SARS: A PANDEMIC PREVENTED
A Science and Democracy Case Study
Science in Action
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SCIENCE IN ACTION
In November 2002, people in China’s Guangdong Province started catching what seemed like a bad cold. But many developed serious breathing difficulties and about 10 percent died. Sudden acute respiratory syndrome—SARS as the disease came to be known—spread quickly, reaching Toronto in February 2003 and the United States in March. Scientists’ efforts to understand the virus were initially delayed by misinformation and fears that overreaction would cause greater economic and social harms than the disease itself. SARS could have claimed tens of thousands more victims, but, fortunately, international collaboration among scientists and policymakers prevailed and contained this emergent threat.

SARS AFFECTED MILLIONS OF PEOPLE WORLDWIDE, NOT JUST THOSE WHO GOT SICK
Morbidity and mortality
By the time the World Health Organization (WHO) declared SARS officially contained on July 5, 2003 (WHO 2003b), SARS had invaded 29 nations and administrative regions, sickening 8,096 and killing 774 people (WHO 2004). Mainland China accounted for 5,327 cases and 349 deaths. Besides China, only five other countries and administrative regions—Hong Kong, Taiwan, Canada, Singapore, and Vietnam—had more than 30 cases each and a combined total of 417 deaths. With 251 cases and 43 deaths, Canada suffered more casualties than any region outside of Asia. Of the remaining 23 countries, none had more than 30 cases, and the total number of deaths outside those countries hardest hit was only eight. In the European Union, SARS sickened 34 and killed one. In the U.S. 27 got sick, and no one died.

Although most experts now agree aggressive precautionary measures and widespread media coverage helped minimize cases outside China, these actions—considered overreactions by some because they amplified both social and economic costs—generated considerable pushback.

Social costs
According to the U.S. Centers for Disease Control and Prevention (CDC), influenza annually claims far more lives than SARS did during its brief scourge (CDC 2010). Yet SARS disrupted the lives of millions of people, most of whom never even came into contact with a SARS victim. Uncertainty and fear spread along with the disease, even in places like the U.S. where numbers of actual cases were very low (WHO 2004).

The CDC took strategic, community-targeted communications steps to minimize stigmatization and discrimination and mitigate fears about how the disease was spread, but these fears nonetheless led to the isolation of individuals and groups perceived as carriers (Person et al. 2004). Nine percent of U.S. residents said they avoided Asian-owned businesses and 11 percent avoided people they thought had recently traveled to Asia (Blendon et al. 2004). Businesses from New York City’s Chinatown to San Francisco’s reported empty stores and restaurants; friends and family of recent travelers to the Far East and Canada urged voluntary quarantine; and at least one U.S. college professor, upon returning from a

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research trip to China, reported students refused to attend class until she produced a clean bill of health (Murphy 2003).

Some critics in the U.S. blamed the media for sensationalizing the story and inducing panic-driven behaviors unsupported by evidence. Virologist and Nobel laureate David Baltimore objected to media images of crowds of people in Asian cities wearing surgical masks after scientists had determined the disease was spread only through close contact with an infected person’s sneezing or coughing (Svitil 2003). The CDC informed the public on its SARS websites that “close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office” (CDC 2003a), but many in the U.S. remained uncertain and took unnecessary and even extreme protections because of dramatic TV images and newspaper headlines.

Despite these reproaches, critics from the public health community agree that, while the media has some responsibility for ensuring the public reaction is not disproportionate to the threat, “the media response, even if it was overkill, helped prevent a more severe outbreak” by raising awareness about symptoms to watch out for and reminding people to take simple, commonsense preventative steps such as washing their hands and abiding by travel alert (Svitil 2003).

Economic costs
Other critics, notably leaders in hard hit areas and industries especially vulnerable to economic losses from the outbreak, were quick to shift criticism of media sensationalism to public policy. Following the WHO’s travel advisory on April 23 against all but essential travel to Toronto, city officials reacted angrily. The city’s mayor Mel Lastman lashed out at the WHO, saying he was “shocked that the medical evidence we have before us does not support this” (Pitz and Bear 2003). Canadian officials argued spread of the disease was confined to Toronto hospitals and that the travel advisory would have unnecessary yet lasting negative consequences for the Canadian economy. While the U.S. CDC had merely warned travelers to Toronto to take precautions, the WHO defended its more stringent advisory on the basis that cases originating in Toronto had spread outside of Canada—an indication Toronto did not have the outbreak as fully under control as it claimed.

Such policies clearly affected some industries more than others. Based on mounting evidence SARS was spreading along international travel routes, the WHO issued its first travel advisory on March 15, followed by a series of others (WHO 2003b). While necessary to stem transmission, such alerts, as well as recommended policy measures like airport screenings of international travelers and quarantines in affected areas, caused many people, voluntarily or otherwise, to simply stay home. Shopping malls and movie theaters in Singapore, Thailand, and Toronto were deserted. By the end of April, retail sales in Hong Kong had dropped by 50 percent since March, and restaurants and entertainment establishments reported 80 percent losses for the same period (WHO 2003b). Globally, losses to the travel industry were particularly devastating, including a 50-70 percent drop in international travel to high-risk areas and a 60 percent drop in hotel occupancy in those areas (WHO 2003c).

But globalization meant that many seemingly disparate industries based far away from outbreak centers were also affected. Technology companies based in the U.S. and European Union cancelled travel to Asia to attend trade shows, as did fabric buyers for fashion companies. Their absence meant losses not only for hotels, restaurants, and airlines in Asian cities but also for these industries themselves due to a slowdown in the development and sale of new products (Bradsher 2003). Other examples of companies experiencing indirect losses include the cosmetics manufacturer and retailer Estée Lauder, which, under normal circumstances, earned 13 percent of its revenue from sales in duty free shops in Asian airports; Caterpillar, the infrastructure and construction giant, which lost stock value after UBS Warburg predicted SARS would hinder its growth in Asia; and the credit card company Visa International, which reported a slump in the volume of transactions in Asia (USA Today 2005).
Estimating total economic costs is difficult, but experts speculate expenditures and losses in markets around the world ranged between $40 and $80 billion. These resulted from added medical outlays, travel fears and restrictions, lost productivity, lost consumer confidence, and investment apprehensions (Forum on Microbial Threats 2004). GDP setbacks in first and second quarter growth in hardest hit areas ranged roughly between 0.5 and 1.5 percentage points (Knowledge@Wharton 2003). If less stringent policies had permitted the outbreak to spread further and last longer, economic losses would have increased dramatically. For example, if the outbreak had persisted for only a few more months, minimum losses for 2003 alone would have jumped from $40 billion to $54 billion (Lee and McKibbin 2004). The longer the outbreak lasted and the more people who were infected, the greater its economic impact. For an outbreak of SARS or a SARS-like future disease lasting longer than a year with an infection rate of one percent of the global population “a decrease in global GDP of 5% could be expected” (WHO 2007).

**Strong Headwinds**

Public officials, such as Toronto’s mayor, who protested economic losses resulting from travel alerts suffered temporarily along with their citizens and businesses, but, ultimately, the global economy and local communities benefitted from preventative, evidence-based public policies. In the case of SARS, coordinated efforts by the public health community overcame resistance to such policies. However, a failure by Chinese authorities in the earliest stages of the outbreak to disclose mounting concerns and accurate morbidity and mortality statistics put the world population at risk. If the information had been openly shared with the global public health community as soon as there was evidence of an emergent disease and possible epidemic, many deaths both inside and outside of China, as well as worldwide economic losses driven by fear and uncertainty, could have been prevented.

**TIMELINE OF THE SARS EPIDEMIC (WHO 2003b)**

**November 2002 – February 2003: The gag order**

Before SARS, most Americans had probably never heard of China’s Guangdong Province where the disease emerged in late 2002, months before it reached the U.S. The simultaneous appearance in the Guangdong city of Shenzhen of confirmed cases of H1N1 “bird flu” complicated recognition of the new disease, but suppression of information, particularly in light of this uncertainty, delayed research efforts and policy measures that could have prevented SARS from spreading outside of China.

**February 2003 – March 2003: SARS lurked democratically**

While China continued to withhold information, notably in Beijing where the disease was later reported to be spreading quickly through hospitals, the virus itself behaved more democratically, refusing to respect confinement within Chinese borders. At the end of February, Liu Jianlun, a 64-year-old doctor from Guangdong Province who had treated infected patients there, travelled to Hong Kong to attend a wedding, where he fell sick himself. Riding the elevator to and from the ninth floor of his hotel, Dr. Jianlun coughed and sneezed in close proximity to other guests, infecting them. Among these guests was Johnny Chen, an American businessman who subsequently flew to Vietnam and infected staff who cared for him at the French Hospital in Hanoi. Another guest was Kwan Siu-chu, a 78-year old Canadian woman, who returned to Toronto a few days later. By March 5, she was dead, her son following a week later on March 13, and staff at Toronto’s Scarborough Grace Hospital had begun showing symptoms. Still another guest, a Singaporean flight attendant, later identified as a super spreader, transmitted the disease to over 100 others (Sternberg 2003).

**March 2003 – April 2003: Science on the frontlines**
Since China had not fully informed the international public health community about the mysterious epidemic raging within its borders, hospital staff in Hong Kong, Hanoi, and Toronto initially had no idea what they were dealing with when Liu Jianlun, Johnny Chen, and Kwan Siu-chu were admitted. This lack of knowledge prevented them from taking precautions against a disease as contagious and deadly as SARS. However, high rates of infection among healthcare workers in these cities triggered a series of WHO alerts beginning on March 12, mobilizing the experts and specialists who made up the WHO’s Global Outbreak Alert and Response Network (GOARN), including individuals from the U.S. CDC. While no cases in the U.S. had yet been reported, the CDC also activated its own emergency operations center on March 14. On April 16, scientists identified the virus.

April 2003 – July 2003: A win for scientific coordination and open communication
As research collaborations continued and international pressures increased, Chinese authorities began cooperating. On April 20, high-ranking Chinese leaders finally removed the Beijing mayor and health minister from their positions—two key individuals responsible for spreading misinformation—and immediately reported an additional 339 cases in Beijing. Greater transparency, accountability, and trust on all sides improved international research efforts, as well as overall communications and containment measures. Throughout April and May, numbers of new cases in hard hit areas like Hong Kong, Hanoi, Singapore, and Toronto dropped off, and by early June, new cases in China also significantly decreased. On June 13, the WHO lifted its travel advisory for China, and on July 5, SARS was declared officially contained.

KEY ACTORS

World Health Organization
At the end of April 2000, just three years before SARS exploded onto the international public health scene, the WHO convened a meeting in Geneva to assess and improve its response capability to combat communicable diseases in the 21st century. The WHO was already in a unique position to coordinate global surveillance and response mechanisms through its existing partnerships with national and international entities, such as ministries of health, scientific research institutes, and networks of specialists and experts. At the April 2000 meeting, 121 representatives from 67 WHO partners discussed the need for a more formalized collaborative relationship that would facilitate better coordination of an international response to a future outbreak (WHO 2000).

Following these discussions, WHO established the Global Outbreak Alert and Response Network, known as GOARN, a technical body which faced its first and—and to-date its greatest—challenge from SARS. There are two crucial things to note about GOARN’s role as an actor in combatting SARS: 1) the 11 labs in nine countries coordinated by the WHO had already been established as part of the network to handle an influenza outbreak and 2) stopping SARS required a rapid response from researchers rather than new techniques. Since GOARN was already in place, it could—and did—very quickly leverage the capacity necessary to implement rapid response in all of the areas of technical expertise and specialized knowledge required: epidemiology, virology, etiology, diagnostics, surveillance, field operations, clinical issues, and animal sources (LeDuc and Pflieger 2004).

Once the WHO had mobilized its networks of experts and laboratories, identification and understanding of the disease progressed rapidly. Researchers shared data through a secure server and daily phone conferences. Just one month after these efforts began, and despite China’s ongoing misreporting, scientists confirmed the causative agent—the SARS coronavirus SCoV, never before observed in humans or animals—and continued further collaboration to develop diagnostic tests.

U.S. Centers for Disease Control and Prevention
The CDC succeeded at minimizing the spread and severity of SARS in the United States in part due to communications structures and policies either implemented expeditiously in response to the emerging crisis or already existing, such as training for bioterrorism in place since the 2001 anthrax attacks. These structures and policies were aimed at maximizing coordinated efforts among scientists, policymakers, and the public.

In particular, the CDC provided rapid and flexible transmission of information by relying on the Internet as a tool well-suited to frequent updates. The CDC’s Division of Global Migration and Quarantine Website, which posted travel-related recommendations and industry-specific guidelines, received close to three million visits during the outbreak (Arguin et al. 2004). Together, all CDC SARS websites received more than 17 million hits, with more than 3.8 million during the week of April 20-26, a crucial period immediately following identification of the disease-causing agent (Forum on Microbial Threats 2004).

Additionally, the CDC targeted public outreach to constituencies such as families adopting children from Asia, expatriates, Asian-American communities, and organizations with offices or major meetings in high-risk areas. Material was aimed at multiple audiences with differing literacy levels, disseminated through varied channels including but not limited to the Internet, and translated into seven languages. CDC quarantine officers, for example, distributed 2.7 million printed Health Alert fliers to passengers arriving in the U.S. on 11,840 flights from SARS afflicted areas (Arguin et al. 2004).

**Healthcare Workers**

Although healthcare workers faced tremendous professional and personal challenges during the outbreak, containment of the disease depended on the compassionate and evidence-based commitment to care they practiced throughout the crisis.

Since SARS spread through droplets patients released when coughing and sneezing, healthcare workers who came into direct contact with SARS patients, especially before instigation of adequate protective measures, fell ill themselves in numbers disproportionate to infection rates among the general public. Risking—and in some instances losing—their own lives, healthcare workers accounted for approximately twenty percent of cases worldwide (Chan-Yeung 2004) and close to fifty percent in Toronto (Duffy 2004). Decreased staffing alongside increased demand strained the capacity and resources of hospitals in heavily affected areas. Additionally, doctors and nurses who remained healthy faced challenges above and beyond caring for patients and protecting their own health. In Hanoi, healthy hospital staff quarantined themselves with patients to avoid the possibility of further transmission, isolating themselves from family and friends during a time of crisis when they most needed their support. In Singapore, people avoided nurses and doctors in public places like food courts and buses, some bus drivers even refusing to stop near hospitals (Chee 2003).

Yet healthcare workers persevered because they recognized that documenting each case through firsthand observation, tracking the trajectory of the illness in individuals, and taking patient samples would help researchers in faraway labs better understand how the virus operated within its subjects.
Reciprocally, they recognized that patient treatment and public policies informed by the emerging science they were contributing to would save many more lives.

Two individuals went above and beyond their immediate responsibilities and took steps that propelled the global response forward:

**Dr. Jiang Yanyong**

In March 2003, Dr. Jiang Yanyong, a surgeon in China’s People’s Liberation Army, observed numerous patients in Beijing’s military hospitals developing high fevers and breathing difficulties. A significant percentage died from what was clearly an infectious disease. Health officials were calling it “atypical pneumonia,” but Dr. Yanyong believed the pathogen could be new and potentially very dangerous.

When Beijing officials underreported the numbers of sick and dying patients in early April, after China had agreed to cooperate with the WHO, Dr. Yanyong felt it his duty to tell the truth to the world. Although risking serious personal repercussions, he released a statement to the international press indicating he had counted at one Beijing hospital alone 60 cases and seven deaths, whereas the Minister of Health had announced only 12 cases and three deaths throughout all Beijing. “As a doctor who cares about people's lives and health,” Dr. Yanyong asserted, “I have a responsibility to aid international and local efforts to prevent the spread of SARS. A failure to disclose accurate statistics about the illness will only lead to more deaths” (Jakes 2003).

By stepping forward, Dr. Yanyong helped make possible the sharing of information essential for scientists to collaborate, understand the new pathogen, and provide reliable data to health officials and the public.

**Dr. Carlo Urbani**

An infectious disease specialist working for the WHO in Vietnam in February 2003, Dr. Carlo Urbani had spent his career studying malaria and parasitic diseases in children. During the 1990s, he had served as president of the Italian chapter of Doctors Without Borders and had been among those who accepted the Nobel Peace Prize on behalf of the group in 1999. Dr. Urbani’s passion for both research and clinical practice energized his response when staff at Hanoi’s French Hospital contacted the WHO for help with a suspected case of bird flu.

That suspected bird flu case turned out to be Johnny Chen, the American businessman who had recently stayed in Hong Kong at the Metropole Hotel, just down the hall from the coughing and sneezing Liu Jianlun. Recognizing that Chen’s symptoms were not caused by an influenza virus, Dr. Urbani immediately contacted the WHO central office in Geneva and set up an isolation ward within the Vietnamese hospital. In the words of one of his colleagues, “Carlo was the one who very quickly saw that this was something very strange. When people became very concerned in the hospital, he was there every day, collecting samples, talking to the staff and strengthening infection control procedures” (WHO 2003a).

Credited by many as the individual who set in motion the coordinated WHO response that saved many lives worldwide, Dr. Urbani himself contracted SARS and died on March 29, 2003.

“One important thing we’ve learned here is what an incredible difference key individuals can make in these situations. Everything Urbani did—the way he used his clinical expertise, the way he sounded the alarm, his willingness to ask for help—proved so, so important.”

--Dr. Neal Halsey (Duffy 2003)
WEIGHT OF THE EVIDENCE

The SARS virus, SCoV, was identified by GOARN scientists on April 16, 2003. Scientists believe it is a zoonotic pathogen, originating in animals, travelling between species, and infecting humans. Guangdong Province, a large, populous area bordering Hong Kong and the South China Sea, is known for its live animal markets. Wild and domestic animals sold for human consumption are kept in unsanitary conditions and close proximity to each other and to humans. SARS likely infected its first human hosts here, rapidly spreading to family members, healthcare providers, and others with whom these early victims came into contact (Wired 2003).

Scientists have traced SCoV’s evolutionary history to horseshoe bats, but it is not well understood how SCoV got from bats to humans. The civet cat (pictured, courtesy of the CDC) was initially seen as the culprit, and as a result, many civets were needlessly killed before scientists had learned that civets actually got the virus from humans. But the bat version of the virus does not survive well in human cells, and a missing link of transmission between bats and humans still remains a mystery (Research News 2008). Jonathan Epstein, senior research scientist at the Consortium for Conservation Medicine, points out that human behavior itself plays a crucial role in the ecology of the disease: "These diseases emerge because of human activities. If we just protected ecosystems, we’d protect both animal and human health. It’s a preventable thing — that’s the bottom line" (Grist 2005). Recent research suggests a zoonotic pathogen—perhaps through the reemergence of SARS or a SARS-like virus—will cause the next great pandemic, one on the scale of the 1918 flu pandemic, which was also caused by a zoonosis and responsible for 40 million deaths worldwide (Quammen 2012).

Distinguished from other viruses for their spikey, crown-like appearance (Introduction to Molecular Biology 2008), coronaviruses (image below left, courtesy National Institutes of Health) are not unfamiliar to scientists. But SCoV had some features beyond its origins and the mysteries surrounding its transmission that intrigued researchers. Coronaviruses cause roughly 30 percent of cases of the common cold in humans and numerous upper respiratory infections in animals; they typically only infect one host species; and they fall into one of three serologic groups. The SARS coronavirus differed from most coronaviruses in nearly all these ways: it caused a much more serious infection, jumped species, and had a genome that differed significantly from all other known coronaviruses (Holmes 2003).

However, what made the WHO response to SARS unique and historic was neither the discovery of this unusual etiologic agent nor the use of recent research innovations employed to find it but rather the degree of collaboration and information sharing among researchers. Once researchers began collaborating and were able to freely and securely share their findings, the evidence available to inform public policy increased significantly. One report concluded, “Despite widespread application of molecular techniques to determine the cause of the outbreak, it was the traditional virologic procedure of inoculation of acutely acquired patient specimens into cell cultures and laboratory animals that ultimately proved successful in isolating SCoV” (LeDuc and Pflieger 2004).

OUTCOME

The net effect of China’s initial refusal to share vital case data stalled both containment efforts by Chinese doctors who were unable to accurately gauge the scope and severity of the outbreak within their own country and the research and control efforts of the international community. Chinese leaders may have
believed asking for help to control a disease that had emerged within their own borders would have led to the perception of weakness and incompetence—of a government unable to manage its own national public health crises. But protectionism and lack of trust in the international community delayed a global response dependent upon collaboration.

As a result, not only did the outbreak spread outside China but it also spread more virulently within China, killing more people. Recognizing the disease had become a bigger problem than they had anticipated both within and beyond their borders, Chinese leaders finally allowed their country to join international collaborative efforts, granting WHO epidemiologists permission to enter Guangdong Province on April 2 (WHO 2003b). But by the time the WHO declared SARS contained in early July, China had had more cases and more deaths than all other countries combined.

In the 21st century, infectious diseases are global problems requiring globally cooperative solutions. International travel drives many human industries and activities. Millions of people fly thousands of miles every day. With a 10-day incubation period, the SARS virus easily travelled with human hosts before those individuals ever presented symptoms. If the disease had emerged in the U.S., an early victim could have carried it from New York to Sao Paolo, Chicago to Mumbai, or Los Angeles to Tokyo, without ever being aware.

Even the United States, an active and central WHO partner from the start, could not have handled SARS on its own. Besides CDC facilities, the WHO coordinated labs and connected experts in many other countries when time was of the essence. Containing the outbreak quickly enough to prevent the disease from becoming endemic demanded the resources and capacity only available through multilateral cooperation.

Fortunately, courageous actions of individuals like Drs. Yanyong and Urbani drove external pressures that persuaded the Chinese to cooperate with global research and containment efforts early enough to break the transmission chain before SARS became a true pandemic rather than a set of localized epidemics. Without international pressures and scientific cooperation, SARS could have been much deadlier than it was, potentially sickening millions of people instead of thousands and killing tens of thousands.

CASE IN POINT

Early involvement of experts and effective and clear communication among scientists, policymakers, and the public helped reduce the number of U.S. deaths to zero

The SARS story spotlights three key elements science and democracy share: transparency, accountability, and trust (Branscomb 2010). Scientific and public policy collaboration driven by these values put an end to the destructive reign of a deadly disease. The WHO’s Network of Laboratories connected researchers in 11 labs in nine countries, including the CDC. For the scientists who identified the pathogen and mapped its genome within a month of initiating their work together, confronting a shared problem took precedence over national loyalties and professional rivalries. Scientific understanding thus advanced more quickly, led to effective containment, and saved lives (WHO 2003d).

Public trust in scientists and the healthcare workers and government officials who relied on them for accurate and timely information was paramount in mitigating the health, economic, and social effects of SARS on the United States and around the world (CIA 2003).

The communications role of the CDC in informing accurate and timely media coverage cannot be underestimated. Following the anthrax scare in 2001 and the confusion caused by misinformation spread by politicians, journalists in 2003 were better prepared to sort fact from fiction during a disease outbreak, whether the result of bioterrorism or a naturally occurring event. Criticism of sensationalizing the story notwithstanding, journalists covering SARS frequently did turn to the CDC, which provided regular press briefings and Internet updates about what scientists knew and what they did not. By citing CDC sources,
the media likely also drew more people to CDC sites, where they could read the latest factual updates for themselves. To this end, between March and July 2003, in addition to 17 million visits to its Internet sites, the CDC answered 10,000 SARS calls from the media, issued 12 press releases, broadcast 21 live telebriefings and news conferences, and answered 35,000 phone inquiries from the general public (Forum on Microbial Threats 2004).

Likewise, the CDC also supported clinicians around the country, setting up 30 conference calls to answer questions from healthcare providers, establishing a hotline for physicians through which CDC staff responded to more than 2,000 calls, and organizing three satellite broadcasts directed towards clinicians that together received an estimated 1.9 million views (Forum on Microbial Threats 2004).

However, as effective as CDC communications efforts on all sides were, it is important to note that at least one CDC self-study has cautioned against assuming such efforts can stand alone in the face of a spreading disease. Research is paramount, for there are still aspects about the SARS outbreak that remain a mystery, in addition to the uncertainties about how it got from bats to humans. Higher numbers of cases and deaths in countries such as Canada, where a single person seeded the entire Toronto epidemic, may have resulted from the presence of so-called super spreaders. These individuals, for reasons still not well understood, are much more contagious and transmit the pathogen to more people more easily. CDC researchers speculate that the chance absence of super spreaders arriving in the U.S., along with fewer very sick patients and fewer procedures performed with higher transmission risk for healthcare workers, like intubation, may account at least in part for the reduced number of cases and deaths in the U.S. (CDC 2003b).

No one can predict exactly how, when, or where the next epidemic will strike, but the global response to the September 2012 appearance of another SARS-like coronavirus that has sickened people in the Middle East suggests an international community more willing and able to share information and coordinate efforts (WHO 2012). Instead of months, the world knew about these cases within days. Experts do not predict this new disease to be as contagious or deadly as SARS, but collaborative efforts to understand and track it are well ahead of where they were when SARS first emerged (Knox 2012).

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