

CHAPTER THREE: The Story of SARS

Guangdong to Scarborough Grace Hospital

Ontario's SARS tragedy began a world away, yet only a plane ride away, in a land hugely different from Canada. Guangdong is a province of China, the landmass surrounding Hong Kong on the South China Sea. Its subtropical monsoon climate nourishes moist green areas where plants grow 12 months a year. The province is slightly larger than Southern Ontario, but much more densely populated, with up to 110 million citizens compared with Southern Ontario's 11 million.⁶¹

South China is 12,000 kilometres distant from Ontario, but the fact that deadly SARS came to us so quickly and easily from such a great distance proves again that "global village" is not just a catch phrase. It reinforces the reality that a sneeze on the other side of the world can bring infectious disease to us in days, if not hours.

Although the two provinces seem worlds apart, they are increasingly connected through trade and immigration. Guangdong has been a major source of immigrants for North America, including Canada.

Guangdong is one of the more prosperous areas of China. It has teeming industrial centres surrounded by fertile farming areas where people work and live in close proximity to their animals. Animals are an important part of life there, and not just for the farm folk. South China is famous for its live animal markets. Many people believe that eating freshly killed wild animals promotes vitality and good health. Live animal markets display cages of domestic and wild animals, from cats and dogs to snakes and bats and civet cats, which are closely related to the mongoose. Customers choose what they wish at the markets and see it butchered on the spot.

61. Xinhua News Agency February 16, 2005, as found at www.chinaview.cn.

These live markets and the fact of animals and humans living so close together are known factors in the development of new diseases, particularly influenzas. Links between animal-human relationships and disease worry the World Health Organization (WHO), which has said that health authorities should “examine the risk to humans from dangerous agricultural practices such as raising chickens, ducks, pigs and other animals together – often in unsanitary conditions and normally with no barriers between them and humans.”⁶²

It is in this environment of “wet” markets and crowded farm settings that SARS is believed to have developed.

On November 16, 2002, a 45-year-old man in Foshan, a Guangdong city of 3.4 million about 100 kilometres from Hong Kong,⁶³ became ill with an unusual respiratory illness. No one is quite sure where or how he contracted the illness. He did not travel in the previous 14 days, but he did prepare chicken, domestic cat and snake for household consumption. Some of the earliest SARS patients had links to the use of wild animals for food.⁶⁴

The man, an administrator and local leader in the province, was married with four children. Within weeks, his 42-year-old wife, a 22-year-old niece, a 50-year-old aunt and her 50-year-old husband also became ill.⁶⁵

He was Patient 1, the earliest retrospectively identified case of a previously unknown lung disease later named severe acute respiratory syndrome.⁶⁶ He and his four family

62. Dr. Shigeru Omi, World Health Organization Regional Director for the Western Pacific, speech to 2nd FAO/OIE Regional Meeting on Avian Influenza Control in Asia, Ho Chi Minh City, Viet Nam, 23 to 25 February 2005.

63. Data on Foshan are from materials developed by a 2004 Massachusetts Institute of Technology planning workshop. See <http://web.mit.edu/11.952/www/en/today/today.htm>.

64. Xu R-H, He J-F, Evans MR, Peng G-W, Field HE, Yu D-W, et al. “Epidemiologic clues to SARS origin in China.” *Emerg Infect Dis.* 2004 Jun. Available from: <http://www.cdc.gov/ncidod/EID/vol10/no6/03-0852.htm> (Xu R-H et al., “Epidemiologic clues to SARS origin in China.”).

65. Xu R-H Article.

66. In June 2004, researchers from China, the United Kingdom, Australia and the World Health Organization published the results of their retrospective analysis of the Guangdong surveillance database and a case investigations database. They also interviewed staff from the Guangdong Provincial Centers for Disease Control, and Foshan Municipal Center for Disease Control to obtain supplementary information on early-onset cases. Information on early cases in the neighbouring Guangxi Province was obtained from local investigators by a visiting WHO team. An important limitation is that none of the cases cited were laboratory confirmed. Diagnoses relied on clinical case definitions. See: Xu R-H et al., “Epidemiologic clues to SARS origin in China.”

members are thought to have been the first cluster⁶⁷ of a disease that infected 8,096 people around the world and killed 774 before ebbing in the summer of 2003.⁶⁸ Guangdong was especially hard hit, accounting for more than 1,500 probable cases and 58 deaths.⁶⁹ Southern Ontario was the worst-affected jurisdiction outside Asia, with SARS infecting 375 people and killing 44.⁷⁰

It took months after this first known infection for health authorities throughout the world to identify the disease as something new, learn its characteristics and determine how to deal with it. In the early days of SARS, little was known by anyone anywhere about this mysterious disease. Medical workers had no diagnostic criteria and no clinical test, and the incubation period was unknown. The method of transmission was uncertain, as was the effectiveness of protective equipment and safety requirements. To this day it is still not known exactly how the disease developed or whether it will reappear.

SARS spread from Foshan into other areas of Guangdong. By January 2003 it was seen in Guangzhou, the provincial capital, where workers in the health industry began to fall ill.

Communication about spread of the disease was poor. Poor communication became a hallmark of the outbreak over the coming months, and when it arrived in Canada. Again and again, as noted below, the Ontario response to SARS was hampered by lack of communication between governments, public authorities, agencies and hospitals.

There were some alerts, but for various reasons they did not register as clearly as they should have. On November 27, 2002, the WHO received a Chinese-language news

67. Cluster: "Aggregation of relatively uncommon events or diseases in space and/or in time in amounts that are believed or perceived to be greater than could be expected by chance." Source: Last, John M., ed., *A Dictionary of Epidemiology* (Oxford, U.K., 2001), p. 31-2.

68. World Health Organization, "Summary of Probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003." See http://www.who.int/csr/sars/country/table2004_04_21/en/index.html.

69. McLean, A.R., May, R.M., Pattison, J. and Weiss, R.A., Eds., *SARS: A Case Study in Emerging Infections* (Oxford University Press, 2005), p. 31.

70. Because of the difficulty in diagnosis, the precise number of Ontario SARS cases has been reported slightly differently at different times. The figure of 375 probable and suspect cases was given by Dr. Colin D'Cunha, then Ontario's Chief Medical Officer of Health, when he appeared before the Commission's public hearings September 29, 2003. Retrospective studies since have yielded slightly different numbers.

report of a flu outbreak in China. The report had an English heading but was not fully translated.

It was not until five weeks later, in early January 2003, that word of the disease began to spread more widely. Newspapers in Hong Kong reported on an epidemic of respiratory illness, but it was not until the end of January that Guangdong Province instituted province-wide reporting requirements for atypical pneumonia.

The world outside China did not hear of this mysterious respiratory illness until February 10, 2003, when reports began circulating on the Internet. These included an email to the WHO in Beijing describing a “strange contagious disease” that has “already left more than 100 people dead” in Guangdong Province in the space of one week. The message further describes “a ‘panic’ attitude, currently, where people are emptying pharmaceutical stocks of any medicine they think may protect them.”⁷¹

At roughly the same time, ProMED-mail, an Internet-based reporting system that provides early warnings on infectious diseases, posted an email from Dr. Stephen Cunnion, a retired U.S. Navy epidemiologist living in the Washington, D.C., area. He had heard through a friend that there was sickness and fear in Guangzhou, so he asked the question on the ProMED service:

Have you heard of an epidemic in Guangzhou? An acquaintance of mine from a teachers’ [Internet] chat room lives there and reports that the hospitals there have been closed and people are dying.⁷²

On February 12 health officials from Guangdong Province reported a total of 305 cases and five deaths from the new respiratory illness between November 16, 2002, and February 9, 2003. Laboratory analyses were negative for influenza viruses.⁷³

The outbreak in China was not totally unknown in Canada in January and February. *Sing Tao*, a Chinese-language newspaper in Toronto, reported on it in early February and raised the possibility of a spread to Canada. It contacted Health Canada and was told the government was closely monitoring the spread of a pneumonia.⁷⁴

71. WHO, Update 95 – SARS Chronology.

72. National Advisory Committee on SARS and Public Health, *Learning from SARS: Renewal of Public Health in Canada* (Health Canada: October 2003), p.23-24 (Naylor Report).

73. WHO, Update 95 – SARS Chronology

74. *Behind the Mask*, CBC News Online, November 19, 2003

After the Canadian SARS outbreak ended, the CBC reported that surgical masks had been disappearing from the shelves of pharmacies in Vancouver's Chinese Community as early as January. It said people there had been receiving panicked telephone calls from relatives in China.

On February 14, 2003, WHO reported in its weekly newsletter that an unusual respiratory illness had killed five people in Guangdong Province since November 2002.⁷⁵ The Chinese Ministry of Health informed WHO six days later that the illness was caused by *Chlamydia pneumoniae*, a common bacterium.

In Guangzhou at this time, Dr. LJL, a 64-year-old physician and professor of nephrology at Zhongshan University, attended patients as the respiratory disease outbreak became an epidemic. It was a hectic and worrisome time for health workers in Guangzhou because, as Dr. LJL would tell medical staff in Hong Kong later, scores of doctors and nurses had become ill and he and his colleagues had begun to wear gowns and gloves for protection.⁷⁶

The outbreak in Guangzhou was complicated by community fear, difficulty in getting important information, the newness of the disease and confusion about who would take charge of the crisis. Those complicating elements of SARS were seen again when the disease found its way to Toronto.

All over the world the problems were the same: lack of preparation, bad communication, the mystery of a new disease; at first no one knew how to diagnose it, how it spread, how to stop it, how to treat it. All over the world front-line health workers stepped into danger and all over the world governments tried desperately to manage a mysterious outbreak for which they were tragically unprepared.

Dr. LJL worked late nights at the university's No. 2 Affiliated Hospital. His nephew was getting married and he and his wife would travel to Hong Kong for the wedding. Six days before he was to leave, he came down with flu-like symptoms and treated himself with antibiotics.⁷⁷ He felt well enough to make the three-hour bus trip and on February 21 checked into the 487-room, three-star Metropole Hotel in Kowloon's tourist district. He was assigned room 911 on the ninth floor of the 19-storey hotel.

75. Naylor Report, p. 23.

76. "The Metropole Mystery," *Washington Post*, May 23, 2003

77. Hong Kong SARS Expert Committee Report, p. 18. www.sars-expertcom.gov.hk.

He arrived still feeling unwell. Unknown to anyone, including himself, when he walked through the front entrance of the hotel, he was about to spread an infectious disease, SARS, around the globe and trigger a world health emergency.

Gateway to Horror

SARS found its gateway to the world on the ninth floor of the Metropole Hotel at 45 Waterloo Road in Kowloon. The hotel is in Kowloon's busy tourist district, and is popular among visitors to Hong Kong seeking a reasonably priced, decent hotel close to shopping and other attractions. The ninth floor had 32 rooms housing a variety of visitors during the third week of February 2003, including Guangdong doctor Dr. LJL and several Canadians.⁷⁸

One of the Canadians was a 78-year-old Toronto woman, Mrs. K, who had returned to visit her Chinese homeland with her husband. Another was a 55-year-old Vancouver man, Mr. C.

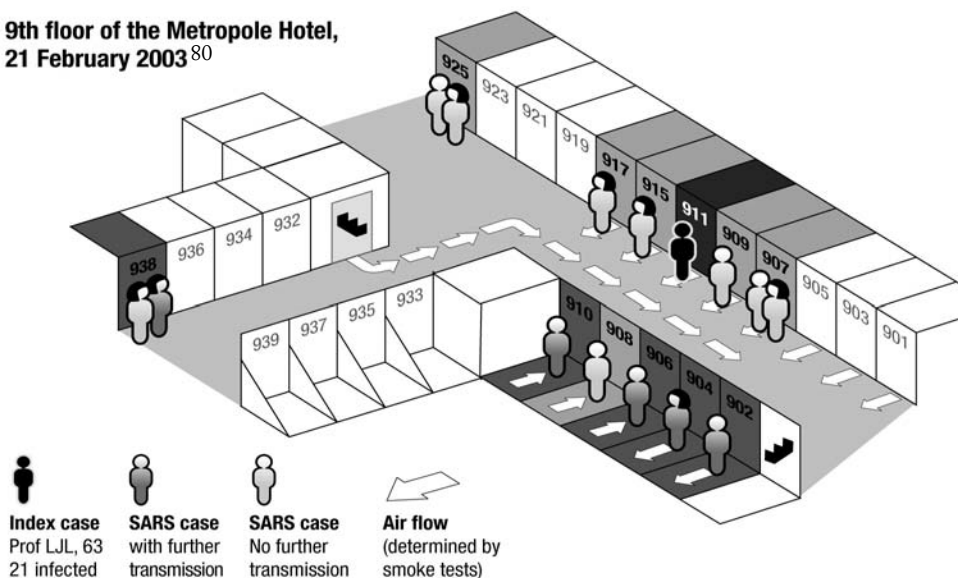
The Vancouver man and the Toronto woman both stayed on the ninth floor of the hotel.⁷⁹ Both fell ill with SARS. She transmitted it to her son when she got back to Toronto. Her son and the Vancouver man, both sick with SARS, went to hospital in Canada on March 7, one to the Vancouver General and the other to Scarborough Grace in Toronto. The Toronto case sparked an outbreak that brought Ontario to its knees. The Vancouver case resulted in very little transmission. British Columbia escaped the overwhelming outbreak that overcame Ontario. This tale of two cities is explored in detail below.

After checking in, Dr. LJL felt reasonably well, enough to shop and have dinner. His room was across from the elevators and it is assumed he walked out the door of 911 over to the elevator doors and descended to the lobby and the street. He returned to room 911 that evening and awoke the next morning with a high fever. Instead of going to his nephew's wedding, he walked to Kwong Wah Hospital, where he was admitted.

78. *SARS: How a Global Epidemic Was Stopped*, p. 141, Published by WHO 2006.

79. Mrs. K stayed in room 904, almost across the hall from Dr. LJL in 911. Mr. CKL was in 1409 after apparently having switched from 909, although there is some confusion about that.

**9th floor of the Metropole Hotel,
21 February 2003⁸⁰**



The Toronto woman, Mrs. K, arrived in Hong Kong to visit relatives February 13,⁸¹ and stayed there at the same time as the infected doctor from Guangdong, from February 18 to February 21 or 22.⁸² Dr. L.J.L never left Kwong Wah Hospital and died there March 4 of the respiratory disease yet to be named SARS. WHO investigations later determined that his brief stay at the Metropole began a terrible chain of infection that resulted in serious outbreaks in Hong Kong, Canada, Singapore and Vietnam. At first, no one suspected the Metropole as the point of spread.

Then, three things happened that raised suspicions about the Metropole Hotel. On March 12, eight days after Dr. L.J.L's death, Singapore reported three cases of the disease. Three women on a shopping trip to Hong Kong had stayed at the Metropole at the same time and on the same floor as Dr. L.J.L. The following day, March 13, the Hong Kong department of health learned that a Canadian man admitted to hospital in Hong Kong March 2 with respiratory distress also had been at the Metropole. On March 18 Health Canada notified Hong Kong that Mrs. K was the index case for a Canadian outbreak and that she too had been a guest at the Metropole.

80. Diagram is adapted from: *SARS: How a Global Epidemic Was Stopped*, p. 141, Published by WHO 2006.

81. "Identification of Severe Acute Respiratory Syndrome in Canada," *New England Journal of Medicine*, May 15, 2003, p. 1996.

82. There is some question about the exact dates she stayed at the Metropole. WHO lists her as being there from Feb. 18 to Feb. 23. Toronto Public Health records say Feb. 18 to 21, while an expert paper presented to the Hong Kong SARS Commission says Feb. 18 to 22. There appears, however, to be no dispute that Mrs. K and Dr. L.J.L were in the hotel at the same time.

The Hong Kong health department now had seven cases of the new disease linked to the ninth floor of the Metropole. Later investigation revealed that 16 guests at the Metropole, and one hotel visitor, had caught the disease from Dr. LJL.

Three years and many investigations later, it is still not known how SARS was spread at the Metropole. How could the Guangdong doctor infect 17 people at the Metropole but leave hotel staff and so many others untouched? Most of the 17 infected at the Metropole Hotel did not pass the disease to others. But four did. These four individuals ignited devastating outbreaks in Hong Kong, Toronto, Singapore and Vietnam.

This mystery remains unsolved. There are still more questions than answers. If SARS is spread primarily by droplet and is only rarely airborne, as some Ontario infection control specialists still insist, how could this one man infect 17 others with whom he had no known direct contact?

None of the investigations found the hotel's plumbing, heating, air conditioning or ventilation systems responsible for carrying the disease. The contamination occurred in one wing of the ninth floor and never moved up or down the building or endangered people in their rooms.⁸³

There is speculation that Dr. LJL might have coughed or vomited in the corridor near the elevator or his room, leaving the disease there for other ninth-floor guests to walk through. A WHO investigation, conducted by four experts from Health Canada, concluded:

The investigation favours a contamination in the corridor that subsequently exposed several of the guests either by walking by the contaminated area or by opening their guest room entrance doors. It is interesting to note that genetic material could still be detected after more than two months since the incident and after a disinfection of the rooms and corridor.⁸⁴

However the disease spread in the Metropole, its transmission was remarkable.

Mr. JC in room 910 carried the virus to Hanoi, setting off an outbreak of 63 cases there. The three Singapore women in Rooms 915 and 938 all were hospitalized within a day of each other, two in the same hospital. Two of them did not transmit the

83. *SARS: How A Global Epidemic Was Stopped*.

84. Final report Metropole Hotel WHO Environmental Investigation, July 2003.

disease to anyone else. Yet one of them did and sparked an outbreak of 238 Singapore cases, 195 with a contact history to her.⁸⁵

Mr. AC, a Canadian in room 902, was hospitalized in St. Paul's Hong Kong, and nine people he had contact with there caught the disease.

An outbreak at Prince of Wales Hospital in Hong Kong was traced to the 17th person infected at the Metropole, a visitor who walked past room 911 to visit a friend in 906. A total of 143 of his contacts were infected.

Others who contracted the disease on the ninth floor of the Metropole did not transmit the disease. They had symptoms and many contacts, but did not pass the disease on to others.

These remarkable stories show the volatile, unpredictable, dangerous and still mysterious nature of SARS. Some got it from the index case and some did not. Some transmitted it to others and some did not. Some sparked international outbreaks that brought entire countries and provinces to their knees. Yet there are still no clear answers as to how and why it spread in and from the flashpoint at the Metropole Hotel. The story of the Metropole Hotel is a cautionary tale to everyone, however expert they may be, who thinks that science has all the answers to the spread of SARS. The WHO, in its 2006 report *SARS: How a Global Epidemic Was Stopped*, asks:

Was it because their infection was milder and they had fewer contacts? ...
Perhaps some people, even though infected, are not infectious.

Mrs. K flew back to Canada and passed the disease on to five family members, becoming the index case for the first Canadian cluster of 136 cases and the outbreak that killed 44 and left more than 330 ill.

SARS Arrives in Toronto

Mrs. K returned to her Scarborough home on February 23 after her 10 days in China, including the stay at the Metropole Hotel in Kowloon. There is no evidence to indicate she was ill, and as far as is known, no one on the large passenger jet bringing her home became ill with SARS, which raises more questions about how SARS is spread.

85. *SARS: How A Global Epidemic Was Stopped*.

She settled back into the apartment that she shared with her husband, two grown sons, daughter-in-law and a five-month-old grandson. Two days after her return she developed a high fever. When the fever did not leave and was joined by muscle aches and a dry cough, she saw her family doctor on February 28.⁸⁶ She was prescribed antibiotics and her family tried to treat and comfort her.

Mrs. K's condition did not improve with the care and antibiotics. Her condition weakened and she died in her home on March 5. Her family did not want an autopsy, nor did the coroner. A heart attack was listed as the cause on her death certificate. There was no apparent reason to suspect anything else. Mrs. K had a history of heart problems, plus diabetes. SARS was not identified or named as a new disease until later that month. Her case was not uncommon among elderly people: heart disease, diabetes and pneumonia. No one suspected that a deadly new virus was spreading in the family apartment. Five of the 11 members of Mrs. K's family became ill with SARS.⁸⁷ Two, including Mrs. K, died.

The disease later identified as SARS was introduced to Scarborough Grace Hospital, the first hospital in Ontario to admit a SARS case, on March 7, 2003, when Mrs. K's son, Mr. T, was taken to hospital via ambulance. Doctors and nurses at the Scarborough Grace were unaware of what was happening in Hong Kong and unaware Mr. T had been exposed to a new infectious disease. As Mr. T remained in hospital, seriously ill, other family members were also falling ill. On March 13, SARS took the life of Mr. T and sent four more family members to hospital. Public health and hospital officials struggled to understand this new and deadly disease. The story of the T family and the introduction and spread of SARS at the Scarborough Grace Hospital is told below.

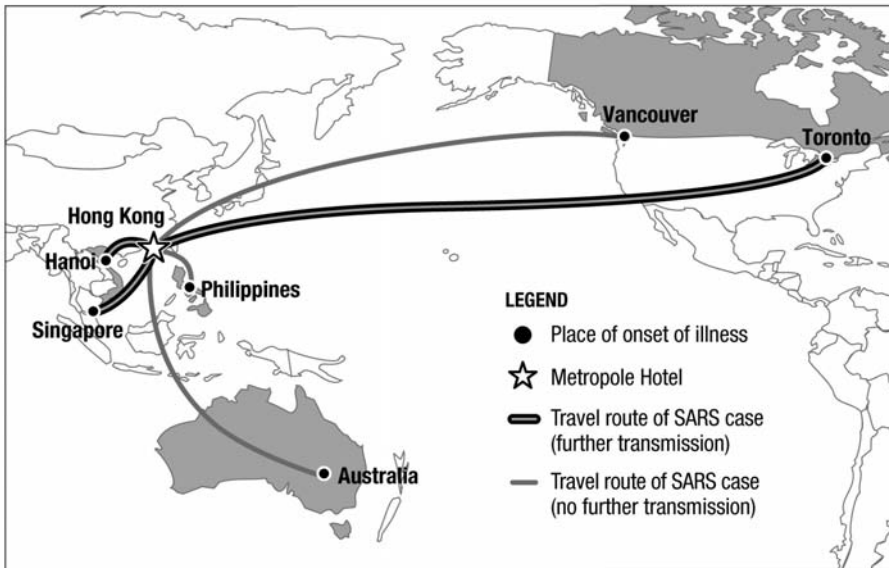
In a remarkable coincidence, another potential SARS nightmare was developing on exactly the same day in Vancouver. Three to four hours before Mr. T was taken by ambulance to Scarborough Grace, Mr. C and his wife returned home to Vancouver from Asia. He was so ill that they went directly from the airport to their doctor, who sent him by ambulance to the emergency department of Vancouver General. He, like Mrs. K, had been a guest at the Metropole Hotel in Kowloon. Also like her he carried SARS from the Metropole. However, unlike in Toronto, SARS did not spread in Vancouver. The reasons are examined later in this report under the section titled Vancouver: A Tale of Two Cities.

86. Naylor Report, p. 25.

87. Health Canada, http://www.phac-aspc.gc.ca/sars-sras/pef-dep/gta-20030424_e.html.

With Mr. T's arrival at Scarborough Grace, SARS was ready to invade the Toronto hospital system and the general community. It had its first firm foothold in Ontario. The next chapters show the lightning spread of SARS from Mr. T.

Spread of virus from the Metropole Hotel⁸⁸



HANOI	SINGAPORE	HONG KONG	TORONTO
Mr JC, 47	Ms EM, 22	Mr CT, 26	Ms KSC, 78
Number infected: >20 directly 63 indirectly	Number infected: 21 directly 195 indirectly	Number infected: 143 directly	Number infected: 4 directly 136 indirectly
		Mr AC, 72	
		Number infected: 9 directly	

88 Diagram is adapted from: *SARS: How a Global Epidemic Was Stopped*, p. 146, Published by WHO 2006.