A look back at the 2003 SARS epidemic, how APIC members made a huge impact on its control, and what we have learned from the incursion.

BY VICKY UHLAND
When it comes to worldwide epidemics, 21st century infection preventionists (IPs) in the United States and Canada tend to be bystanders rather than first responders. But in 2003, Canada was one of the epicenters of the severe acute respiratory syndrome (SARS) epidemic that infected approximately 8,400 people in Asia and North America and killed nearly 1,000, including four Canadian healthcare workers. Ten years later, IPs who worked in the Toronto hospitals most affected by SARS still remember the confusion, fear, grief, and guilt they felt during the epidemic, but they also credit the lessons they learned with advancing the profession of infection prevention exponentially.

**THE INDEX CASE**

The SARS epidemic has been traced back to food handlers in wild animal markets in China’s Guangdong province. In late 2002, it began migrating to hospitals and families in the province. A Guangdong physician became infected and traveled to Hong Kong in February 2003, where he stayed at the Metropole Hotel. He infected people in nearby rooms who subsequently traveled to Vietnam, Singapore, Ireland, the United States, and throughout Hong Kong. In addition, a 78-year-old Toronto woman who was visiting family in Hong Kong contracted SARS from the physician.

“She had a coupon for a free night’s stay in the hotel prior to her flight home to Toronto,” said Sandra Callery, RN, MHSc, CIC. But what appeared to be a stroke of good fortune actually cost the woman her life. Less than two weeks after her return to Toronto, she died, and on March 7, the son who was taking care of her checked into Toronto’s Scarborough Grace Hospital (SGH) with severe respiratory symptoms. He later died as well.

Callery, who is currently director of Infection Prevention and Control at Sunnybrook Health Sciences Centre in Toronto, worked at St. Joseph’s Health Centre in Toronto during the SARS epidemic. Five days after the elderly woman’s son checked into Scarborough Grace, the World Health Organization (WHO) issued an alert for an atypical pneumonia of an unidentified cause that was mainly affecting healthcare workers and was spreading throughout Southeast Asia.

Although Canadian healthcare workers took the alert seriously, “in North America, we tend not to be the place where we’re putting together the epidemiology for an infectious disease,” Callery said. “And then all of a sudden SARS was on our doorstep before we realized what was happening.”

Because no one knew the epidemiology of SARS, the son was put into an open observation unit in SGH’s emergency room, where he infected two other patients. They in turn infected others when they checked out of the hospital, as did the doctor who treated the son and other family members in his office. Subsequent patients who checked into SGH over the next two weeks infected visitors in the waiting room—some of whom went to other facilities for treatment. As healthcare personnel also began developing SARS symptoms—eventually, 153 employees in Toronto hospitals and other healthcare facilities were diagnosed with the disease—fear began to kick in.

“Most healthcare workers tend to think of ourselves as invulnerable, so it shocked us to think we were as susceptible as the patients we cared for,” Callery said.

The province of Ontario declared a Code Orange emergency on March 26, and formed the National Advisory Committee on SARS and Public Health. The committee, which consisted of specialists in infectious disease, microbiology, and epidemiology, was charged with determining the factors behind the cause of SARS and formulating strategies to prevent the spread of the disease. When one of the committee members developed SARS symptoms and had to leave, Callery was named as a replacement.

As more and more Toronto residents reported symptoms of febrile respiratory...
illness, the committee analyzed and documented healthcare workers’ detailed observations of symptoms and incubation periods in an effort to understand the disease’s epidemiology. The committee soon discovered that SARS had an incubation period of 10 days. This was of particular concern because in the Canadian healthcare system, staff tend to work part-time at more than one facility, and patients often travel to different facilities for diagnostic services—all of which helped transmit the disease.

At one point there was fear that the virus had become airborne, but healthcare workers eventually discovered it was spread by droplets. But they underestimated its range. “We thought the infection agents went about three feet, but then we realized you could double that,” Callery said. This was critical in the initial stages of the outbreak because many hospital staff members didn’t don protective apparel within that radius when treating a SARS patient.

PHASE II
The Code Orange emergency came with infection control directives. Among them were observation of any new patient for acute respiratory infection symptoms at triage and in the inpatient units; use of protective clothing, including N95 respirators, for staff throughout a hospital; and the creation of isolation units for potential SARS patients. The directives, although aggressive, were thought to have been effective and by April 20, there were no further SARS cases detected in Toronto.

At that point, the SARS advisory committee issued a set of guidelines for hospitals to follow for the foreseeable future. Known as the “new normal,” the guidelines incorporated some of the directives but relaxed others—particularly the ones associated with personal protective equipment (PPE). Under the guidelines, if a patient had SARS symptoms or a history of travel in countries with SARS outbreaks, hospital staff were encouraged to apply routine infection control practices (known as standard precautions in the U.S.) before interviewing the patient further. Along with hand hygiene, these practices included mask and eye protection for the healthcare worker, along with a mask for the patient if he or she was unable to be immediately taken to a separate area. The guidelines also recommended that patients with significant SARS-related symptoms and travel history be placed on airborne and contact precautions in negative-pressure rooms.

About four weeks after the “new normal” guidelines went into effect, a patient in a Toronto community hospital was diagnosed with post-operative pneumonia. The staff thought the pneumonia was surgery related, but it turned out to be a case of SARS.

This case initiated the second phase of SARS in Toronto, which lasted until July 5. A CDC report said Phase II was likely caused by relaxation of Phase I directives—in particular, the routine wearing of N95 masks or respirators throughout the hospital, maintaining distance among staff members when they were congregating and eating, and limiting the amount of visitors a patient could have.

ARRIVAL OF THE AMERICANS
On June 23, 2003, Ann Marie Pettis, RN, BSN, CIC, director of infection prevention at the University of Rochester Medical Center, and Janet Franck, RN, MBA, CIC, a self-employed infection prevention consultant, were at APIC’s Annual Conference when a representative from the CDC took the stage with an urgent request from the Canadian government for IPs to volunteer to work in Toronto.

Soon afterward, Pettis and Franck headed to Scarborough Grace and Scarborough General hospitals. As some of the first American IPs on the scene, they didn’t know what to expect.

“Honestly, it was probably the scariest thing I’ve ever done, not from the contagion standpoint, but fear of the unknown—not knowing what was required of me or if I could do it,” Pettis said. “Now I realize it was truly the most exciting thing I’ve done in my career, and the thing I’m most proud of.”

Franck and Pettis encountered Toronto healthcare workers displaying everything from panic to post-traumatic stress disorder (PTSD). Some personnel had self-quarantined themselves in their hospitals for fear of transmitting SARS to their families and hadn’t been home for weeks.

“There were people from the WHO sitting at desks and wearing masks when they were nowhere near patients,” Pettis said. “One IP from Scarborough went on disability for PTSD the day I came in, and when she returned she never went back to infection prevention. Sometimes I would listen to a nurse and she wouldn’t make sense because she was so exhausted and stressed out; it was hard for her to run her thoughts together.”

But despite this, the IPs were still doing their jobs. “I have such admiration and respect for our Canadian counterparts,” Pettis said. “They truly are heroes.”

Callery said most Toronto healthcare workers didn’t realize how stressed they were until Phase II hit in May. That, coupled with the number of people who were absent because they had contracted SARS, necessitated the call to the U.S. for reinforcements.

PHOTOS COURTESY OF ANN MARIE PETTIS.

The hospital checked healthcare providers’ temperatures before going into work. A negative pressure room was created on the clinical units.
At SGH, a 280-bed hospital, Pettis found that because so many personnel had been affected by SARS, the only remaining member of the infection prevention department was a nurse who had some training in infection control but wasn’t actually an IP. Pettis also discovered that Canadian surveillance focused almost exclusively on methicillin-resistant Staphylococcus aureus (MRSA).

“They weren’t looking at SSIs [surgical site infections] or VAPs [ventilator-associated pneumonias],” she said, “and with SARS, they went into a crisis mode and hadn’t done surveillance for months.” At Scarborough General, Franck found emergency rooms that were so crowded, patients were placed on beds in hallways.

For two-and-a-half weeks, Pettis took over the day-to-day functioning of SGH’s infection prevention program, including daily calls to the health department. Although the end of Phase II was less than a week away, there was still a handful of patients with SARS in the hospital. “There was a lot of patient crisis management and allaying of fears,” Pettis said. This included twice-daily rounds for new patients, and staff and visitor education on SARS symptoms, and respiratory etiquette.

Franck, who stayed on in Canada as an infection prevention consultant for 10 months after her initial six-week stint ended, instituted a Train the Trainer program in protocol such as the correct use of PPE. She said healthcare workers were wearing double gloves, double gowns, and sometimes double masks, but weren’t changing gloves between patients or using enough alcohol-based hand rub.

Franck also created a program called Ask MS Norma Flora, which encouraged staff to anonymously email their infection prevention and control questions. And she helped institute infection prevention teams—before that, most IPs worked independently from one another. Finally, to boost morale, she sent tips to the media about hospitals’ success in eliminating infections so the news wouldn’t focus solely on the negative.

LESSONS LEARNED
The SARS epidemic taught Canadian IPs many lessons. Callery said surveillance for acute respiratory infections and travel history is now part of Canadian hospitals’ day-to-day routine, as is understanding the core competencies around PPE, applying standard infection control precautions consistently, and monitoring infections beyond those caused by antibiotic-resistant organisms.

In addition, Callery said Canadian IPs learned the importance of collaboration with occupational health and safety teams and discussion of infection control strategies locally and with other countries. As a result, “with MERS and H7N9, I’ve seen a much better level of communication and information sharing,” she said.

In the United States, SARS taught IPs the importance of practicing respiratory etiquette year-round. “SARS brought infection prevention to everyone’s attention in Canada and the United States and gave credence and resonance to the messages I was already giving, including not coming to work sick, following proper infection prevention cautions, and the importance of PPE and when to put it on and take it off correctly,” Pettis said.

The SARS epidemic also taught IPs on both sides of the border the importance of emergency preparedness plans. “Because of SARS and bioterrorism, we’re so much better prepared to deal with national disasters and the next scourge that’s coming,” Pettis said. “And we’ve learned to never let our guard down, because chances are we’ll get a second wave.”

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