARS cases there. Proponents of the idea argued that it would be easier to bring the disease under control in a single hospital, where it would be possible to enforce the strictest infection controls. But opponents of the plan noted that it would expose SARS health care workers to a concentrated risk that was, at present, dispersed more democratically among a number of city hospitals. In the current anxious climate, there was an excellent chance that the health care staff would refuse to work there; the West Park experience had given a pretty good indication of that. It also raised the specter of inciting a union battle in the midst of a health care emergency—a thing

¹ The meeting time was later changed to 1:00 p.m.

no one wanted to contemplate. In addition, some argued that creating a designated SARS hospital would give the other non-SARS hospitals a false sense of security. If a SARS patient were mistakenly admitted to a hospital that was not on guard against SARS, the undetected spread of the disease would begin all over again. In the end, these latter arguments won the day.

Information and Advice

In organizational terms, the Ontario Health Ministry's Public Health Department might have been the logical choice to provide staff back up to the POC Executive Committee, in the form of information, analysis, and recommendations. But Ontario Public Health possessed neither expertise in the infectious disease field nor in-house capacity for epidemiological analysis, two areas of major importance in the SARS outbreak. So Young and D'Cunha set out to fill these gaps as best they could, on the fly.

The Science Advisory Committee. Young created the ad hoc "Science Advisory Committee," by asking Mt. Sinai's well-respected and well-connected infectious disease expert, Dr. Don Low, to send out an SOS to his infectious disease colleagues around the province and the country, asking them to come to Toronto to help the province turn the daily arrival of new bits and pieces of information into practical advice about how to stop SARS from spreading, especially within Toronto's hospitals. Over time, it would become clear that other areas of expertise were needed as well, so the group was gradually broadened to include experts in public health, emergency medicine, and family medicine. The SAC met daily in a conference room provided by the Public Safety Ministry, and reported to Young.

The Epi Unit. D'Cunha, meanwhile, created within Ontario Public Health a temporary "Epi Unit," which reported to him. He recruited Bill Mindell from the York Region Public Health agency to set up and administer the unit and Mindell recruited Dr. Ian Johnson, a professor at the University of Toronto, to direct the epidemiological work itself. Johnson's staff consisted primarily of a rotating group of epidemiologists volunteered by municipal public health units in communities not (or not yet) affected by SARS and four federal field epidemiologists.

The SARS Operations Centre. Young also created a temporary "SARS Operations Centre" within the Hospitals Division of the Ontario Health and Long-term Care Ministry. This center, headed by Hospitals Division Director Stuart, had responsibility for writing and disseminating special emergency infection control directives to hospitals and other health care facilities based on recommendations handed down from the Science Advisory Committee. It was also responsible for managing the logistics of the outbreak—for example, providing help in rounding up N95 masks for hospitals and doctors.

A Word About the Incident Command System. Students of emergency management may note that the organization of the SARS response effort did, in a few respects, borrow concepts from

the Incident Command System, a widely embraced though somewhat controversial organizational template for managing a broad array of emergencies.² For example, ICS called for a clearly identified incident commander, or for multiple commanders working closely in a “unified command” structure. Young and D’Cunha arguably fit this description, at least in theory—two commissioners managing the emergency response together. As in the ICS, they brought in outside experts to advise them in making decisions, via the SAC and the Epi Unit. Young says he used ICS principles “as was practical,” but notes that the ICS model was not familiar to many in the health care system, nor was the health care system organized to operate in line with the model. For example, ICS called for a single, clear chain of command linking every front-line responder straight up to the Incident Commander(s). This chain of command—absolutely crucial to the Incident Command System—was absent from the response organization in Ontario and, in fact, would have been impossible to establish under provincial law and practice. The front-line activities of the responders—to identify and isolate those with SARS, to identify and quarantine those exposed to SARS, to provide information to the public about avoiding exposure to SARS, and to gather and report data about SARS cases and SARS contacts—were all carried out by a combination of doctors, hospital personnel, and staff members of the local public health units. Doctors—though ultimately accountable to their own professional and accreditation organizations—were not, in a day-to-day way, accountable to anyone. Hospitals had their own internal hierarchies, and each hospital was ultimately governed by an independent private board of directors. Local public health units, likewise, had their own internal hierarchies, and were ultimately accountable to their local medical officers of health and boards of health.

Thus, although Young created the SARS Operations Centre to carry out the writing of the emergency directives for hospitals and other medical institutions and clinics, the hospitals and other recipients of these directives were left to their own devices to figure out how to comply. In addition, there was no mechanism to ensure that they did, in fact, comply, beyond their own self-interest in remaining on the safe side of the law with respect to medical malpractice. In the absence of any legal authority (or organizational capacity) to proceed differently, the SARS emergency response relied on the existing and highly decentralized medical and public health systems to carry out the outbreak response.

² The Incident Command System featured a pre-established organizational template that had the advantage of being simple, consistent, and flexible. A basic structure was prescribed, but the pieces of the structure could be expanded, contracted, or eliminated to adapt to emergencies of varying sizes and types. Critics charged, however, that Incident Command, which was originally created to eliminate chaotic management in the case of large fires that cut across two or more jurisdictions, was not a good one-size-fits-all solution for all emergencies. Under the system, the emergency response was managed by either a single Incident Commander or a joint Unified Command Team. This commander or team oversaw four major “sections” that could be subdivided into assorted branches, divisions, groups, and units, depending on the demands of the incident: the “Operations” Section managed all tactical activities; the “Planning” Section gathered and evaluated current and forecasted information so that the command group could create and update the “Incident Action Plan”; the “Logistics” Section provided ongoing supports for the responders—ordering new equipment and replacing supplies, arranging for facilities, transportation, equipment maintenance, and fuel, and providing food, counseling, rest/sleeping arrangements, medical care, etc.; the “Finance/Administration” Section kept track of the money and time spent on the emergency response by any agency that did not have the in-house capacity to track such information.

The Cost of Missed Cases

On March 28, two days after Eves had declared a provincial emergency, the staff at York Central Hospital made a dismaying discovery. James Dougherty, a 77-year-old cardiology patient, had been transferred from the Scarborough-Grace Hospital to York Central on March 16 for dialysis treatment. He had arrived with a low fever and respiratory trouble—symptoms that, at the time, doctors assumed were byproducts of the heart attack. But by March 28, Dougherty was near death with a virulent pneumonia and York Central doctors concluded that he had SARS. Further investigation revealed that a week before his heart attack—on March 7—Dougherty had come to the Scarborough-Grace Emergency Department with congestive heart failure, and had spent the night on a gurney in the observation unit—across from Tse Chi Kwai and Joseph Pollack. After his March 14 heart attack, Dougherty had spent two days in the Scarborough Grace cardiology ward without infection precautions, followed by 12 days at York Central, also without infection precautions.

This news was a terrible blow to those trying to contain the outbreak. It meant that the Scarborough-Grace infection control unit and TPH had not, in fact, tracked down every hospital patient that had been exposed to Tse; at least one had slipped through the cracks. In addition, it wasn't until 14 days into his second hospitalization that Dougherty's SARS case was finally recognized. Once the diagnosis was made, York Central immediately closed down its Emergency Department and Intensive Care Unit and more than 3,000 staff members, patients and visitors were placed under quarantine.

Over the next days and weeks, public health officials would tally the effects of the Dougherty case. At Scarborough-Grace, Dougherty spread SARS to an estimated 21 health care workers, patients, and visitors (including the liver transplant recipient who was transferred from Scarborough Grace to Mt. Sinai on March 25, forcing the 10-day shut-down of the Mt. Sinai Emergency Department and Intensive Care Unit). At York Central, he infected an estimated 15 people. "In hindsight," says Dr. Allison McGeer, Mt. Sinai Hospital's director of infection control, the Dougherty case "was the worst miss of the early days of the investigation."³

Another early "miss" also proved consequential for many weeks to come. When Joseph Pollack had been rushed to the Scarborough-Grace Emergency Department on March 16 with an advanced case of pneumonia, his wife, Rose Pollack, had accompanied him. Though Joseph was quickly identified as a probable SARS patient and isolated, no one had thought to worry about Rose, who was feverish herself that evening, but not otherwise symptomatic. She too had been infected with SARS, however, and was highly infectious. She checked her husband in at the registration desk—and while there, she infected three ward clerks. She sat in the waiting room for about two-and-a-half hours—during which time she infected five other people seated in the

³ *Time Magazine*, May 5, 2003.

waiting room, along with a security guard, three nurses, and a housekeeper. In the end, public health workers calculated that Rose Pollack infected a total of 24 people. She and Dougherty became the first SARS patients identified as “super-spreaders.”⁴

The Dougherty and Pollack cases revealed a frustrating truth about SARS: it was a hard disease to diagnose, especially in its early stages, before all symptoms were manifest. The early SARS symptoms were extremely general.

The Diagnosis Dilemma

Researchers would not isolate the SARS virus until April 16. Even though this discovery paved the way for the rapid development of a laboratory test for SARS, the test was not reliable for patients in the early stages of the disease. Thus doctors were forced to rely on a combination of the patient’s clinical symptoms and the “epi-link”—the moment of contact with a person or place that could have exposed the patient to SARS.

The WHO’s Diagnostic Criteria. As soon as the WHO identified SARS as a new infectious disease and global threat, the organization had identified diagnostic criteria for making both a “probable” and “suspect” SARS diagnosis. The WHO’s criteria for a suspect-SARS were as follows:

- The patient must have had SARS symptoms after February 1, 2003.
- S/he must have had a fever of 100.4 degrees F or higher and one or more respiratory symptoms (for e.g., cough, shortness of breath, difficulty breathing).
- In addition, the patient must have had either close personal contact with a diagnosed SARS patient or a recent history of travel to an area reporting SARS cases.

A probable-SARS case included all the suspect criteria *plus*:

- a chest x-ray finding of pneumonia or Respiratory Distress Syndrome⁵ or

⁴ The term “super-spreader,” akin to yesteryear’s term, “Typhoid Mary,” was imprecise but referred to SARS patients who were thought to excrete the virus in unusually large quantity, thus infecting an unusually large number of people. After-the-fact, some epidemiologists questioned whether the notion of the super-spreader might not be entirely myth. The explanation, instead, might be that the hospital environment—where large numbers of people were infected—was especially conducive to the spread of SARS for a number of reasons: warm, humid air in a relatively contained environment; close contact between health care workers and SARS patients at their sickest; high risk procedures that put health care workers in direct contact with respiratory secretions; SARS patients in proximity to susceptible fellow-patients.

- a death owing to an unexplained respiratory illness, with an autopsy examination demonstrating the pathology of Respiratory Distress Syndrome without an identifiable cause.

Other symptoms sometimes associated with SARS included headache, muscular stiffness, loss of appetite, malaise, confusion, rash, and diarrhea, the WHO added. For purposes of developing an official disease count, the WHO used only the probable-SARS numbers from each country.⁶

Health Canada's Diagnostic Criteria. The official definition in Canada, developed by the federal health care agency, Health Canada, was the same as the WHO's except that instead of a chest x-ray finding of pneumonia or Respiratory Distress Syndrome, Health Canada required a clinical finding of severe, progressive pneumonia. Later in the outbreak, this disparity would prove consequential, but in the early days, it had little effect.

The Possibility of Asymptomatic Carriers. The problem with both the WHO and the Health Canada definitions, says Ian Johnson, who managed the epidemiological work of the province's emergency Epi Unit, was that they assumed that everyone who was infected with SARS would be symptomatic. But what if some of the people infected with the virus never became sick themselves, but did spread the disease to others? Most infectious diseases included such asymptomatic carriers. In the case of Hepatitis B, for example, a full 60 percent of the people who spread the disease did not get sick themselves. If this were true of SARS, then it would not be possible to find the epi link in every case; a person might catch SARS from someone who appeared perfectly healthy. Thus, public health personnel were loathe to rule out a SARS diagnosis on the basis of the epi link alone. "So then we had to try to start monitoring for other kinds of SARS-like illnesses that did not have an epidemiological link," says Johnson. "Otherwise the thing could be spreading way beyond our control and we would just be happily looking at this one little area—because we could *link* it all."

On the other hand, to consider every pneumonia patient a possible SARS case would overwhelm the hospital system and confuse efforts to distinguish SARS from other kinds of pneumonia. Ontario therefore created a third category called "persons under investigation (PUI)" which primarily consisted of people with all the clinical symptoms of SARS, but no apparent epi link. In addition, a person with an epi link and just one SARS symptom—for example, a Scarborough-Grace health care worker with a fever but no respiratory symptoms—was often categorized as a PUI.

⁵ Refers to a syndrome of life-threatening progressive pulmonary insufficiency in the absence of a known pulmonary disease.

⁶ Over time, a number of "suspect" cases evolved into "probable" cases.

Likely Alternatives. Despite the failsafe PUI category, it was still easy to miss SARS cases, doctors noted. One of the most confounding situations arose if a doctor believed a pneumonia patient not only had no epi link to SARS, but that his or her pneumonia symptoms had a very likely alternative cause. This, in fact, had happened with Dougherty, whose respiratory symptoms were assumed part of his congestive heart condition until they became extremely virulent.

Finding the Epi Link. In addition, it was often very difficult to find the epi link—a job that belonged to the local public health department. There were several reasons for the difficulty. For one, the primary source of information was necessarily the patient’s own memory, perhaps supplemented by the recollections of close family or friends. Public health staff had to question patients—who were often woozy with fever and struggling to breathe—to recall everything they had done, every place they had gone, every person they had been near, for the 10 days preceding the first onset of symptoms. “Think of yourself—how hard it is to remember what you were doing in the last 10 days,” says Barbara Yaffe, then-director of TPH’s Communicable Disease Control division. “Now think if you were sick and trying to remember.”

What’s more, the links could be Byzantine, and public health staff had practically to become gumshoe detectives to uncover them. For example, in mid April, health authorities in Manila, the Philippines, would announce that a 46-year-old Toronto woman, Adela Catalon, had brought SARS to the country when she arrived from Canada to visit her ill father and attend a wedding. During her stay, her symptoms worsened, leading to diarrhea and labored breathing. She finally went to a hospital where she was diagnosed with SARS. She died 10 hours later, on April 14. According to an article in the *Toronto Star*, the case set off a panic in the Philippines. Catalon had potentially exposed many people before her hospitalization. She had, for example, attended an April 7 wedding with 500 guests. Armed troops forcibly quarantined three towns in the Philippines, and members of Catalon’s extended family were reportedly shunned and lost jobs.⁷

Ontario public health authorities at first disputed the Philippines’ claim: they could find no epi link to Catalon from the known pool of SARS cases. But eventually, the Toronto Public Health department did find a link. Just before Catalon’s departure, she reportedly helped care for the ill 69-year-old mother of her roommate. That 69-year-old woman was later diagnosed with SARS, and died on April 25—11 days after Catalon, herself, had died in the Philippines. Published reports indicate that the roommate’s mother may have contracted SARS at the Lapsley Family Clinic in late March from a member of the Samson family. Some 17 members of this family reportedly contracted SARS from the family patriarch, 82-year-old Eulialo Samson, who was not diagnosed with SARS until a few days after his April 1 death. Samson and his son contracted SARS on March 16 in the Scarborough Grace Emergency Department from Rose Pollack, who was seated near them in the waiting room.

⁷ *Toronto Star*, September 27, 2003.

A Shifting Approach to Diagnosing SARS. Through the month of April, the number of probable-, suspect-, and PUI cases mushroomed. While public health officials continued to believe that it was disastrous for a SARS case to go undiagnosed, they also saw the downside to casting too wide a net for SARS. If the child of a health care worker on quarantine came down with the flu, for example, and—errring on the side of caution—public health doctors decided to consider it a possible SARS case, the diagnosis could close down an entire school for days. If a hospital patient acquired pneumonia and, again on the side of caution, doctors diagnosed possible SARS, it could close the hospital ward and send hundreds of health care workers into quarantine. A SARS diagnosis, in other words, could prove extremely disruptive. If it was crucial not to miss cases, it was almost as important not to bend over backward to diagnose the disease when the chances were remote. “Over-calling of cases causes huge resource problems, public panic, and potentially discredits the operation,” says Young.

In mid April, hoping to reduce over-diagnosis of SARS, D’Cunha began to stress the need to pay strict attention to the SARS criteria listed in the Health Canada SARS definition. In addition, with the support of the POC Executive Committee, he created a provincial adjudication program, in which questionable or conflicting local diagnoses were subject to the review of one of several provincially-designated experts, who would look at the patient’s case file and make a final judgment call.⁸

The Month of April: Long Hours, Camaraderie, and a Large Dose of Exasperation

During the month of April, the emergency response to SARS settled into a basic *modus operandi*, buoyed by a high level of expertise, professionalism, and earnest good will among the participants and hobbled by limited information, inadequate staff resources, and unworkable systems for the exchange of vital incoming information about the behavior of the disease. Within this basic context, each of the major organizational players in the response—TPH, the Epi Unit, the Science Advisory Committee, and the Greater Toronto Area hospitals—faced a particular set of challenges and frustrations.

The TPH and the Problem of ‘Overwhelm’

The tasks that fell to the local public health units during the outbreak were all extremely labor-intensive, especially for the TPH, as most of the SARS caseload was in Toronto. For example, a TPH staff member had to investigate every potential SARS case in an effort to find the epi link. In some cases, the link was obvious, but in others, it took a full-blown investigation to track it down—and that might take days. The average epi link investigation took nine hours to complete. In the course of the outbreak, TPH investigated 2,000 potential cases.

⁸ Some public health units objected to this move, which they regarded as an unlawful usurpation of their authority.

Once a patient had been identified as a possible SARS case, the TPH had to come up with a list of every person who might have been exposed to the patient since the onset of his or her symptoms. In the course of the outbreak, more than 26,000 people were identified as contacts. If the contact had no SARS symptoms but had been exposed to the SARS patient less than 10 days before, the virus might be “incubating” in the body of the contact person. Thus the contact had to go into quarantine for the remainder of the 10-day period. That meant getting the person a mask and thermometer and calling once or twice a day to make sure the person was complying with quarantine, and to check on his or her health status.

As a practical matter, TPH caseworkers would find that they had to help people under quarantine in a number of other respects, as well. If the person became severely anxious or depressed, for instance, the caseworker had to arrange psychological support by phone. If the parent of young children was quarantined, the caseworker might have to help him or her find childcare. If the person had no way to get food, TPH had to find him or her a free food delivery service. Or if an employer refused to allow an employee to comply with quarantine, TPH had to call the employer to advocate on the employee’s behalf.

In addition to the casework itself, TPH leaders had to figure out a way to keep track of assorted details of every possible SARS case, and every possible contact of every possible SARS case. The existing software for reporting infectious diseases in Ontario was unworkable as it was limited to a set of specific, known diseases. They then tried to develop a system using Excel spread sheets, but even the Excel template was too limited for the task at hand. TPH asked its internal computer experts to devise a viable tracking system—which they did, but they were not able to complete it until late April. This, as Toronto’s Medical Officer of Health Basrur put it, “was like designing the bucket when you’re fighting the fire.”⁹ In the meantime, TPH resorted to old-fashioned paper files. As Basrur has explained:

We had flip charts and color-coded post-its as one of the key ways in which we shared information and passed it on between shifts. It [was] absolutely manual—highly visual. Expeditious, but not efficient, if you know what I mean, when it comes to such things as reporting to the Ministry or to the media what was our total number of cases, how many were in hospital, how many were in ICU, how many were on ventilators. At one point, it was practically a matter of counting stick men every single time they called us up to ask for more recent numbers, and that’s no way to run a public health unit.¹⁰

Given the amount of work involved and given the burden to those under quarantine, there were questions, early on, about what categories of people to place under quarantine. Everyone at

⁹ Canadian Broadcasting Company, November 19, 2003.

¹⁰ Canadian Broadcasting Company, November 19, 2003.

TPH agreed on the need to track down the contacts of all the probable- and suspect-SARS cases—but what about the PUI's? Did all their contacts have to be quarantined as well? “That was the dilemma,” says Yaffe, director of the TPH Communicable Disease Control division. “We decided to err on the side of caution. So if there was any doubt that the person was a case, we kept investigating very carefully to figure out if they were or they weren't. In the meantime, we had to deal with them as if they were, and deal with their contacts as if they were the contacts of a case.”

Similar questions arose with respect to the degree of exposure to SARS. It seemed clear that the virus was at least primarily spread by droplets; an airborne virus would have spread the disease far more widely and quickly. Droplets were heavy enough that they could only travel about three feet before falling to the ground. They could also land on flat surfaces and be spread by the hands. That meant that close contact between people was generally necessary to spread the disease. But there were also examples of disease transmission that seemed to have occurred from a more remote level of contact. In terms of identifying people who should be quarantined, this uncertainty posed a dilemma. The members of a SARS patient's household were a clear-cut case: they should be quarantined. But what about someone who had walked through a hospital at a time when SARS was spreading, unchecked, among health care workers? Early on, TPH decided to quarantine anyone with a plausible level of contact—again, erring on the side of caution—but later the agency adopted a position in the middle ground: “active surveillance” instead of quarantine for a low-likelihood contact. That meant allowing the person to go about his or her regular life, but monitoring closely for SARS-type symptoms. There were 13,374 people under quarantine in Toronto over the course of the outbreak—as many as 8,000 at once during the outbreak peak.

While TPH received wide praise for the long hours and unstinting efforts of its leadership and staff, there were, in the final analysis, not enough trained people to carry out all this work, even when an additional 400 people were re-deployed to the Communicable Disease Control division from other parts of TPH, and even when a few nearby communities volunteered public health workers to help out. Nor was the old fashioned paper information system really viable. As a result there were many mistakes of various types reported by a frustrated public. There were hours spent on “hold” when trying to call TPH for information. There were people under quarantine who were never called—and then those who were called repeatedly. There were people who had to repeat their entire story over and over to a string of TPH staff members, as the information given before could not be located. There were deceased SARS patients whose grieving relatives received calls asking about the patient's condition. There were SARS-exposed individuals who were not contacted soon enough to prevent the possibility of further spread of the disease.

In fact, a number of Toronto residents figured out they had been exposed to SARS and placed themselves under quarantine—not at the request of TPH, but because they had heard about the protocols from TV news reports and decided to do the responsible thing. The impression of widespread cooperation and compliance with quarantine in Toronto would later be a topic of

some wonder to officials at both the WHO and at the CDC, according to Health Minister Clement, although there was no way to calculate the actual compliance rate, and estimates ranged from 50 to 90 percent. There were also a few infamous examples of noncompliance—in particular, a Hewlett-Packard employee who scoffed at the idea that he might be infected and went to work, persuading his wife to cover for him on the phone when public health workers called. Not only did he have a fatal case of SARS, but he infected a co-worker who also died.

Although it created an overwhelming workload, most people in the public health field agreed that, given what was known at the time, there had been little choice but to use quarantine in Toronto. There was one prominent exception to this viewpoint, however. Dr. Richard Schabas, chief of staff at the York Central Hospital and Ontario's former chief medical officer of health, believed that quarantine was ineffective and a waste of resources. "Quarantine was abandoned by public health a hundred years ago because it doesn't work," he argues.

When it comes to quarantine diseases, there are two categories. There are those diseases where quarantine is ineffective because the disease is too infectious—like measles or influenza. And then there are diseases where quarantine is unnecessary because the disease isn't sufficiently infectious—your standard garden-variety pneumonias. Why would you put immense effort into a control measure which doesn't work for any other infectious disease? You might as well bring out the leeches.

What's more, Schabas says, epidemiologists should have been able to see that the outbreak was almost entirely hospital-based, and focused resources there, not exhausted themselves trying to halt the small amount of community spread. Even after-the-fact, Schabas' view was well out of the mainstream, however, and certainly at the time, the TPH leadership did not doubt the need to use quarantine, however arduous and imperfect.

The Epi Unit and the Bad Information Reporting System

One of the greatest difficulties in arresting the spread of SARS was to come up with infection control protocols in the absence of clear information. For example, there was an operating assumption that everyone infected by the virus got sick—but was that really true? Might there not be people who were infected but asymptomatic, and might they not still spread the disease? Was SARS spread only by droplets—and did the virus transmit only through respiratory secretions or also through fecal matter? Was the maximum incubation period 10 days, or was it really 12? Were some SARS patients "super-spreaders"—people who were highly infectious because their secretions contained an unusually large volume of the virus—and, if so, did they have identifiable characteristics?

The job of the Epi Unit was to provide the answers to these kinds of questions by analyzing statistical data about the behavior of the disease. In addition, the Epi Unit was to provide authoritative data about all SARS cases in Ontario. It was information and analysis that many agencies and interest groups desperately wanted, including Health Canada, the WHO, the Science Advisory Committee, the scientific researchers, provincial politicians, and the media.

This would have been challenge enough to an established epidemiology office working with the latest and most flexible computer software. In Ontario, the Epi Unit had to be created from scratch by people outside government in the midst of the outbreak. “This fact, in and of itself, is stunning,” according to the interim report of the province’s post-hoc analysis of the SARS response effort.¹¹ “[Y]ou cannot, in the event of an outbreak, suddenly hire your whole work force, implement your computer system, and then implement the processes and the legislative frameworks in which to produce a coherent surveillance system,” says an anonymous observer, quoted in the report.

As the Epi Unit began work, its staff consisted of Johnson, the professor seconded from the University of Toronto, four field epidemiologists loaned by Health Canada, and a revolving pool of epidemiologists loaned from the local public health units. This latter situation necessitated constant training of incoming epidemiologists, and created some problems with consistency in the work product.¹² But the biggest problem for the Epi Unit leaders concerned the hopelessly antiquated and inappropriate system for reporting data from the province’s 37 public health units to the Epi Unit. This “Reportable Disease Information System,” was a DOS-based system that dated from the late 1980s and only worked for specific, known diseases.¹³ By the time the Epi Unit was up and running, each public health unit affected by SARS had come up with its own means of recording patient data, using Excel spreadsheets, which they e-mailed to the Epi Unit. There were several problems with this, from the point of view of the Epi Unit. For one, the data was inconsistent from one public health unit to another. Also, the information the unit was trying to record often did not fit the design of the Excel template. For example, a public health unit might list a date of death in a field intended for yes/no information, which made it impossible even to do a simple calculation like a fatality rate without having to count the fatalities manually. In addition, the sheets did not track changes in a patient’s condition. Thus, the only way to see, for example, whether the diagnosis of a particular patient had changed from suspect- to probable SARS was to

¹¹ SARS & Public Health in Ontario, Interim Report (Problem 13: No Provincial Epidemiology Unit), 2004.

¹² Early on, the managers of the Epi Unit tried to get the Ontario Public Health Branch staff to assist the Epi Unit, but were turned down on the grounds that the staff was too busy working on other projects. According to the province’s later analysis, there was an odd dynamic in play, in which the Epi Unit volunteers were working long hours at a frantic pace, while the Public Health Branch staff worked their usual 8:30 a.m. to 4:30 p.m. schedule at a deliberate and unhurried pace on non-SARS matters.

¹³ The inadequacy of this system was no secret to the Public Health Branch or to the local public health units. D’Cunha had tried and failed to obtain provincial funding to upgrade it in 2000. A 2003 provincial report had also noted the inadequacy of the system in reporting information about the West Nile virus. (2003 Annual Report, Provincial Auditor of Ontario.)

rifle through past spread sheets. Even worse, the sheets did not record enough detail about patients to allow epidemiologists to do the kind of analysis urgently required by the Science Advisory Committee and Health Canada. For example, to calculate the incubation period of the disease, the Epi Unit needed to know the date of the patient's exposure and the date of the onset of fever or other symptoms. In some communities, however, the spreadsheets had been set up to give only a "yes" or a "no" for a list of symptoms (e.g., fever-yes, cough-no).

In collaboration with Health Canada, therefore, the Epi Unit devoted a great deal of energy, early on, to bringing in the more state of the art Integrated Public Health Information System (iPHIS). The iPHIS system was ready to use in mid April just when TPH, York, and other public health units were at their busiest, however, and did not feel able to make the switch. What's more, while the iPHIS system would have allowed for better analysis of SARS, it did not have the capacity to track quarantine contacts—an important need for the local public health units. Further, TPH was well along in developing its own system, which TPH leaders insisted would be superior to iPHIS.

In the end, the Epi Unit could not persuade the public health units to switch to iPHIS. Instead, the Epi Unit quietly hired a group of caseworkers to go back out to the community and re-research every SARS case, in order to capture the data the Epi Unit needed—a time-consuming process and one that raised hackles among hospitals and public health units.¹⁴

The Science Advisory Committee and the Lack of Data

The Science Advisory Committee was created out of Young's conviction that Ontario should take advantage of any new discoveries about SARS—gleaned from research scientists or from the behavior of the disease in the outbreak itself. And who better to interpret the new information than a group of infectious disease experts? They would be able to extrapolate from small discoveries to recommend the best possible outbreak policies, Young reasoned.

When Low and others put out a call to infectious disease experts around the country to come and help Ontario, many responded—in some cases, spending weeks away from work and home. After-the-fact, the provincial analysis of the outbreak would praise the group's good will, camaraderie, and civic-mindedness, but argue that—because the Science Advisory Committee was created without the advantage of emergency planning ahead of time—it was created without thought to important topics: Should other areas of expertise be represented on the committee, and if so, what areas? Who, exactly, should the committee report to? What kinds of questions should the committee take up—and what kinds not?

¹⁴ The information in this section was largely drawn from "SARS & Public Health in Ontario, Interim Report (Problem 13: No Provincial Epidemiology Unit, Problem 14: Inadequate Infectious Disease Information Systems)," 2004.

Over time, the membership of the SAC did broaden to include, in particular, public health doctors and—after some campaigning—primary care physicians, but not without first incurring bad feeling among those left out. One committee member later commented that disease surveillance and epidemiology experts were never well enough represented on the committee. Committee members also expressed confusion over whether they were reporting to Young or D’Cunha, both of whom were members of the committee.

There was additionally some doubt about the purview of the SAC and of how it should prioritize its tasks. As the post-hoc provincial analysis would later put it, “[T]he Science Committee not only had to answer the questions but had to identify the issues at the outset, prioritize them, and determine who best could help answer the question. [In addition,] the Science Committee quickly became inundated with requests for guidance and information.” Thus, for example, in addition to recommending directives to hospitals, the committee was lobbied to send out guidance to long-term care facilities and primary care physicians. A handicap in this regard was the fact that—because the province had never gotten very far with emergency planning for pandemic influenza—the SAC did not have the advantage of starting with a set of prototype directives for hospitals and other medical settings, that could be tailored for the particulars of the SARS outbreak. They had to start entirely from scratch.

The committee also received questions from hospital administrators, confused about aspects of the directives that had been sent out. Sometimes, the committee was also asked to address questions that were coming in from the media. It was impossible to do everything, and especially impossible to do everything all at once, though committee members reportedly often put in 14- and 16-hour days.

In addition, except for three or four core members, the SAC members could not serve on the committee for more than a week or so, as they had work and personal demands elsewhere. The turnover meant the continual need to bring new people up to speed, says Sunnybrook’s Dr. Brian Schwartz, director of pre-hospital care, who co-chaired the SAC from beginning to end. “There was a learning curve—and in an outbreak, you don’t have time for that. It might take them two days to figure out what was going on and start contributing—especially if they were from out of the area.

People would come in from other provinces saying, “Oh, why can’t you do it this way?” Which, in a normal environment, is great, but [in this situation] you needed people to just leave that stuff at the door and say, “OK, we’ll take it from here.”

In addition, Schwartz says, many of the experts had a tendency to offer information in all its complexity, but were reluctant to make hard-and-fast recommendations. Schwartz, with his background in emergency medicine, was the person who pushed them to do so. “I was the guy that had to bring closure on a lot of things,” he says, “and I was the guy who had to stand up and

sometimes take responsibility for things that were less than perfect.” It would have been better, he suggests, to establish ahead of time a roster of experts who had agreed to help out in an emergency, and who had received training in the particular nature of decision-making in an emergency, and the role of scientific experts in that process.

To the committee members, themselves, the great frustration was the lack of daily-breaking epidemiological data and analysis on which to base their recommendations. “Put yourself in the position we were in, in the second week of April,” says Schwartz. “We do not yet know the results of the protection measures [in the hospitals] and the quarantine measures and all the other things we were doing. We don’t know whether it’s working or not. We still aren’t sure whether [SARS transmission] is *airborne*.” It was crucial to know, yea or nay, in order to know whether to stay the course or take a new, more draconian approach.

After-the-fact analyses have cited several reasons for the information problem. One was, simply, that the Epi Unit was struggling with insufficiently detailed information in unwieldy form and thus, the data was often not available or not available in timely fashion. But a further problem was the fact that D’Cunha insisted that all data from the Epi Unit go to himself so that he could ensure its accuracy before passing it on. This, reportedly, became quite a bottleneck, though D’Cunha steadfastly denied that it caused any significant delays. He was, however, adamant that his department not release flawed data. At one point, for instance, he explained to the SAC that patients were sometimes double-counted—once in the city or region in which they lived and once in the city or region in which they were hospitalized—and he insisted that such errors be corrected. “One of the things we said was, we’d rather have flawed data than no data,” says SAC Co-chair Schwartz. “At least we’d have *something* to work with, even if some patients were counted twice. And Dr. D’Cunha’s retort was, ‘Well, no, we can’t do that.’”

When the SAC was able to have direct contact with the Epi Unit, Schwartz added, the exchange was generally very useful. On several occasions, however, D’Cunha directed the Epi Unit leaders to cancel scheduled presentations to the SAC. Such episodes were enraging to the SAC. In mid April, the SAC wrote an official letter of complaint and, at one point, even threatened to disband. Young and a high level Health Ministry official tried to intervene to speed up the flow of data to the SAC, with mixed results. Says Young, “You see, the problem we ran into is—how do I fix that? They’re my committee, but he’s got the information. How do I fix that? We tended to find ways to fix it by going around the edges and developing side pathways—stuff that you shouldn’t do in an emergency.”

In Fact, Many Resort to ‘Side Pathways.’ The frustration, from many quarters, at not having the newest and best data led to assorted efforts to circumvent the official reporting structure and recreate the data from scratch, leading to some of the most unpleasant tensions in the outbreak response.

One example was the decision of the Epi Unit, frustrated at not getting the detailed information it needed through regular channels, to hire caseworkers to go out and collect all the information they could on the SARS cases again, one at a time. But the Epi Unit was not alone. At various times, D’Cunha’s staff, the SAC, Health Canada, and the POC all ended up calling hospitals, public health units, and even patients or their relatives to get data. Not only did this result in assorted discrepancies in the data, but already-overloaded hospitals and public health units were flooded with calls for information on specific cases. Many times, the hospital or public health person who received the calls had never heard of the person who was calling and was reluctant to give out confidential patient information over the phone. But, under increasing pressure from the WHO, Health Canada pressured D’Cunha and D’Cunha, in turn, pressured the Epi Unit staff and his own staff. Sometimes five different people would be asked to get the same information—and all would call the public health unit, insisting that the matter was extremely urgent, and—if the call was not returned within five minutes—calling again. Civility was reportedly a casualty of this dogged fight for data. “I had people coming into my office *crying* about being harassed,” says TPH’s Yaffe.

The Hospitals and the Problematic Directives

According to an article in the *Toronto Star*, the Ontario Health Ministry sent out more than 50 bulletins and directives to hospitals and other medical settings in the course of the outbreak response. The system for developing the directives began with deliberations by the SAC. The SAC then made a recommendation and passed it to Young, who passed it on to the SARS Operations Centre, which was supposed to take the SAC advice and—in rapid order—write it up as a clear, workable directive. Any big changes were sent to Schwartz or his SAC co-chair for approval—then on to Young and D’Cunha for their signatures—up to Health Minister Clement for final approval—then back to the SARS Operations Centre for dissemination.

From the perspective of the hospitals, these directives were cumbersome, confusing, overly long, and overly complicated—not at all what was needed in an emergency—and some members of the SAC and the Health Ministry concede the point, but say they were doing their best. “As a personal comment, we didn’t have the time or the strength to be able to simplify it more than we did,” says Schwartz. “The science advisory group was made up of individuals who each had expertise in an area, but had never met as that kind of a group before, and had zero time to be able to exchange knowledge enough so that we could translate the infectious disease expertise into emergency response expertise—and so it came out cumbersome.” Even more exasperating to the hospitals was the fact that, based on new information and complaints from the field, the SAC and SARS Operations Centre would re-issue directives. The new version would be sent out without summaries of what changes had been made, so hospital personnel had to spend hours wading through them all over again, hunting out the new bits and pieces. The problem, says Stuart, was that there were many changes, scattered all through the documents. In retrospect,

Young notes, a simple expedient might have been to highlight the changes, but he adds that in the press of the moment, no one thought to do this. Stuart acknowledges that this made the directives difficult for hospitals to deal with. “But it wasn’t done out of malice,” she says. “It was a huge amount of work to send out a directive—a *huge* amount of work.”

Hospital administrators additionally complained that some of the directives were simply impossible to fulfill. The most obvious example, perhaps, was the decision—included in the province’s first batch of directives—to require all hospital personnel to use N95 masks, which offered much better protection against airborne viral particles than did standard surgical masks. The preponderance of evidence suggested that SARS was droplet-spread, but there were enough anecdotal exceptions to this that the group decided to err on the side of caution by mandating the more protective masks.

Unbeknownst to the SAC or the Health Ministry, however, there were not enough N95 masks available for all Greater Toronto Area hospital workers to use them. “Once we decided we needed the N95 masks, the reality is, we couldn’t get [them]. So the complaints that the hospitals didn’t get what they needed—they were legitimate, but there was no way around it,” says Schwartz. “It just took some time to get the supply chain revved up to be able to get people the equipment they needed.”

Eventually—cleaning out the supply of stored N95 masks all across North America—the hospitals were able to get the masks. But then there was a second problem. The Ontario Labor Ministry required that these particular masks be “fit-tested,” an elaborate procedure requiring trained personnel and special testing equipment. The SAC and Health Ministry had not known about this occupational safety requirement, either, when they adopted the directive.

“There was a recognition that, operationally, you just couldn’t do this,” says Schwartz. But despite these difficulties, he stands by the N95 requirement. “My feeling as a front-liner was—get the damn masks out there. Even if you’re not exactly sure how to use it, even if it’s not perfectly fit-tested, it will provide you a level of protection. Better than nothing—and better than the surgical masks.” Was it fair to require hospitals to do something that was—at least immediately—undoable? Says Schwartz:

I think it was the idea that people need to be pushed to do what they need to do—and I don’t think that anybody was particularly punished for not following the directives—but there had to be a fire lit under them to understand the seriousness of the problem. And, ultimately, people were able to procure the masks, and I think there was some leeway given in terms of fit testing from Labor.

But the fact that, for a time, the provincially required masks were not available to them made some health care workers extremely uneasy, especially as they watched their colleagues with

SARS growing sicker and sicker. Some filed union grievances about having to work without the N95 masks.

Former Ontario Chief Medical Officer of Health Schabas argues that the whole notion of sending out detailed directives during the outbreak was benighted from the beginning. “Hospitals are large and complex and, for the most part, very sophisticated organizations,” he says.

[The provincial leaders of the response] were dealing with institutions that in many cases had far more expertise than they did at the [Health] Ministry. Basically, the Ministry’s approach was to deal with the hospitals like they were small children: “Here are Our Rules, written down.” Of course, it’s enormously difficult to write a coherent policy in black and white, yet that’s what they tried to do. And of course as a result, they had to change their policies every few *hours* because people found flaws in them.

They should have issued general guidelines and left it to the hospitals how they implemented them—and they should have had the capacity to respond to questions and to troubleshoot. That’s not what they did—and so there was tremendous wasted effort, tremendous ill will created between the hospitals and the Ministry.

‘The Weekend from Hell ...’

In the week before Easter Sunday, April 20, the emergency responders endured the two most dispiriting and frightening developments in the outbreak. The first was the discovery of an undetected cluster of SARS cases—not in a hospital, but at large in Toronto.

The Cluster in the BLD Community. On Friday, April 11, the Toronto Public Health department discovered that SARS had been spreading, just outside the radar of the public health surveillance system, within a 500-member, mostly-Filipino charismatic Catholic group called Bukas-Loob Sa Diyos Covenant Community. As of April 11, TPH reported, there were 10 probable- and 19 suspect-SARS cases in the BLD. In addition, two community-based doctors who had treated some of these patients had also acquired SARS. Although the TPH had been following most of these cases individually, it had taken some time to see the connections among them.

The two cases that began the cluster were those of Eulialo Samson, the man who had, fatefully, gone to the Scarborough-Grace Emergency Department on March 16 with a knee injury, and his son, who had accompanied him. There, they had contracted SARS from Rose Pollack, who was sitting nearby in the waiting room. The 82-year-old Samson, who was the patriarch of a large family, had 10 children and dozens of grandchildren. He was not diagnosed with SARS until after his April 1 death but, in the meantime, he had infected 17 members of his extended family.

At least one of those family members had attended two large BLD events—a March 28 religious service, attended by 500 people and a March 29 religious retreat, attended by 225. In addition, an April 3 funeral visitation service for Samson had been attended by a combination of BLD members and family members who had been infected with SARS.

At first, TPH authorities tried to identify which BLD members, in particular, had been exposed to SARS, but found this impossible to reconstruct, given the large numbers of people at each gathering. By April 13, TPH reluctantly¹⁵ decided it had to quarantine the entire BLD community. But TPH leaders were not confident that they could get the word of the quarantine out to everyone in the BLD fast enough and persuasively enough to avoid a major spread of the disease during Easter weekend, April 18 to 20. All things equal, many BLD members would either visit or host out of town family members over Easter. Such visits had the potential to disperse the disease widely. In addition, officials worried that some BLD members might be unwilling to miss services for Easter, the holiest religious holiday in the Catholic faith. They also worried that some of the rites of Easter in Catholic and Protestant churches might facilitate the spread of the disease—for instance, drinking wine from a common cup, giving communion wafers in the mouth, conducting confession in a small confessional stall, kissing the crucifix on Good Friday, widespread shaking of hands in the Salute of Peace.

Health Minister Clement appealed to the local Catholic archbishop for help in encouraging BLD members to observe the quarantine. He also asked the archbishop (and some Protestant church leaders) to substitute bows and other non-contact rituals for the traditional rites. Church leaders pledged their help, but the leaders of the outbreak response were still on tenterhooks. They worried that this could be the moment they had fought hard to avoid—the moment when a disease that was still traceable, and therefore still controllable, spilled out of control. “We were on the precipice,” says Clement. “We were on the razor’s edge.”

The Sunnybrook ‘Intubation’ Fiasco. In the midst of the BLD anxiety, the leaders of the emergency response learned, to their horror, that at the Sunnybrook hospital, 11 healthcare workers—who had taken pains to follow infection control precautions carefully—had all contracted SARS during a particularly difficult “intubation” procedure. Intubation in this context refers to the insertion of a tube down a patient’s trachea to clear the airway.

On April 8, Nestor Yanga, a 54-year-old family doctor who contracted SARS from one of his patients at the Lapsley Family Clinic, had been admitted to Sunnybrook. By April 12, his condition had deteriorated, and he was having extreme difficulty breathing. Hospital staff moved him to Intensive Care and placed a BiPAP mask over his face, but he kept pulling it off to cough.

¹⁵ Public health officials and BLD leaders worried that BLD, in particular, and Filipinos, in general, might be stigmatized as a result of the quarantine. Already, Toronto’s Chinese community was suffering from a mistaken impression that SARS was widespread among Chinese-Canadians. Chinese restaurants were experiencing a pronounced drop in business, although, in mid April, political leaders began to make a show of eating in them, in an effort to persuade citizens of their safety.

They therefore tried to intubate Yanga, but secretions rose up from his lungs, blocking the tube. The tube had to be removed and drained, then reinserted—all in the rushed atmosphere of a respiratory emergency. Doctors speculate that the combination of the techniques and the circumstances led to the aerosolization of the patient's secretions, which increased the virus' ability to spread. In addition, the procedure took place in crowded quarters and lasted four hours, in all.

Still, the doctors, nurses, respiratory technicians and other health care workers present had worn the requisite N95 masks, goggles, gloves, and gowns. Three days later, they began to get sick and by the end of the Easter weekend, four were diagnosed with probable-SARS and another eight with suspect-SARS. On April 20, Sunnybrook closed its Emergency Department and Intensive Care Unit for 10 days. This was a blow to morale in the medical community, as Sunnybrook was a flagship hospital with the largest trauma center in Canada. It had played a leadership role in the outbreak, and had treated about half of the area's SARS patients.

To the SAC advisors, the episode was especially devastating. They had banked on the idea that these precautions were—if anything—cautious to a fault, and that they would be utterly reliable at protecting health care workers. At this point, they began to fear that there might be *nothing* that health care workers could do to keep safe. “We thought we'd see health care workers walk out of the hospitals—because we weren't protecting them,” says Low. “They were getting SARS even though we were using precautions. That was a dark time.”

Bracing for the Worst-Case Scenario

At the least, the BLD outbreak demonstrated that Toronto's contact tracing and quarantine efforts were not fool-proof. And the Sunnybrook episode demonstrated that the new hospital safeguards were not fool-proof either. Were these cases aberrations, or was the emergency response, more broadly, failing to stop SARS? The data that would answer that question was not yet available. Thus, on April 22, Health Minister Clement called a meeting with the SAC to ask the scientific experts a distressing question: If their best efforts failed, if SARS continued to spread, what was the worse case scenario? What dire and extreme choices might he and Premier Eves be forced to face? “I wanted to know how bad this could get,” he says. “You hope for the best, but plan for the worst—that was my motto during this whole thing.”

The SAC laid out a shocking picture. Under the worst-case scenario, SARS would turn out to be a highly contagious disease, impossible to contain, that would begin spreading uncontrolled in the community. The very worst-case scenario—it would eventually infect everyone. Given the projections at the time of a 10 percent mortality rate, that would mean one million people dead in Ontario and three million dead in Canada before the virus burned itself out.

In terms of the government response—if the disease began spreading out of control in the Toronto area, the government might have to close down all non-essential venues for public

mixing, by shutting movie theaters, for instance, or canceling ball games. Worst-case scenario—the province might have to quarantine the entire Greater Toronto Area in an effort to save the rest of Ontario and Canada.

A Sigh of Relief

Once Toronto had gotten past the Easter weekend, however, the situation brightened considerably. In fact, the BLD community did comply with the city's quarantine order; the outbreak did not, after all, slip out of control.

Nor did health care workers walk out *en masse*. SAC members and provincial authorities candidly expressed their distress and bewilderment at the fact that health care workers were still getting SARS, and vowed to redouble their efforts to understand why. In support of that effort, Health Canada requested assistance from the Atlanta-based Centers for Disease Control.¹⁶

At SAC's recommendation, the province issued new protective regulations—for example, the use of face shields in place of goggles, and double gloves, double gowns, and double masks when caring for SARS patients, so that the top layer could be shed as the worker left the patient's room. They stopped short of mandating stryker "space" suits for high-risk procedures such as intubation, suctioning, bronchoscopy, or the use of BiPAP masks. These suits, which resembled the suits worn by astronauts, entirely enclosed the worker and provided him or her with a special protective air filter. But they were hot, unwieldy, and reportedly took about three minutes to put on—far too long in a respiratory emergency, some experts argued. In the wake of its own intubation disaster, however, Sunnybrook did require its own staff to use the stryker suits for high-risk procedures on SARS patients.

The best news, though, was that data was now available that indicated that in the past two weeks, there had been only one new case identified as probable- or suspect-SARS in the Greater Toronto Area. The outbreak was dying out; the end was in sight. The emergency response group heaved a collective sigh of relief. But not for long.

Blind-Sided: The WHO Cautions Against Travel to Toronto

On Wednesday, April 23, the World Health Organization issued a global advisory against all non-essential travel to the City of Toronto. Although WHO officials insisted that Canada's federal leaders should have seen this coming, local and provincial health officials were dumbfounded. *Why*—when SARS had been almost entirely confined to Toronto-area hospitals?

¹⁶ Nothing conclusive came out of the CDC consultation, but the CDC did heighten SAC's consciousness about the importance of removing protective clothing correctly to avoid becoming infected from the protective gear itself. The CDC recommended removing the gear in a strict order, interspersed with frequent hand washing.

And why *now*—when the outbreak was nearly over? “The day they called it, we knew we had it under control,” says Young.

The WHO had issued SARS travel advisories to only four other cities or regions—Hong Kong, Beijing, and two provinces in Mainland China—Guangdong and Shanxi. Although the purpose of the alerts was pragmatic—to minimize the spread of SARS to other regions and to other nations—any city or region named in such an alert regarded it as a tremendous blow, sure to exact a heavy penalty in lost revenue from foreign visitors.

What’s more, for a wealthy industrial nation like Canada, inclusion in a WHO travel advisory was a significant embarrassment. The government of such a nation was expected to have the public health sophistication to rein in infectious diseases expeditiously. After all, Canada was on a short-list of countries that, by many widely accepted measures, offered the best quality health care in the world. Canada was accustomed to *advising* the WHO, not receiving its injunctions. And within Canada, Toronto was no podunk outpost; it was the nation’s largest city—its lively, thriving, cosmopolitan economic center. How could Toronto be placed in the same category as struggling, poverty-ridden Guangdong Province in China?

Complaints About Political Leadership

The fury and indignation of the health authorities upon learning of the WHO travel advisory were immediately joined by the fury and indignation of local, provincial, and federal politicians of every stripe. “I’ve never been so angry in all my life,” said Toronto Mayor Mel Lastman. “Let me be clear: It’s safe to live in Toronto... It’s safe to visit this city... This isn’t a city in the grips of fear and panic.”¹⁷ Federal Health Minister Anne McLellan telephoned WHO Director General Gro Harlem Brundtland to argue that the advisory was unwarranted and should be rescinded immediately. Brundtland refused to do that, but did agree to listen to Canada’s arguments at a WHO “review” of the decision the following week.¹⁸ The next day, Canada Prime Minister Jean Chretien called Brundtland, personally, to reiterate McLellan’s call for an immediate end to the advisory. He also put in a similar call to the Deputy Secretary-General of the United Nations, Louise Frechette.¹⁹ (The WHO and the UN stuck to their guns, however, and WHO Communicable Disease Director David Heymann would later call Canada’s April lobbying effort “very inappropriate.”²⁰)

But the sudden visibility of political leaders seemed to remind local reporters of their prior invisibility. Except for Ontario Health Minister Tony Clement, elected leaders had played almost

¹⁷ *Toronto Star*, April 24, 2003.

¹⁸ *Ottawa Citizen*, April 25, 2003.

¹⁹ *Toronto Star*, April 26, 2003.

²⁰ *Toronto Star*, June 17, 2003.

no role during the first month of SARS. Chretien, followed by other federal officials and later by Ontario Premier Eves, did troop, one by one, into Toronto's Chinatown in the second and third weeks of April to eat in local restaurants and assure a jittery public that these establishments were perfectly safe. But reporters observed pointedly that during the darkest hours of the SARS outbreak—when the leaders of the emergency response had been sick with worry at the thought of an uncontrolled community outbreak and/or an angry walk-out by health care workers, and when the Ontario Health Minister had been facing the frightening implications of a SARS “worst case scenario”—the top political leaders of the city, the province, and the country were nowhere to be found. Where had they *been*? the reporters asked.

The answer, it turned out, was that, during Easter week, Prime Minister Chretien had been in the Dominican Republic on a golfing holiday. The parliament was likewise in vacation mode, enjoying the Easter recess. Ontario Premier Ernie Eves was golfing in Arizona, and had, since the start of the outbreak, not deemed SARS the kind of emergency that required the interruption of the Ontario legislature's four-month recess. Toronto Mayor Mel Lastman had been receiving arduous medical treatment for Hepatitis C, which made him a more sympathetic figure, but in the course of excoriating the WHO travel advisory, Lastman mortified partisans and enemies alike by appearing frankly befuddled on international news broadcasts. For example, ABC News aired the following exchange with reporters:

Mayor Lastman: What I'm doing right here, right now, is sending out a message to this CDC group, whoever the hell they are.

Reporters: The WHO.

Lastman: Who?

Reporters: The WHO.

Lastman: The WHO. Sorry. Well, who's the CDC?

Reporters: The Centers for Disease Control.

Lastman: Okay, the WHO.

Though later briefed by his staff, Lastman made another gaffe on a subsequent, and more widely disseminated CNN broadcast. Apparently trying to diminish the stature of the WHO, the Mayor remarked, “I don't know who this group is. I've never heard of them before.” The tactic, if such it was, backfired. “There's a vastly greater chance of dying from embarrassment in this city over the performance of our political leaders than there is from succumbing to SARS,” wrote *Toronto Star* columnist Jim Coyle on April 26, 2003. With respect to Lastman, in particular, Coyle continued, “To admit, as he has, to not even knowing what WHO is demonstrated a degree of ignorance inconceivable in any newspaper-reading adult. For that admission to come from the leader of a cosmopolitan metropolis is mind-boggling. To have gone on CNN and admitted as much is just plain stupid—a credibility-destroyer that was total.”

Another *Star* columnist, James Royson, described the Prime Minister, Premier, and Mayor, collectively, as “lame,” “lax,” and “lethargic” on April 30, 2003. “The SARS outbreak is a classic case of How Not to Handle a Crisis.”

For their part, the politicians insisted that they had been taking the high road by stepping back and letting the professionals handle the situation—that they did not want to exploit SARS for political capital, nor did they want to increase public alarm. In fact, their biggest role would come later, with a partisan federal versus provincial (and Liberal versus Tory, respectively) tussle over who was going to foot the bill for the SARS emergency response and how much of the economic loss suffered by individual citizens, businesses, and hospitals in the Greater Toronto Area would be offset by government spending in some form or other.

The Cavalry Rides to Geneva

After receiving Canada’s enraged response to its Toronto travel advisory, the WHO did agree to hear an appeal of its decision on April 30 and Canada sent a delegation to Geneva, headed by Ontario Health Minister Clement. In addition to Clement, the delegation included Ontario Public Health Commissioner D’Cunha, Toronto Communicable Disease Control Director Yaffe, and two federal officials—a political assistant to the federal Health Minister and the ambassador to the WHO and the World Trade Organization.

The delegation came armed with facts and figures and suggested that the WHO had probably not seen the best and most current data from Toronto, and thus did not understand that SARS was well in-hand in the city; there had been no new transmissions of the disease in the last 10 days. Clement recalls, “When we gave them the numbers on the decline in new cases, and when we gave them the information on how we were handling the cases in the hospitals, what they said to us was, ‘OK, what about the border issue?’”

The Border Issue. Clement says that it rapidly became clear to the delegation that the WHO’s primary concern with respect to SARS was to prevent the disease from traveling to developing countries which had little public health infrastructure. The WHO’s sudden focus on Toronto, in fact, may have resulted from the claim of the Philippine government that Adela Catalon had brought SARS to Manila from Toronto, setting off a panic reaction in the areas she visited. (Whether Catalon really had SARS was in sharp dispute at that time, and the question was never completely resolved, though TPH did eventually find a clinical link between Catalon and other SARS patients in Toronto.)

On March 27, well before the Catalon incident, the WHO had called upon the federal government in Canada to institute health screening of all passengers aboard international flights out of Toronto’s Pearson International Airport. Ontario officials had urged their federal counterparts to comply, but federal officials were reportedly not convinced of the efficacy of

airport screening. Instead, they arranged for the distribution of information cards at the airport, asking passengers with SARS symptoms to put off traveling and see a physician. To the WHO—which favored the use of questionnaires to identify potential SARS carriers along with infrared scanners to detect passengers traveling with a fever—the Canadian information cards were anemic indeed. “They said, ‘Why are Singapore and Taiwan doing ‘x,’ ‘y,’ and ‘z,’ including infrared scanning, and why are you doing nothing?’” Clement recalls. “‘Why are we getting better compliance on border control from Asia than we are from North America?’”

From Geneva, Clement and his delegation colleagues were able to broker a deal. Health Canada committed itself to carrying out a set of specific, robust airport screening measures, including infrared scanning, and the WHO rescinded its advisory on April 30—one week after issuing it. (The advisory would otherwise have lasted three weeks.)

‘It’s Over!’

Back in Toronto, meanwhile, leaders of the emergency response to SARS were worn out, dispirited by the WHO advisory, and eager to put this difficult chapter behind them. Luckily, the prospects of doing so appeared promising: there had been 10 consecutive days without a new probable-SARS case. Once the city had gone 20 consecutive days without a case—two incubation periods—the epidemiologists believed it would be safe to declare the outbreak at an end.

They waited, impatiently, for the next 10 days to tick by without event. On May 9, Toronto’s Basrur jubilantly told the press that the outbreak was over. On May 14, the WHO removed Toronto from its list of areas with recent local transmission. On May 17, Ontario Premier Eves formally ended the province’s declared emergency and dismantled the Provincial Operations Centre. That same day, the Ontario Health Ministry ended Code Orange for Greater Toronto hospitals, so they could return to their full complement of health care services. But the post-SARS celebration was to be brief.

‘Falling Apart Before Our Eyes ...’

On Friday, May 18, Maurice Buckner, a 57-year-old double-lung transplant recipient at St. John’s Rehabilitation Hospital, went home for the Victoria Day long weekend. Almost immediately, he became feverish and exhausted. In alarm, his wife took him to the Emergency Department of the Toronto General Hospital. Doctors there stabilized him and sent him back to St. John’s, where he developed pneumonia symptoms. But one Toronto General doctor, fearing SARS, ordered a bronchoscopy and tested Buckner’s respiratory secretions for signs of the SARS virus. On May 22, that test came back positive. When TPH received this grim report, it sent an envoy to St. John’s posthaste. In dismay, the TPH doctors discovered a cluster of four patients with probable SARS.

At 9:00 p.m. that night, according to the Canada Press, “a clutch of ashen-faced public health officials filed into a small room in the headquarters of Toronto Public Health” to report this dispiriting piece of news to the public. They did not yet have the answer to the crucial public health question: Where had this cluster come from?

At first, public health workers held out the hope that the St. John’s outbreak would turn out to be a small and isolated incident, easily contained. They learned that Kitty Chan, the mother of St. John’s leg surgery patient Hubert Chan, had recently returned with her husband from a trip to Hong Kong, where the couple spent part of each year. Both Kitty Chan and Hubert Chan were now sick with probable-SARS. Had Kitty brought SARS back from Hong Kong and infected her son, who had, in turn, passed the disease to others at St. John? TPH wondered. But the answer was no. Kitty Chan and her husband had returned from Hong Kong on April 22, and had immediately placed themselves in a 10-day self-quarantine, just to be on the safe side. After that, they went to visit their son, who was, at the time, at North York General Hospital. On May 9, he was transferred to St. John’s. On Mother’s Day, May 11, Kitty Chan visited him there. Over the next two or three days, both Kitty and Hubert became feverish and weak with respiratory symptoms. Kitty Chan was admitted to Centennial Hospital soon thereafter.

Another of the St. John’s SARS cluster had also been a patient in North York’s orthopedic ward. On May 23, two TPH doctors and Low headed to North York General and asked to look at the medical charts of all the pneumonia patients. They soon discovered that there were a large number of pneumonia cases—perhaps 20—clustered in the orthopedic ward. Even as they sat in North York General, poring over the charts, they learned that members of the hospital staff had just turned up in the Emergency Department with suspicious symptoms. It was all too familiar. “The day we sat in that conference room, I remember, it was really quite surreal, because things were falling apart before our eyes,” Low recalls. “Not only were we seeing all these cases, but health care workers were now coming back to the Emerge sick.” That night, at TPH’s instigation, North York General closed down. TPH announced that anyone who had visited St. John’s between May 9 and May 20, or North York between May 13 and May 23 must go into quarantine. The outbreak was back.

SARS II

Call it “SARS II” or call it the moment when Toronto realized that “SARS I” had never actually ended—either way, the second go-round of the outbreak had a very different character from the first. “Phase One was sort of a rah-rah kind of outbreak,” says Low. “And Phase Two—everybody was sick of it. They didn’t want it. It was a mistake. People were fed up with SARS. It was a failure. It was a very different atmosphere than the first wave.”

For all that, the actual containment of the second outbreak was smoother and more efficient than the first, public health experts agree. Working with better information about SARS,

and having learned from the experience of SARS I, hospitals and their workers had clearer protocols from the start—and so did public health departments. In fact, once the second outbreak was detected, it took only one week to halt nearly all transmission of the disease. The WHO removed Toronto from its list of active SARS outbreak areas on July 2. But 118 people became sick during SARS II and 13 of them died. Thus, the city was much-occupied with figuring out what had gone wrong—what had allowed the resurgence of SARS when it had been all but extinguished in late April.

By mid June, with the help of epidemiologists from the CDC, Toronto Public Health doctors believed they had worked out the basics of the link between SARS I and SARS II, though some of the particulars remained a mystery. According to the CDC report, the chain of infection went all the way back to Tse, who had passed the disease to James Dougherty, the cardiology patient who had spent the night of March 7 on a gurney near Tse's in the Scarborough-Grace Emergency Department. When Dougherty was re-admitted to Scarborough-Grace on March 14 with a heart attack, he spent two days in the Scarborough-Grace cardiac unit, without being recognized as a SARS patient and without being isolated. There he is believed to have passed SARS to a female heart patient, who returned home on March 17, where she developed respiratory symptoms but was never diagnosed with SARS. She passed the virus to her daughter, who was a nurse at North York General. The nurse began to feel sick on March 30, but did not immediately stop working. The CDC is not sure how she could have come into contact with Lewis Huppert, a 99-year-old North York patient with a fractured pelvis, as she was not assigned to his ward. But epidemiologists believe that, somehow, she did pass the disease to him.

Huppert developed pneumonia symptoms on April 2, but doctors assumed he had aspiration pneumonia—common to elderly, bedridden patients. Especially confusing, Huppert's symptoms seemed to abate when he was given a round of antibiotics.²¹ By April 19, however, he was worse again, with a fever and diarrhea. On May 1, Huppert died. Meanwhile, other patients in the orthopedic ward began to develop pneumonia symptoms. So, too, did Huppert's wife, daughter, son-in-law, and granddaughter—all of whom came, at some point, to the North York Emergency Department as patients. None of the four was diagnosed with SARS, and none was hospitalized.

A junior doctor at North York and a number of nurses were convinced that the family had SARS, however. They finally insisted on a meeting with hospital management on May 20 to press the issue. North York's management team reportedly tried to calm the group and repeated the common wisdom that the SARS outbreak was over.

Political Pressure? Once the news of the missed SARS cluster became public, there was much public speculation about whether the WHO travel advisory had led to direct or understood

²¹ Antibiotics should have no effect on a viral disease like SARS.

political pressure on doctors, hospitals, and public health personnel not to “find” any more SARS cases. For one thing, the WHO’s travel advisory had resulted in an abrupt shift in public rhetoric about SARS. Before the advisory, the rhetoric had been cautionary (some said alarmist) warnings to the public and exhortations to stay home if suffering from flu-type symptoms. Afterward, the rhetoric was reassuring and stressed that the outbreak was well in-hand and the city, safe. Some remarked wryly that the city and province had gone directly from panic to denial with no stop in between.

What’s more, a late May dustup over Health Canada’s diagnostic criteria for SARS fed the picture of a nation trying to minimize its SARS profile through a bit of fancy footwork. The issue erupted when Low and TPH doctors were deciding how to diagnose the cluster of cases at North York General in late May. The dilemma was whether they should be labeled probable-SARS or suspect-SARS. In terms of stopping the spread of the disease, this distinction did not matter, as all the cases would be isolated and handled with the same barrier infection precautions. But only the probable-SARS tally was reported to the WHO. Infectious disease and public health doctors had actually paid little attention to the Health Canada definition until mid April, when D’Cunha had begun pushing for a more exacting diagnosis of SARS, in an effort to cut down on the “false positive” diagnoses of the disease. But the Health Canada definition of probable-SARS was stricter than the WHO definition and, in Low’s opinion, stricter in a way that made no sense.²²

When asked by a radio journalist to characterize the scope of the North York outbreak, on May 28, Low publicly criticized the Health Canada definition, arguing that it led to a significant undercount of probable-SARS cases. “There was no question what was going on—yet when you went through the Health Canada definition, nobody fit the definition,” he says. “They were all ‘suspect.’ In the first wave, we would have called them all [probable-] cases.” He had spoken out of frustration but was stunned when his comments set off an international media uproar. The WHO expressed indignation at being given a deceptively low SARS “count” from Canada. Health Canada expressed indignation at Low, saying that this was the first the agency had heard of the problem. “By the end of the day, I was ready to leave town,” Low recalls. “But within 24 hours, Health Canada had changed the definition,” he adds, bringing it in line with the WHO language. Under the new definition, there were not just a handful but 43 probable-SARS cases in Greater Toronto.

Infectious disease experts and public health doctors at all levels of government resolutely deny that there was any political pressure not to find SARS cases after the WHO advisory. “It is an urban myth. It did not occur,” says Young. Yaffe says that, for its part, TPH “remained vigilant for any new cases of SARS and did not let down our guard.” In the case of hospital physicians, the pressure not to find SARS cases—to the extent that it existed—was subtle and internal, according to Low. “I don’t think anybody tried to hide a case they thought in their hearts was SARS,” he

²² The Health Canada definition required a clinical finding of severe progressive pneumonia, while the WHO definition required only an x-ray finding of pneumonia or Respiratory Distress Syndrome.

says. But, for all kinds of reasons, doctors ardently wanted to believe that SARS had gone for good. And, given the general nature of SARS symptoms and the prevalence of pneumonia among hospital patients, it was not difficult to find ample evidence for an alternate diagnosis. There was a climate, he explains, in which “subconsciously, people were more apt to say ‘no’ as opposed to ‘yes.’”

Exit Strategy. None of that would have mattered, though, if Ontario had consciously developed an outbreak “exit strategy” back in April, Low continues, voicing the common wisdom of the emergency responders, in retrospect. On May 14, the day the WHO removed Toronto from the list of areas with local SARS transmission, “everybody should have gone into their hospitals and identified everybody over the next week that had febrile respiratory illness with pneumonia. [You then assume] that person has SARS until proven otherwise, and therefore you don’t allow [any further] transmission to occur.”

This was, more or less, what happened at the end of SARS II, though Low says that the second time around, the province and the hospitals erred on the side of extreme caution. Many precautions remained in place long after the threat of SARS had passed. “We just kept everything in place until there was absolutely no possible way in the world that we could ever have missed a case. And then,” he adds, “we added a buffer of two to three months.”

Exhibit 1

Timeline of the 2003 Toronto SARS Outbreak

- March 26 ___ Ontario Premier Ernie Eves declares a provincial emergency.
- March 27 ___ On the recommendation of an ad hoc group of front-line public health and infectious disease experts, the Ontario Health Ministry requires all greater Toronto hospitals to invoke their Code Orange emergency plans, closing down the hospitals to all but essential care. The Ministry also issues a set of directives to the hospitals for improving infection controls.
- Public Safety Commissioner Jim Young creates a SARS Operations Centre within the Health Ministry to translate the hospital policy recommendations of the Science Advisory Committee into hospital directives.
- Young asks Don Low, microbiologist-in-chief at Mt. Sinai Hospital, and others to recruit infectious disease experts from across Canada to form a Science Advisory Committee.
- The WHO calls on Health Canada to institute health screening of all passengers aboard international flights out of Toronto's Pearson International Airport.
- March 28 ___ York Central Hospital discovers that James Dougherty, an undetected SARS patient, spent 12 days in its hospital without being isolated. York Central closes its Emergency Department and Intensive Care Unit and sends 3,000 staff, patients and visitors into quarantine.
- Person with undiagnosed SARS attends a religious service of the Bukas-Loob Sa Diyos Covenant Community where 500 people had gathered.
- Person with undiagnosed SARS attends a Bukas-Loob Sa Diyos Covenant Community religious retreat attended by 225 people.
- March 31 ___ Ontario extends infection control directives (but not Code Orange) to all Ontario acute care hospitals.
- Colin D'Cunha, Ontario Chief Medical Officer of Health, asks Bill Mindell, Medical Officer of Health in the York Region, to create a temporary "Epi Unit" in the Ontario Public Health Branch.
- April 2 ___ Experts believe Lewis Huppert, 99, a patient at North York Hospital, had SARS and not aspiration pneumonia, as doctors had initially believed.
- April 11 ___ Toronto Public Health discovers SARS spreading within the Bukas-Loob Sa Diyos Covenant Community, a mostly-Filipino religious group.
- April 12 ___ Eleven health care workers at Sunnybrook & Women's Health Care Centre are infected with SARS during a difficult intubation procedure. They begin to show symptoms on April 15.
- April 13 ___ Toronto Public Health quarantines the entire BLD community.
- April 20 ___ Sunnybrook Hospital closes its Emergency Department and Intensive Care Unit for 10 days.
- April 23 ___ The WHO issues a worldwide advisory warning against non-essential travel to Toronto.
- April 30 ___ A delegation of health officials from Toronto, Ontario, and Canada meets with WHO officials in Geneva to try to persuade them to rescind the travel advisory. Canada agrees to put in place rigorous airport screening of passengers traveling internationally and the WHO agrees to lift the advisory.
- May 9 ___ Toronto Public Health declares the SARS outbreak over.
- May 14 ___ The WHO removes Toronto from its list of areas with active SARS transmission.
- May 17 ___ Ontario Premier Eves ends the province's formal emergency.
- May 20 ___ A group of North York General nurses and other health care workers holds a meeting with hospital management expressing concern over a possible SARS cluster in the hospital.
- May 22 ___ Maurice Buckner, 57, a patient at St. John's Rehabilitation Hospital, tests positive for the SARS virus. Toronto Public Health doctors diagnose three other St. John's patients with probable SARS. Toronto and Ontario public health officials announce the cluster of four cases.
- May 23 ___ Toronto Public Health and Mt. Sinai's Low discover a large cluster of patients with suspect or probable SARS at North York General.
- May 28 ___ Low publicly criticizes the Health Canada definition of probable SARS, saying it leads to a pronounced undercount vis-à-vis the WHO definition.
- May 29 ___ Health Canada brings its definition of probable SARS in line with the WHO definition.
- July 2 ___ The WHO once again removes Toronto from the list of areas with active SARS transmission.

Exhibit 2

Acronyms

BiPAP	Bi-level Positive Airway Pressure
BLD	Bukas-Loob Sa Diyos Covenant Community
CDC	Centers for Disease Control
ER	Emergency Room
GTA	Greater Toronto Area
ICU	Intensive Care Unit
iPHIS	Integrated Public Health Information System
MAG	Ministry Action Group
ProMED	Programs for Monitoring Emerging Diseases
POC	Provincial Operations Centre
PUI	Persons Under Investigation
SAC	Science Advisory Committee
SARS	Severe Acute Respiratory Syndrome
TB	Tuberculosis
TPH	Toronto Public Health
WHO	World Health Organization

Exhibit 3

People Named in this Case Study

Public Officials in Spring 2003

- Sheela Basrur, MD, Toronto Medical Officer of Health
- Tony Clement, Ontario Minister of Health and Long-term Care
- Colin D’Cunha, MD, Ontario Chief Medical Officer of Health & Public Health Commissioner
- Ernie Eves, Ontario Premier
- Bill Mindell, MD, York Region Medical Officer of Health
- Allison Stuart, Ontario Health and Long-term Care Ministry’s Hospitals Division Director
- Barbara Yaffe, MD, TPH Communicable Disease Control Director
- Jim Young, MD, Ontario Public Safety Commissioner

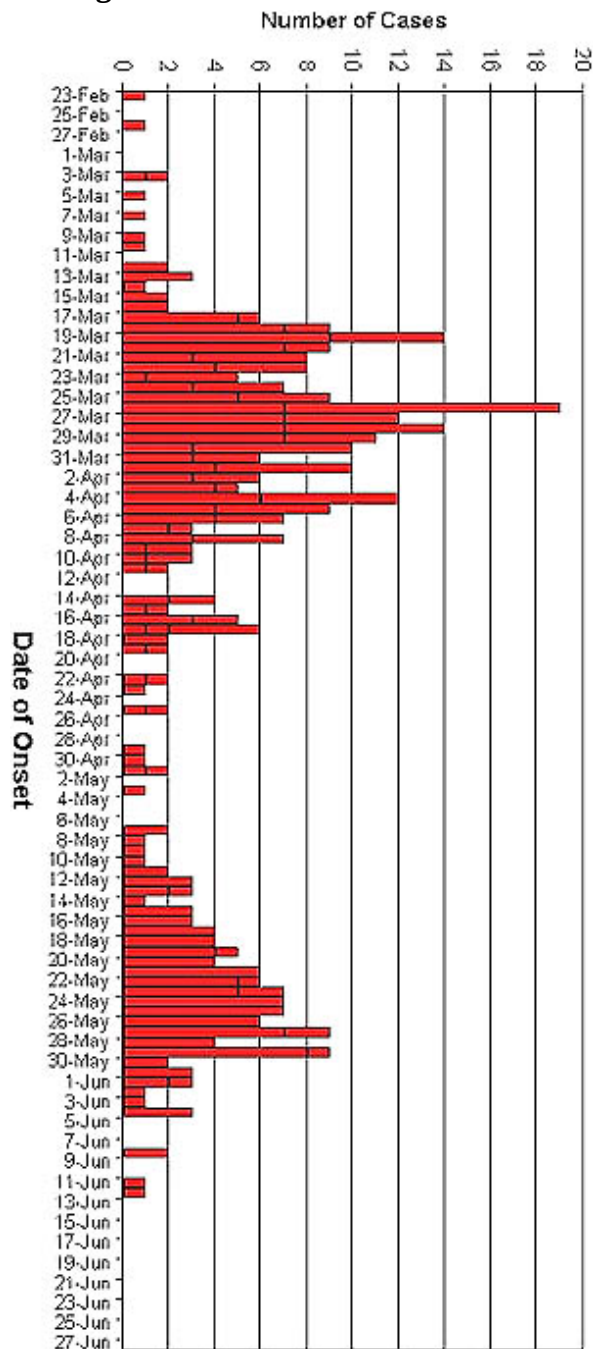
Medical Experts

- David Heymann, WHO Communicable Disease Director
- Ian Johnson, MD, University of Toronto Professor of Public Health & the Epi Unit’s Epidemiology Director
- Donald Low, MD, Mt. Sinai Microbiologist-in-Chief
- Allison McGeer, MD, Mt. Sinai Infection Control Director
- Richard Schabas, MD, former Ontario Chief Medical Officer of Health & York Central Hospital Chief of Staff
- Brian Schwartz, MD, Science Advisory Committee Co-Chair & Sunnybrook Pre-hospital Care Director

SARS Patients

- | | |
|-----------------------|-----------------------|
| • Kwan Sui-chu, 78 | • Eulialo Samson, 82 |
| • Liu Jian Lun, 64 | • Nestor Yanga, 54 |
| • Tse Chi Kwai, 43 | • Maurice Buckner, 57 |
| • Joseph Pollack, 76 | • Kitty Chan, 66 |
| • Rose Pollack, 73 | • Hubert Chan, 44 |
| • James Dougherty, 77 | • Lewis Huppert, 99 |
| • Adela Catalon, 46 | |

Exhibit 4 **The Epidemiological Curve of the Toronto SARS Outbreak²³**



²³ This graph shows the date of onset—that is, the date that symptoms of illness began—for each person diagnosed with probable SARS in the Toronto area between February and June 2003. Courtesy of Mount Sinai Hospital in Toronto.