Green Health
An A-to-Z Guide

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Severe Acute Respiratory Syndrome

The spread of severe acute respiratory syndrome (**SARS**) in 2003 represented the first global infectious disease epidemic of the new century, affecting individuals in 29 countries. From February to May 2003, over 8,000 **SARS** cases were identified worldwide, with a 10 percent fatality rate. The epidemic had significant economic repercussions in many sectors, but those related to hospitality, tourism, and the service industry were directly impacted by a dramatic decrease in travel to **SARS**-affected areas. Due primarily to the adoption and strict adherence to traditional public health measures such as contact tracing, isolation and quarantine, travel restrictions, screening at international borders, and the implementation of stringent infection prevention measures in hospitals, the epidemic was halted by July 2003. The epidemic demonstrated how developments that uniquely define our contemporary globalized existence, such as intensified interconnections of places and people throughout the world and the highly mobile nature of our world today, are conducive to the rapid spread of infectious disease. In addition, the generally effective response to **SARS** highlighted another aspect of globalization, namely, the advent and role that an extensive communications and information network may play in combating an unfolding international infectious disease threat.

The earliest cases of **SARS** had been identified in Foshan, China, in November 2002, but its potential as a disease threat had not been recognized at that time. Sporadic outbreaks of a respiratory illness then referred to as "atypical pneumonia" continued sporadically throughout southern China for the next year. The global spread of **SARS** was initiated, however, when an elderly medical professor who had been treating patients with atypical pneumonia in the province of Guangdong unknowingly became infected and subsequently traveled to Hong Kong to attend a relative's wedding in mid-February 2003. During his stay at the Metropole Hotel, the disease spread to 11 other hotel guests, each of whom continued their respective travels to various other locations throughout the world. It is not known exactly how the disease spread to these other hotel guests, but environmental transmission through a contaminated elevator is suspected. A few days later, local disease outbreaks arose almost simultaneously in those destinations where the infected guests traveled, particularly impacting major world cities, including other parts of Hong Kong as well as Toronto, Singapore, and Hanoi. Although most of these outbreaks were limited to the hospital settings (i.e., nosocomial transmission), there were at least three major community outbreaks: one in the Amoy Gardens apartment complex in Hong Kong involving 300 people; the second in the Pasir Panjang wholesale market that resulted in 14 cases; and a cluster of 31 cases within a closely knit religious community in Toronto.

The Etiology of SARS

SARS seriously damages the alveoli of lungs, thus interfering with the process of respiratory gas exchange. In early April, the causative agent of **SARS** was discovered to be a novel strain of the coronavirus—the viral family in which one of the most prevalent causes of the common cold is found. The airborne virus is transmitted directly from person to person on respiratory droplets when an infected individual coughs or sneezes but can survive on some surfaces for several hours, thereby enabling environmental transmission as well. As is true of many viruses that affect human beings, **SARS** could be traced to an animal reservoir, namely, the palm civet cat (although some scientists also implicate the horseshoe bat). The palm civet cat is used for human consumption in parts of southern China, and it is suspected that the crossover of the virus from the civet to human beings probably occurred in the live animal markets of that region—as indicated by the fact that as many as one-third of the early cases of **SARS** involved food handlers.

The incubation period of the virus (i.e., the period between exposure and symptom development) is two to 10

days, with the individual being most contagious at the time he or she is most ill. These two biological characteristics had significant implications for the nature of disease diffusion. First it meant that air travel became an important factor in the spread, since the incubation period of **SARS** was shorter than the travel time between most global cities of the world. Consequently, seemingly healthy individuals who were in a position to travel could unknowingly carry **SARS** to international locations. Second, because the time at which the individual was most infectious coincided with the greatest experience of illness, he or she would more likely admit him or herself to the hospital at that time he or she posed the greatest public health threat. For this reason, disease outbreaks would more likely occur in the hospital setting rather than in the community. A third factor that played a role in the spread of **SARS** was the phenomenon of "superspread," where some infected individuals, for unknown reasons, were able to infect an inordinate number of other susceptible individuals. Thus, for example, one young woman returning home from the Hong Kong Metropole Hotel infected 20 others in a Singapore hospital.

The Global Response to SARS

During the early stages of the pandemic, the government of the People's Republic of China did not reveal to the international community the extent to which the mysterious illness was spreading. This shroud of secrecy could not be maintained, however, as reports of the mysterious disease were transmitted informally through cell phones and the Internet. One of these reports was captured by Canada's Global Public Health Information Network (GPHIN)—a computerized search engine that monitors Websites, news wires, local online newspapers, public health e-mail services, and electronic discussion groups in six languages—and forwarded to the World Health Organization (WHO). On the basis of this lead, the WHO began more extensive investigations and, with the emergence of subsequent outbreaks outside China, on March 15, 2003, issued an unprecedented "worldwide health threat" including travel advisories to those intending to travel to **SARS**-affected areas. The WHO also coordinated the international response to **SARS** by officially calling upon its network of 120 partners in its Global Outbreak Alert and Response Network (consisting of national government agencies and scientific institutions) to focus on the virological, clinical, and public health dimensions of the **SARS** epidemic. Central to these efforts was the unprecedented sharing of data, resources, and expertise from around the globe through the formation of virtual networks predicated on satellite broadcasts, teleconferencing, and Webcasts. It was on the basis of this rapid real-time information sharing and analyses that a clinical case definition of **SARS** was developed and agreed upon by international consensus within the remarkable span of one week, while the viral agent and its genetic code were identified in the unprecedented span of several weeks (as opposed to months). Such developments highlight one of the greatest successes of the global outbreak response. Many scientists predict that a major global influenza epidemic will ensue in the future and, in this light, it was clear that **SARS** served as a sort of trial run that provided many lessons as to how governments, scientists, and communities may respond more effectively to future public health threats.

—S. Harris Ali

Further Readings

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