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## **Severe Acute Respiratory Syndrome (SARS): The International Response**

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# Severe Acute Respiratory Syndrome (SARS): The International Response

## Summary

Severe Acute Respiratory Syndrome (SARS), a new highly infectious disease, was first identified by the World Health Organization (WHO) in February 2003. While the overall number of confirmed cases is not high by comparison with statistics for other infectious diseases, the distance and speed with which SARS spread raised an alarm over the potential risks to international public health. Containment appears to be working; however, there are fears that another SARS outbreak could take place during the regular influenza season later in 2003.

The United States was instrumental in the global effort to contain the spread of SARS. Affected countries responded in different ways. Singapore and Taiwan acted quickly and encouraged international support in curbing the spread of the virus. China, on the other hand, has been criticized for down-playing the magnitude of the problem, particularly in the early phase of the disease. This, some analysts contend, ultimately enabled the virus to cross borders and in the case of Canada, hemispheres.

This report takes a retrospective look at the global response by WHO and by those countries most affected. It reveals some of the challenges that may lie ahead for the global health community, such as global interdependence and transparency, surge capacity, management of public fear and information disclosure, coordination of different national responses, and lack of funding. Examining the impacts of SARS and lessons learned may be useful in the response to future outbreaks or incidences of new diseases. This report will not be updated.

# Contents

Background .....	1
International Response .....	1
Overview of the Role of the World Health Organization .....	2
WHO's Global Health Alert Systems .....	3
The Global Outbreak Alert and Response Network (GOARN) .....	3
The Global Public Health Intelligence Network (GPHIN) .....	3
The Global Threat of SARS .....	3
WHO's Response to SARS .....	4
SARS and International Health Regulations .....	6
Overview of the International Health Regulations .....	6
The Fifty-Sixth World Health Assembly .....	7
Country Responses to SARS .....	9
China and Hong Kong .....	9
Taiwan .....	12
Vietnam .....	13
Singapore .....	15
Canada .....	16
Congressional Response .....	18
Infectious Disease Monitoring .....	18
Capacity Building .....	18
Improving U.S. Response Capability .....	19
Future Challenges .....	19
Global Interdependence and Transparency .....	19
Developing Surge Capacity .....	20
Public Fear and Information Disclosure .....	20
National Response .....	20
Inadequate Funding .....	21

# Severe Acute Respiratory Syndrome (SARS): The International Response

## Background

Severe Acute Respiratory Syndrome (SARS), a new, highly infectious viral disease, was first identified by the World Health Organization (WHO) in February 2003. It is believed to have had its beginnings in China's Guangdong Province in November 2002. A respiratory disease that causes flu-like symptoms which may progress to pneumonia, SARS has an average fatality rate of 15%. Between November 2002 and July 2003, a total of 8,437 cases and 813 deaths were reported in 31 countries.<sup>1</sup>

While the overall numbers are not high by comparison with other serious infectious diseases, the speed and distance with which SARS spread raised an alarm over the potential risks to international public health. Containment appears to be working; however, there are fears that another SARS outbreak might take place during the regular influenza season later in 2003. This report reviews the global response by WHO and those countries most affected. It also examines the challenges that may lie ahead should another outbreak of SARS (or another unknown infectious disease) occur.<sup>2</sup>

## International Response

Since late February, when WHO first identified the outbreak of what later became known as the Severe Acute Respiratory Syndrome (SARS), it has played a key role in the global response to the disease. SARS is a striking example of the risks to international public health posed by such infectious diseases. It also highlights the need for appropriate mechanisms of containment, particularly as global travel has become the primary means of spreading the disease around the world.

Following its initial assessment, WHO made containment of SARS its main goal. "Despite the lack of understanding about the disease, its cause, and future

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<sup>1</sup> For a full discussion of the medical background to SARS and the U.S. response see CRS Report RL31937, *Severe Acute Respiratory Syndrome (SARS): Public Health Situation and U.S. Response*.

<sup>2</sup> Other sources are examining the SARS outbreak, for example, J.M. Drazen, "SARS — Looking Back over the First 100 Days," *The New England Journal of Medicine*, July 24, 2003.

evolution, the need was great to introduce a series of emergency measures to contain SARS outbreaks in the affected areas and prevent further international spread, thus reducing opportunities for the new disease to establish itself.”<sup>3</sup> Although WHO’s representative in China, Henk Bekedam, reportedly said on June 5, 2003 that the outbreak of SARS had reached its peak worldwide,<sup>4</sup> WHO continues to stress the importance of sustaining international public health measures against SARS and working towards eliminating it as a public health threat. The SARS outbreak may reveal valuable lessons about the effectiveness of WHO’s surveillance and response systems, and its capacity to respond to similar outbreaks in the future. Examining the evolution of SARS also demonstrates the chains of transmission and role of the WHO in responding to unfolding events.

Although WHO led an unprecedented global collaborative effort to contain SARS, the U.S. Centers for Disease Control and Prevention (CDC) also played a key role in the global partnership. For more information on the role of the CDC in relation to SARS, see CRS Report RL31937, *SARS: Public Health Situation and U.S. Response*.

## Overview of the Role of the World Health Organization

The World Health Organization (WHO), established in 1948, is the U.N. system’s authority on international public health issues. It assists governments in improving national health services and in establishing worldwide standards for foods, chemicals, and biological and pharmaceutical products. WHO concentrates on preventive rather than curative programs, including efforts to eradicate endemic and other widespread diseases, stabilize population growth, improve nutrition, sanitation, and maternal and child care. WHO works through contracts with other agencies and private voluntary organizations. The United States has been a member of WHO since 1948.

The WHO policy making body is the World Health Assembly, composed of all 192-member states. It meets annually in May to decide the overall direction of the Organization and the general program for a specific period, and to adopt the two-year budget. Decisions are made by majority vote, except for decisions on the budget that require a two-thirds vote. There is no veto provision. The Assembly elects the Director General as well as the 32 member states who designate persons to serve on the Executive Board. The Executive Board meets twice a year to review the work of WHO in more detail and prepares issues for consideration by the Assembly. Ten to twelve members of the Board are replaced every year. The United States has been a member on the Executive Board three out of every four years.

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<sup>3</sup> WHO, *Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*. WHO: Geneva, May 20, 2003.

<sup>4</sup> United Nations Foundation, “SARS: WHO Declares Outbreak ‘Over its Peak.’” June 5, 2003. [[http://www.unwire.org/UNWire/20030605/34097\\_story.asp](http://www.unwire.org/UNWire/20030605/34097_story.asp)]

## WHO's Global Health Alert Systems

**The Global Outbreak Alert and Response Network (GOARN).** In April 2000, WHO formally established the Global Outbreak Alert and Response Network (GOARN) which brought together 112 institutions and networks of people and technical resources to respond to disease outbreaks of international concern. This global health security network provides not only an operational framework, drawing on data, expertise, and skill, but also aims to standardize the international response.<sup>5</sup> It relies on its partners and agreed standards of practice in responding to potential threats, which may include emerging diseases and the intentional use of biological agents. In four years, between January 1998 and March 2002, GOARN examined 538 such cases in 132 countries.<sup>6</sup>

**The Global Public Health Intelligence Network (GPHIN).** WHO also relies on the Global Public Health Intelligence Network (GPHIN), which is a customized search engine that tracks Internet communications. This system proved to be very useful in picking up telecommunicated alerts in China. The system is also useful to WHO in clarifying or refuting information that may create disruption or panic. Other tools include geographical mapping technology and an event management and tracking system that provides an overview of operations.

## The Global Threat of SARS

It was clear that SARS presented a serious global threat. Lack of information about the cause and evolution of the new disease made its potential impact unknown. WHO concluded that the virus comes from a strain likely to include frequent mutations and links to animal species, with implications for the likelihood of establishing endemicity and underlining the importance of finding the means to control or contain it. Several factors were deemed critical in this analysis:

- ! The symptoms are non-specific and common;
- ! The symptoms can be severe and some patients require intensive care for respiratory failure;
- ! The disease spreads easily from one location to another via air travel as demonstrated in transmission patterns from the initial outbreak in Asia to other regions, such as North America and Europe;
- ! There is no vaccine or treatment yet available and diagnostics tests are of limited use. A number of antivirals are not effective;
- ! The causative agent is not well understood, so the potential for continued spread remains;
- ! Certain cases may contribute to the rapid spread of infection;
- ! Hospital staff, who are a vital link to the control of infection, are disproportionately affected as are other close contacts of the patients;

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<sup>5</sup> For more information on the Global Outbreak Alert and Response Network, see: [<http://www.who.int/csr/outbreaknetwork>].

<sup>6</sup> WHO, *Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*. WHO: Geneva, May 20, 2003, p. 4.

- ! The disease requires intensive treatment in isolation and is a burden on health care systems.<sup>7</sup>

By comparison to SARS, except in the case of HIV/AIDS, other new diseases that have emerged in the last few decades have not presented the same combination of factors that pose such a heavy global risk to international health. Some of these diseases have not sustained strong human-to-human transmission, others have relied on food or a vector (such as mosquitos) for transmission, and still others have had an identifiable, often containable, geographic location.

## WHO's Response to SARS

Once the severity of the disease was recognized, in February and March 2003, WHO took aggressive action. Examining the factors outlined above and the chronology of events unfolding in China, Hong Kong, Vietnam, and Toronto, it identified international travel as a primary means of spreading the virus. It also concluded at the time that some people might be highly infectious, or “super spreaders”. Identifying these individuals could be critical to the control of the disease.<sup>8</sup> On March 15, 2003, WHO issued emergency travel recommendations as a global alert and response to international travelers, health care professionals, and border authorities. Later in March it recommended screening passengers at airports coming from areas with recent local transmission and gave advice to airlines on appropriate procedures if a case was suspected during flight. In April and May, on several occasions, the WHO issued its most stringent travel advisories recommending the postponement of all but essential travel to areas considered high risk for SARS.<sup>9</sup>

WHO also quickly moved to set up systems for — and increase awareness of the need for — immediate isolation and quarantine of those with or suspected of having SARS. In addition, it began the detailed work of contact tracing to find the source of the spread. These procedures along with simple diagnostics and screening all contributed to the ongoing containment effort.

The response to SARS placed heavy demands on WHO and its GOARN partners. Time was very much of the essence. WHO pulled together a comprehensive network, including mobilizing a response on the ground, providing resources and supplies, monitoring and reporting, and establishing scientific and medical collaboration. The WHO issued travel procedures to prevent and manage probable cases of SARS.<sup>10</sup> It established a collaborative multi-center research project

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<sup>7</sup> The eight bullet points are drawn from a discussion in *Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*. WHO: Geneva, May 20, 2003, p. 2-3.

<sup>8</sup> TB and Outbreaks Weekly, “*Severe Acute Respiratory Syndrome; WHO points at ‘super spreaders’* as key to stopping SARS,” April 29, 2003.

<sup>9</sup> WHO, *Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*. Geneva: WHO, May 20, 2003, p. 6.

<sup>10</sup> For more detail, see [[www.who.int/csr/sars/travel](http://www.who.int/csr/sars/travel)].

on SARS and brought together clinicians for SARS diagnosis and treatment.<sup>11</sup> It also developed guidelines, recommendations, and descriptions concerning case definitions, case management, laboratories, biosafety, blood safety, epidemiology, mass gatherings, and goods and animals from SARS-affected areas.<sup>12</sup>

An urgent plan for the operational response to SARS was developed and implemented. This included providing expertise and supplies in SARS-affected areas and hospitals, and “in the air” through technology to bring the best minds to the collaboration required. This plan resulted in:

- ! A global alert
- ! Rapid case identification
- ! Global reporting system and verification
- ! Regular updates and advice
- ! International field support and logistics coordination
- ! Epidemiological and clinical networking
- ! Laboratory network<sup>13</sup>

Through this network, and daily conference calls, epidemiologists were able to discuss cases, refine their definitions, examine chains of transmission, track progress, and increase their understanding of what worked best where. Similarly, individuals working in the clinical network were able to share experiences with different forms of treatment, examine the possible reasons for the range of individual responses to the disease, and develop guidelines for infection control. The network of the laboratories enabled many scientists to work together to come up with the identification of the SARS virus.

Scientists have much to learn about SARS, including understanding the evolution of the disease, designing early detection, prevention and treatment strategies, and establishing effective surveillance systems. Until then, containment may remain the most effective control tool. If SARS becomes endemic, the WHO may find the application of models of response for other infectious diseases, such as malaria, meningitis and yellow fever useful in combating the disease and developing therapies and vaccines.<sup>14</sup>

WHO has issued an appeal for funding to support its surveillance and monitoring activities in Asia. It hopes to help those hardest hit by the disease economically, to continue with their efforts to control SARS, and ultimately to

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<sup>11</sup> For more information about the WHO collaborative network, see [<http://www.who.int/csr/sars/networkhome>].

<sup>12</sup> Links to information under these headings can be found at [<http://www.who.int/csr/sars/guidelines>].

<sup>13</sup> WHO, “*The Operational Response*,” April 16, 2003.

<sup>14</sup> WHO, “*Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future*,” Geneva, Switzerland, May 20, 2003, p. 7.



eliminate the disease as a global threat.<sup>15</sup> The WHO has an annual budget of nearly \$850 million. It relies heavily on its 192 member states for resources and teams of experts.<sup>16</sup>

## SARS and International Health Regulations

The outbreak of SARS has raised many public health questions, including the application of international law. According to David P. Fidler, Professor of Law at Indiana School of Law in Bloomington, the legal implications affect three main areas — International Health Regulations (IHR); public health measures and civil and political rights; and principles of state responsibility in responding to SARS.<sup>17</sup> This section will focus on the IHR because of its relevance to WHO.

**Overview of the International Health Regulations.** In 1951, under Article 21 of the WHO constitution, member states adopted the International Sanitary Regulations, which in 1969 became known as the International Health Regulations (IHR). Amendments were made in 1973 and 1981. The main purpose was to control the spread of diseases with minimum impact on world traffic through the development of a global surveillance system, the use of procedures at ports and airports, and the creation of disease-specific provisions. Some argue that the regulations have not been effective in ensuring protection against diseases in a world of increasing trade and travel. Experts maintain that a key reason for ineffectiveness lies in the limited number of diseases to which the IHR applies. Originally, the regulation covered six diseases — smallpox, relapsing fever, typhus, cholera, plague, and yellow fever.<sup>18</sup> Today the IHR applies only to the last three diseases. Smallpox is considered to have been eradicated some years ago. Relapsing fever and typhus had been so successfully controlled that they were no longer considered a public health threat. The IHR do not apply to more recent infectious diseases such as HIV/AIDS and SARS. Member states were therefore under no obligation to report the outbreak of a new infectious disease nor were they required to restrict trade or travel even if it would benefit containment.<sup>19</sup>

In the 1990s, the WHO initiated a revision of the IHR to address the limited scope of the diseases covered, increase its relevance to the kinds of infectious disease

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<sup>15</sup> *The Australian*, “WHO Seeks \$306m for SARS Fight,” May 23, 2003.

<sup>16</sup> *Washington Post*, “SARS Shows WHO Disease Hunters’ Skills, and Limits,” May 31, 2003. [<http://www.washingtonpost.com>]

<sup>17</sup> The American Society of International Law, *SARS and International Law*, April 2003, see [<http://www.asil.org/insights>].

<sup>18</sup> WHO, “International Health Regulations.” [[www.who.int/csr/ihr/en](http://www.who.int/csr/ihr/en).]; The American Society of International Law, *SARS and International Law*, April 2003.

<sup>19</sup> The American Society of International Law, *SARS and International Law*, April 2003, see [<http://www.asil.org/insights>].

threats most prevalent or likely today, and to manage the return of old diseases. These revisions are scheduled to be finalized in 2005.<sup>20</sup>

In 2001, the World Health Assembly adopted a resolution concerning member response to international public health emergencies and global health security with reference to epidemics. In 2002, another resolution made the response more specific, and included health risks related not only to natural occurrence, but to accidental or deliberate use of biological and chemical agents.<sup>21</sup>

The SARS outbreak added momentum to discussions about revising the IHL that were already well under way. As recently as January 2003, the 192 member states had been discussing the details of the new framework, with a resolution for completing the revised regulations. Although the IHR were recognized as being outdated, the case of SARS highlighted the problems of transparency — China denied the problem existed for months, and the information provided from Toronto was criticized by some as incomplete and not timely enough.

**The Fifty-Sixth World Health Assembly.** Fidler argues that “the SARS epidemic may encourage WHO member states to accept a more robust international legal framework for global infectious disease control than has existed historically.”<sup>22</sup> At the Fifty-Sixth World Health Assembly in May 2003, the member states adopted two resolutions relevant to the SARS outbreak, one specifically on SARS, the other on the revision of IHL.<sup>23</sup> The SARS resolution focuses on eleven recommendations to WHO member states in addressing the SARS outbreak; it also requests the WHO Director General to take specific actions. None of these are new obligations or binding on member states as earlier press reports might have suggested. Rather, they build on the role of the WHO and highlight the need for information sharing and international cooperation in combating an outbreak such as SARS.<sup>24</sup>

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<sup>20</sup> WHO Executive Board, *Revision of the International Health Regulations*, EB111.R13, Agenda Item 5.12, 111<sup>th</sup> Session, January 24, 2003. Report by the Secretariat, WHO Executive Board, “*Revision of the International Health Regulations*,” EB111/4, Provisional Agenda item 5.12, 111<sup>th</sup> Session, December 15, 2002.

<sup>21</sup> WHO, *Revision Process of the International Health Regulations (IHR)*. [<http://www.who.int/csr/ihr/revision/en/>]. Previous resolutions include: WHA48.13 on new, emerging, and re-emerging infectious diseases, WHA54.14 on global health security, epidemic alert and response, EB111.R13 on revision of IHR, and EB111.R6 on the prevention and control of influenza pandemics and annual epidemics. See Fifty-Sixth World Health Assembly, Geneva, 19-28 May 2003, A56/48 - Revision of the International Health Regulations.

<sup>22</sup> The American Society of International Law, *SARS and International Law*, April 2003.

<sup>23</sup> World Health Assembly, *Severe Acute Respiratory Syndrome (SARS)*, WHA56.29, May 28, 2003; and World Health Assembly, *Revision of the International Health Regulations*, WHA56-28, May 28, 2003. For a discussion of these resolutions in international law, see The American Society of International Law, *Developments Involving SARS, International Law, and Infectious Disease Control at the Fifty-Sixth Meeting of the World Health Assembly*, June 2003. See [<http://www.asil.org/insights>].

<sup>24</sup> The American Society of International Law, *Developments Involving SARS, International* (continued...)

The IHL Resolution takes an important political step in emphasizing the need for member states to cooperate with other states and the WHO in monitoring and responding to infectious diseases. Although the SARS outbreak highlighted the strong need for revision of the IHL, then WHO Director General Gro Harlem Brundtland also pointed out the difficult balance to be struck in revising the regulations, such as state obligations to report sensitive health information, protection of human rights and civil liberties in light of an international health threat, and the impact on immigration policies and decisions.<sup>25</sup> The IHL Resolution does not give WHO a significant increase in authority in terms of intervention during a potential public health threat, nor does it give WHO the power to reprimand a state that does not comply.<sup>26</sup> However, the IHL Resolution lays the political groundwork for states to respond appropriately, much of the encouragement to comply will likely come from international pressure as the SARS case demonstrated.<sup>27</sup>

The IHL resolution was adopted as an interim measure until the IHL revisions are finalized in 2005. The WHO opted for this two-step process rather than insisting that members immediately approve the incorporation of the resolution into the IHL.<sup>28</sup> Some experts suggest that this resolution will encourage WHO collaboration within countries and also provide momentum for implementation of the measures outlined in the resolution.<sup>29</sup> The U.S. delegation initially asked for a postponement of action on the proposed resolution, hoping to include it in a broader discussion, but later conceded when it did not enlist member support.<sup>30</sup> Others suggested that this was a “negotiating tactic” used to avoid too early a commitment by the United States.<sup>31</sup>

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<sup>24</sup> (...continued)

*Law, and Infectious Disease Control at the Fifty-Sixth Meeting of the World Health Assembly*, June 2003. See [<http://www.asil.org/insights>].

<sup>25</sup> Washington Fax, *Brundtland Urges Health Security Measures for WHO Member States*, May 21, 2003.

<sup>26</sup> The American Society of International Law, *Developments Involving SARS, International Law, and Infectious Disease Control at the Fifty-Sixth Meeting of the World Health Assembly*, June 2003. See [<http://www.asil.org/insights>].

<sup>27</sup> *Washington Post*, “WHO Gets Wider Power to Fight Global Health Threats,” May 28, 2003. [<http://www.washingtonpost.com>]

<sup>28</sup> *Washington Post*, “WHO Gets Wider Power to Fight Global Health Threats,” May 28, 2003. [<http://www.washingtonpost.com>]

<sup>29</sup> *ProMed*, “Comment on WHA Resolution,” May 28, 2003.

<sup>30</sup> *Washington Post*, “WHO Gets Wider Power to Fight Global Health Threats,” May 28, 2003. [<http://www.washingtonpost.com>]

<sup>31</sup> United Nations Foundation, “WHO: Members Vote to Give Agency New Powers in Outbreaks, More” UN Wire, May 28, 2003. See [[http://www.unwire.org/UNWire/20030528/33949\\_story.asp](http://www.unwire.org/UNWire/20030528/33949_story.asp)]

## Country Responses to SARS

The SARS virus rapidly spread to 30 countries, ultimately infecting 8,437 people, of whom 813 died.<sup>32</sup> Each country handled the virus differently. Some countries, like Vietnam, immediately called for international support. Others, like China, initially downplayed the severity of the virus within their borders. Although the United States reported 75 SARS cases it had no SARS-related deaths.<sup>33</sup> Countries experiencing five or more SARS deaths are discussed in this section. Other countries that reported SARS deaths include: France (1), Malaysia (2), Philippines (2), South Africa (1), and Thailand (2).

### China and Hong Kong

Reports of SARS outbreak coverups surfaced in mainland China in April 2003. Many blamed China for the global SARS crisis, which seems to have started in southern China. Critics argued that had China been forthright in proclaiming the extent of the SARS problem, the disease would not have spread throughout the country, and eventually to other countries.<sup>34</sup>

In response to international criticism about its complacency and cover-up in preventing the spread of the virus, the Chinese government took a number of steps to demonstrate transparency and vigilance in combating the spread of SARS. The Mayor of Beijing and the Minister of Health were fired.<sup>35</sup> Chinese authorities also quarantined those with symptoms of the disease and those with whom they had contact, often thousands at a time.<sup>36</sup> Entire apartment buildings, markets, hospitals, universities, and schools were shut down. All schools in Beijing were closed for nearly three months.<sup>37</sup> Chinese authorities banned all tourist visits from the central part of the country and Tibet.<sup>38</sup> China also closed some border crossings, including

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<sup>32</sup> WHO, *Cumulative Number of Reported Probable Cases of SARS*. July 10, 2003. [[http://www.who.int/csr/sars/country/2003\\_07\\_11/en/](http://www.who.int/csr/sars/country/2003_07_11/en/)]

<sup>33</sup> For more information on how the United States combated the spread of SARS see CRS Report RL31937, *Severe Acute Respiratory Syndrome (SARS): Public Health Situation and U.S. Response*.

<sup>34</sup> Pomfret, John, "Beijing Told Doctors to Hide SARS Victims." April 20, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>35</sup> Pomfret, John, "Thousands Flee Beijing, Fearing SARS." April 24, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>36</sup> Eckholm, Erik, "4,000 Quarantined in Beijing as Suspected SARS Cases Climb." April 25, 2003. *The New York Times*. [<http://www.nytimes.com>]

<sup>37</sup> *The New York Times*, "As SARS Eases, Beijing Classes Resume." May 19, 2003. [<http://www.nytimes.com>]

<sup>38</sup> Maynard, Micheline, "Passport, Mask, Thermometer." May 11, 2003. [<http://www.nytimes.com>]

some between China and Mongolia and postponed reopening the Khunjirap crossing between China and Pakistan.<sup>39</sup>

Chinese officials enacted new laws to fight SARS. One of China's most controversial laws, calls for the imprisonment or execution of anyone found intentionally spreading the virus. The first person facing punishment under this law is Dr. Li Song. Authorities charge Dr. Li with vandalism and violating an infectious disease law.<sup>40</sup> Hospital officials argue that he left a hospital knowing he had SARS, and ultimately spread the virus to his family and more than 100 others in the small town of Linhe. Dr. Li's mother, father and wife have died of SARS, while Dr. Li remains in jail.<sup>41</sup>

Other laws sought to halt the spread of the virus through fines. Authorities in the southern town of Guangzhou began fining individuals who spit in public 50 yuan (about \$6 US), a fine that many will find difficult to pay.<sup>42</sup> In Shanghai, those found spitting, as well as throwing away cigarette stubs or fruit peels in public areas, and dumping garbage and sewage in the wrong places are subject to a fine of 200 yuan (about \$24 US), compared to 50 yuan prior to the SARS outbreak.<sup>43</sup>

China's moves to address the spread of SARS have also included financial assistance. The Chinese Ministry of Finance allocated a total of 440 million yuan (about \$53 million) to reinforce the fight against SARS.<sup>44</sup> Provincial and local governments also offered assistance to those affected by SARS. Assistance included the distribution of temporary subsidies, disinfectants, protective surgical masks and soap. One Beijing district, the Dongcheng District, reported that it decided to provide 420 thousand yuan (about \$51 thousand) to its low income residents, and Chaoyang District allocated 350 thousand yuan (about \$42 thousand) towards the purchase of preventive aids.<sup>45</sup> Meanwhile officials in Hong Kong announced a \$1.5 billion aid package, which included waiving water and sewage charges for the

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<sup>39</sup> China Internet Information Center, "China Temporarily Closes Some Border Ports." May 12, 2003. [<http://www.china.org.cn/english/index.htm>]

<sup>40</sup> Kahn, Joseph, "Man's Virus Infects Town, Killing His Family." May 15, 2003. *The New York Times*. [<http://www.nytimes.com>]

<sup>41</sup> Supporters of Dr. Li point out a number of inconsistencies in the charges. Although Chinese officials claim Dr. Li spread the virus throughout Linhe when he walked out of Ba Meng Hospital on April 8, 2003, SARS was not placed on the mandatory quarantine list until April 14, six days later. Furthermore, members of Dr. Li's family contend that he did not know that he was infected with SARS, and he only left the hospital after complaining of poor treatment. Dr. Li also reportedly walked out of the facility to care for his parents who suddenly became ill. The Li family are currently searching for a lawyer.

<sup>42</sup> BBC News, "Spitting ban to combat SARS." May 14, 2003. [[www.bbc.co.uk](http://www.bbc.co.uk)]

<sup>43</sup> *People's Daily*, "SARS Epidemic Increases Personal Hygiene Awareness." April 28, 2003. [<http://english.peopledaily.com.cn/>]

<sup>44</sup> *People's Daily*, "China Allocates US \$6.25 mln on Anti-SARS Measures." May 23, 2003. [<http://english.peopledaily.com.com.cn/>]

<sup>45</sup> *People's Daily*, "Beijing Moves to Aid Economically disadvantaged residents in SARS fight." April 24, 2003. [<http://english.peopledaily.com.cn/>]

general public for up to four months, increasing income tax rebates, waiving license fees for heavily affected industries, guaranteeing \$450 million in loans to affected businesses, increasing medical research spending, and reducing commercial rents for stores at public housing sites and other government controlled properties.<sup>46</sup> The Chinese Government also reserved \$128 million for a Hong Kong marketing campaign now that the city has been removed from the WHO list of infected areas.<sup>47</sup> According to the Chinese Government, the international community donated about \$76.6 million to aid its fight against SARS.<sup>48</sup>

On June 10, the WHO sent a high-level team, including Dr. David Heymann, Executive Director for Communicable Diseases at WHO, to China to assess the current situation and plan a strategy for the future. They proposed steps for examining and detecting cases, defining procedures for contact tracing, and responding to local transmissions. WHO was particularly concerned about the capacity of the Chinese rural health systems to deal with emerging infectious diseases, from effective monitoring and reporting to adequate hospital care.<sup>49</sup> However, it found that surveillance systems in two key rural provinces were effective.<sup>50</sup> China has also surprised many with the speed with which it brought its outbreak under control. Some studies suggest that the mortality rate may have been lower, and the cure rate higher, than in other parts of the world. Differences in incubation period and groups at highest risk may provide clues for fighting the disease. According to Dr. Heymann, “Long-term containment depends on finding answers to a long list of scientific questions. China has much to offer the rest of the world.”<sup>51</sup>

On June 24, 2003, WHO removed its recommendation that people should postpone all but essential travel to Beijing, China. Beijing was the last area in the world to have the travel warning lifted. Beijing, with a cumulative total of 2,521 probable cases and 191 deaths, has had the largest outbreak of SARS anywhere in the world, followed by Hong Kong with 1,755 cases and 296 deaths, and Guangdong Province with 1,511 cases and 57 deaths.<sup>52</sup>

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<sup>46</sup> Bradsher, Keith, “Epidemic Spurs Plan to Revive Hong Kong.” April 24, 2003. *The New York Times*. [<http://www.nytimes.com>]

<sup>47</sup> Bradsher, Keith, “Relieved Hong Kong Starts to Shed Masks.” May 25, 2003. *The New York Times*. [<http://www.nytimes.com>]

<sup>48</sup> *People’s Daily*, “FM Spokeswoman Briefs on Assistance to China for SARS Battle.” May 9, 2003. [<http://english.peopledaily.com.cn/>]

<sup>49</sup> WHO, “Update 77 — WHO Officials to Visit China,” June 10, 2003.

<sup>50</sup> WHO, “Update 59 - Report on Guangxi (China) visit, situation in Taiwan, risk of SARS transmission during air travel.” May 19, 2003. [<http://www.who.int/csr/sars>]

<sup>51</sup> WHO, “Update 77 — WHO Officials to Visit China,” June 10, 2003.

<sup>52</sup> WHO, “Update 87 - World Health Organization changes last remaining travel recommendation — for Beijing, China.” June 24, 2003. [<http://www.who.int>]

## Taiwan

The doubling of SARS deaths<sup>53</sup> in Taiwan prompted WHO to send a team to investigate the island's SARS situation. The sharp increase in new cases and deaths surprised some as Taiwan initially appeared successful in curtailing mortality, avoiding international community transmission, as well as maintaining a relatively low number of new cases compared to mainland China. The government of Taiwan took early steps to avoid a massive SARS outbreak, including imposing mandatory 10-day quarantines on all visitors arriving from China, Hong Kong, Singapore or Toronto; cancelling more than 100 commercial flights; cancelling high school exams scheduled for the end of May; and monitoring the temperature of visitors to many public buildings and hotels.<sup>54</sup>

In May 2003, the President of Taiwan, who has been vocal in his desire to gain Taiwanese observer status to the WHO<sup>55</sup>, stated that Taiwanese hospital officials from Taipei Municipal Heping Hospital may have tried to cover up a SARS outbreak.<sup>56</sup> In response, Taiwanese authorities fired the superintendent of the hospital and relocated all 200 patients and 900 employees from Heping Hospital to a designated SARS facility while the hospital was being disinfected.<sup>57</sup> Shortly after, the Taipei City Government fined the Heping Hospital 1.1 million Taiwan dollars (\$31,682 US) and four other hospitals 1.5 million Taiwan dollars (\$43,202 US) each for delaying reporting SARS cases to health authorities, and revoked the licence of the former Jen Chi Hospital superintendent, Liao Cheng-hsiung, accusing him of covering up a SARS outbreak while serving.<sup>58</sup> The Taiwan Minister of Health, Dr. Twu Shiing-jer, voluntarily resigned on May 16, 2003, taking full responsibility for the SARS spread.<sup>59</sup> Two days later, more than 140 medical employees across the island reportedly resigned to avoid dealing with SARS patients.<sup>60</sup> The medical workers charged that the government had failed to provide sufficient protective gear.<sup>61</sup>

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<sup>53</sup> WHO reported 10 SARS deaths in Taiwan on May 6, 2003, and 24 SARS deaths on May 13, 2003.

<sup>54</sup> Luh, Shu Shin and John Pomfret, "Taiwan Bidding to Join WHO." May 10, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>55</sup> Taiwan is not a WHO member, thus it sought China's consent before sending a team.

<sup>56</sup> Luh, Shu Shin and John Pomfret, "Taiwanese President Suggests Hospital Covered Up Disease." May 13, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>57</sup> Ibid.

<sup>58</sup> Channel News Asia, "Taiwan officials confident of bringing SARS under control despite 55 new cases Friday." May 23, 2003. [<http://www.channelnewsasia.com>]

<sup>59</sup> McNeil Jr., Donald G., "Taiwan Health Minister Quits Over His Handling of SARS." May 16, 2003. *The New York Times*. [<http://www.nytimes.com>]

<sup>60</sup> Culpan, Tim, "Taiwan Posts Daily Record for SARS Cases." May 21, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>61</sup> Connolly, Ceci and Tim Culpan, "U.S. Doctor with SARS Symptoms to Return Home." May 23, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

WHO officials believe that lapses in infection control, particularly in emergency rooms, may have been one of the reasons for the rapid increase in cases.<sup>62</sup> Reports seem to support the assertion that Taiwanese health officials may not have taken enough measures to limit the spread of the virus both within and among the hospitals. The Dean of Heping Municipal Hospital's Radiology Department reported that, "Everything went wrong. There is no proper quarantine facility." It was reported that hospital staff did not separate SARS patients from non-SARS patients, and did not ask patients about their medical history. Concern about Taiwan's ability to contain the virus was heightened when CDC officials announced on May 23, 2003 that an American doctor sent with the WHO/CDC team to investigate Taiwan's recent upsurge in SARS cases was suspected to have become infected with SARS and was returned to the U.S. to undergo treatment.<sup>63</sup> CDC officials added that Heping Hospital made the critical mistake of sending SARS patients to other hospitals for treatment, unwittingly spreading the disease.<sup>64</sup>

In addition to its collaborative efforts with CDC and WHO, Taiwan bolstered its quarantine efforts, strengthened its contact tracing capabilities, and improved its infection control practices. The Government of Taiwan also released a \$1.44 billion U.S. aid package, which sought to assist ailing businesses and families of SARS victims, establish SARS prevention mechanisms, and create effective SARS contact tracing mechanisms.<sup>65</sup> Taiwan was removed from the WHO list of areas with recent local transmission on July 5, 2003. Its last probable case was reported on June 19, 2003. To date, 671 people have contracted the virus, of whom 84 have died.

## Vietnam

Vietnam, the poorest of the SARS-affected countries, was the first country to contain the SARS virus. The WHO removed Vietnam from its list of affected countries less than five weeks after it recorded its first SARS death.<sup>66</sup> Vietnam was hailed as a success story largely because of its rapid response to the health crisis, and its cooperation with WHO and CDC officials who offered critical technical assistance.<sup>67</sup> According to the WHO, Vietnam was fortunate to have had only one carrier, who spent less than three days among the general public prior to hospitalization. This limited the number of contacts that the man made.

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<sup>62</sup> WHO, "Update 59 - Report on Guangxi (China) visit, situation in Taiwan, risk of SARS transmission during air travel." May 19, 2003. [<http://www.who.int>]

<sup>63</sup> Altman, Lawrence and Donald G. McNeil, "U.S. Doctor with Symptoms to Fly Home from Taiwan." May 23, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>64</sup> Chung, Lawrence, "Complacency and infighting led to worsening outbreak." May 23, 2003. The Straits Times website. [<http://www.straitstimes.com>]

<sup>65</sup> Channel News Asia, "Taiwan's parliament approves special budget of US \$1.44 billion to combat SARS." May 23, 2003. [<http://www.channelnewsasia.com>]

<sup>66</sup> Nakashima, Ellen, "Vietnam Took Lead in Containing SARS." May 5, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>67</sup> WHO, "Update 39 - Optimism in Viet Nam, caution urged when using diagnostic tests." April 25, 2003. [<http://www.who.int/csr/sars>]



Some observers praised the success of the country with less resources than its SARS-affected neighbors to rapidly contain the virus. One Vietnamese health official explained that Vietnam's response contrasted with China's initial response in that Vietnam did not seek to downplay the potential impact of the disease and it welcomed international assistance. France quickly announced that it would offer more than \$100,000 to help sterilize Hanoi French Hospital, where the first SARS case was detected.<sup>68</sup> The WHO and CDC donated masks, gowns and other equipment; Japan contributed two ventilators and other medical supplies; Doctors Without Borders sent a medical team; and Vietnamese medical workers were trained in infection control techniques.<sup>69</sup> Vietnamese doctors also voluntarily quarantined themselves in Bach Mai hospital, the designated SARS hospital, to avoid spreading the virus to their families and the general community.

The government of Vietnam ordered the establishment of provincial and municipal steering committees responsible for closing down any entity and isolating any individual who contracted SARS or was suspected to be infected with the virus.<sup>70</sup> It also trained medical workers, customs officers, airline staff and those working in the tourism sectors.<sup>71</sup> The Finance Ministry spent about \$2 million on medical equipment and activities related to SARS prevention<sup>72</sup> and targeted a little more than \$1 million for Vietnam's border provinces tasked with preventing SARS from leaving or entering Vietnam.<sup>73</sup> The Government of Vietnam recently announced that it intended to spend an additional \$3.3 million to prevent SARS from returning.<sup>74</sup> Johnny Chen, believed to have carried SARS to Vietnam from China, died of SARS on March 13, 2003. A little more than a month later on April 28, 2003, the WHO announced that Vietnam was the first country to have contained the deadly virus. A total of 63 people contracted SARS in Vietnam, 5 of whom died.<sup>75</sup>

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<sup>68</sup> *Asia Times*, "Vietnam shows how to beat SARS." April 30, 2003. [<http://www.atimes.com>]

<sup>69</sup> Nakashima, Ellen, "Vietnam Took Lead in Containing SARS." May 5, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

<sup>70</sup> Ministry of Foreign Affairs, "Further precautions taken to ward off SARS." March 31, 2003. [<http://www.mofa.gov.vn>]

<sup>71</sup> Ministry of Foreign Affairs, "Deputy Prime Minister asks all provinces to establish SARS control committees." April 16, 2003. [<http://www.mofa.gov.vn>]

<sup>72</sup> Ministry of Foreign Affairs, "30 billion VND for SARS prevention work." April 8, 2003. [<http://www.mofa.gov.vn>]

<sup>73</sup> Ministry of Foreign Affairs, "Further precautions taken to ward off SARS." March 31, 2003. [<http://www.mofa.gov.vn>]

<sup>74</sup> Ministry of Foreign Affairs, "Ninety returnees from Beijing to leave isolated centre." May 12, 2003. [<http://www.mofa.gov.vn>]

## Singapore

Some civil libertarians criticized the Government of Singapore in its response to the SARS virus as being too harsh. However, the World Health Organization commended Singapore on its response to the virus. Dr. David Heymann, Executive Director of communicable disease programs at the WHO described Singapore's actions as "exemplary", and stated that "Singapore has been one of the most successful countries in its response to SARS."<sup>76</sup> The World Health Organization removed Singapore from the list of areas with local SARS transmission on May 30, 2003.<sup>77</sup>

Singapore's actions against SARS were viewed as swift and widespread. For example, the Ministry of Education required all schools to provide students with a personal thermometer, and to teach them to check their own temperatures daily. All students taking the national language exams in June 2003, underwent temperature checks before entering testing sites. The Ministry also required the Institutes of Higher Learning to segment their large campuses into smaller sections to reduce movement across the campus and to facilitate contact tracing. Singapore required all students and households to have thermometers by June 2003. Other steps taken to prevent the spread of SARS included: directing all SARS cases to one hospital, installing video cameras in the homes of all quarantined individuals, electronically tagging violators of quarantine orders, using body thermal scanners at airports, enforcing mandatory temperature checks for all individuals departing Singapore and those arriving from SARS affected areas, requiring all food handlers to take their temperatures twice a day, and applying mandatory temperature checks for entry to many public events. On March 24, 2003, the Singapore Ministry of Health invoked the Infectious Disease Act to isolate those infected with SARS, and prevent the further spread of the virus. The act was amended on May 23, 2003, by requiring all those who broke the home quarantine to be tagged, arrested, detained, and/or fined. The first offense is punishable by up to \$10,000 or 6 months imprisonment and repeat offenders can be fined up to \$20,000 or 12 months.<sup>78</sup>

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<sup>76</sup> WHO, "Update 53 - Situation in Singapore and Hong Kong, interpretation of areas with recent local transmission." May 12, 2003. [<http://www.who.int>]

<sup>77</sup> WHO, "Update 70 - Singapore removed from list of areas with local SARS transmission." May 30, 2003. [<http://www.who.int>]

<sup>78</sup> Singapore Ministry of Information, "Ministerial Statement in Parliament, SARS - A National Response." April 24, 2003. [<http://app.sprinter.gov.sg/data/pr/2003042408.html>]; Ramesh, S, "Singapore toughens Infectious Disease Act to deal with SARS outbreak." April 25, 2003. Channel News Asia. [<http://www.channelnewsasia.com>]; Government of Singapore, "Home Quarantine Information." May 27, 2003. [<http://www.sars.gov.sg/family.html>]; and Singapore Ministry of Education, "Arrangements for the 2003 GCE 'O' & 'A' Level Mother Tongue Language Mid-Year Examinations." May 27, 2003. Government of Singapore. [[www.sars.gov.sg](http://www.sars.gov.sg)]

The Government of Singapore also unveiled a \$230 million SARS relief package on April 17, 2003. Key elements include:

- ! a Home Quarantine Allowance Scheme, which pays an allowance to the self-employed and to small business owners who have employees affected by home quarantine orders;<sup>79</sup>
- ! property tax rebates for commercial properties and tourist hotels;
- ! 50% reduction in foreign worker levy for unskilled workers employed by tourist hotels;
- ! a Bridging Loan Program, which offers working capital loans to tourism-related small- and medium-sized enterprises;
- ! a Skills Redevelopment Program and SARS Relief Tourism Training Assistance Program, which offers funds to employers who send their employees to certified training courses in the tourism sector;
- ! diesel and road tax rebates for taxis, and operator licence fee waivers;
- ! rebates on aircraft landing fees and rental spaces at airports;
- ! 50% reduction in port dues for cruise ships; and
- ! dollar-for-dollar matching of funds for the Courage Fund, a tripartite fund established to help the victims of SARS and affected health care workers. The fund received nearly \$10 million in just 7 weeks.<sup>80</sup>

Singapore was removed from the list of areas with recent local transmission on May 31, 2003. To date, 206 people have contracted SARS in Singapore, and 32 have died of the virus. The last probable case was reported on May 18, 2003.

## Canada

When SARS first emerged in the country some criticized Canadian officials for waiting too long to quarantine 500 members of a prayer group widely believed to have been the source of the virus in Canada.<sup>81</sup> WHO officials also complained that the Canadian government had been slow to relay current information. Relations between the U.N. agency and Canadian authorities were strained when the WHO decided to place a SARS travel advisory on Toronto. Canada appealed to the WHO to remove the travel advisory, because officials claimed they could trace all occurrences of the virus.<sup>82</sup> On May 14, 2003, two days after the 24<sup>th</sup> SARS victim died, the WHO removed the travel advisory, citing 20 days had passed without new

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<sup>79</sup> Singapore Ministry of Information, "Ministerial Statement in Parliament, SARS - A National Response." April 24, 2003. [<http://app.sprinter.gov.sg/data/pr/2003042408.htm>]

<sup>80</sup> Ministry of Manpower, "Joint Media Release from the Ministry of Finance and Ministry of Trade & Industry: Government Unveils \$230 million SARS Relief Package." April 24, 2003. [<http://www.mom.gov.sg>]

<sup>81</sup> Krauss, Clifford, "Disease Has Canada Doubting Its Leaders," *New York Times*, April 19, 2003.

<sup>82</sup> Brown, DeNeen L., "Virus Worry Fades in Toronto, but Concerns Lingers." April 24, 2003. *The Washington Post*. [<http://www.washingtonpost.com>]

cases. However, on May 23, 2003 Toronto health officials reported that four new suspected SARS cases were under close surveillance.<sup>83</sup> On May 26, 2003, the WHO placed Toronto back on its list of countries with recent local transmission, but it did not place a travel advisory on the city.

Following criticism of bureaucratic delay, Canadian officials took a number of steps to contain the virus, including inviting the U.S. Centers for Disease Control (CDC) to monitor its hospitals, closing a number of hospitals and clinics, and quarantining those individuals suspected to have SARS. Canada also undertook a number of initiatives to aid businesses and individuals adversely affected by SARS.

On April 30, 2003, the Government of Canada passed the SARS Assistance and Recovery Strategy Act, which protects the jobs of people affected by SARS, and enables employees to take unpaid leave of absence for SARS-related reasons. It also included \$1.7 million in new funding to help scientists develop a new test and possible vaccine for SARS. All tourist facilities in Toronto were also exempt from retail tax from May 1, 2003 to September 30, 2003, under the act.<sup>84</sup>

Another government initiative implemented to assist Canadians affected by SARS is the SARS Grant Initiative. Eligible full-time and part-time health care workers affected by SARS can receive \$400 per week and \$200 per week, respectively. This initiative complements adjustments made to the Employment Insurance (EI) Act, which allows up to 15 weeks of special benefits when an eligible claimant is unable to work because of illness, injury or quarantine. The Government of Canada has adjusted the EI program so that those who become ill due to SARS are not immediately required to provide a medical certificate, and no longer have to wait two weeks to receive benefits.<sup>85</sup> Other SARS-related actions include:

- ! committing \$10 million toward a marketing campaign;
- ! arranging special payment schedules or temporary deferral of mortgage payment for those who find it difficult to pay mortgages due to SARS;
- ! extending tax due dates, establishing flexible payment schedules and waiving tax penalties or interest for those affected by SARS; and
- ! offering a four-month postponement of capital payments without penalty and small capital loans to small businesses affected by SARS.<sup>86</sup>

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<sup>83</sup> *The Straits Times*, "Officials fear four in Toronto hospital may have SARS." May 23, 2003. [<http://straitstimes.com>]

<sup>84</sup> Premier Ernie Eves Media Office, "Premier Ernie Eves' SARS strategy bill passes on first day of legislature." May 13, 2003, Canada NewsWire. [<http://www.newswire.ca/releases/April2003/30/c6392.html>] and Brown, DeNeen L., "Canada Seeks Help From CDC in Fighting Virus." April 23, 2003. *The Washington Post*.

<sup>85</sup> Human Resources Development Canada, "*Severe Acute Respiratory Syndrome News Release*." March 28, 2003. Human Resources Development Canada. [<http://www.hrdc-drhc.gc.ca/common/news/insur/030328.shtml>]

<sup>86</sup> Government of Canada, "Government of Canada Action to Contain the Effects of Severe Acute Respiratory Syndrome (SARS)." May 2, 2003. Prime Minister of Canada website. [<http://www.pm.gc.ca/>]

In June 2003, health workers concerned about their safety, including hundreds of nurses, demonstrated in Canada to demand danger pay, protective suits, and a public investigation into the cause of the SARS resurgence. Some nurses claimed that hospital officials were slow to respond to their warnings that patients in other wards showed SARS-like symptoms. Still, some family practitioners expressed concern that health officials failed to notify them when the virus first resurfaced. As a result, some family practitioners fell ill with the virus.<sup>87</sup> When the virus resurfaced thirteen people died of SARS and thousands were quarantined.<sup>88</sup>

Toronto was removed from the list of areas with recent local transmission on July 2, 2003. The last probable case was reported on June 12, 2003. To date, 250 people have contracted the virus and 38 have died of SARS.

## **Congressional Response**

### **Infectious Disease Monitoring**

The rapid spread of the SARS virus underscored the importance of establishing a database system that would allow rapid and accurate information sharing on emergent infectious diseases. The Senate FY2004 Labor, Health and Human Services (HHS) and Education appropriations bill provides over \$370 billion for infectious disease control at CDC, including \$25 million for SARS research, prevention and control. It also includes \$50 million to develop a Global Disease Detection System at the CDC that would enable the United States to effectively respond to a global infectious disease threat. The Senate bill also increases NIH funding for emerging infectious disease from nearly \$600 million in FY2003 to \$1.7 billion.

### **Capacity Building**

Congress has also recognized the need to strengthen state and local capacity to respond to a bioterrorist attack or infectious disease outbreak. The Senate bill proposes that CDC funds for that purpose be maintained at FY2003 levels, \$940 million. Part of strengthening state and local capacity includes the support of the Health Alert Network (HAN). Prior to HAN, one-half of local public health departments did not have e-mail. The HAN system has been used to share information about SARS. Forty million U.S. dollars have been reserved for this purpose in the Senate version of the FY2004 Labor, HHS, and Education appropriations bill.

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<sup>87</sup> *The Washington Post*, "SARS Takes Toll on Nurses." June 12, 2003. [<http://www.washingtonpost.com>]

<sup>88</sup> WHO, "Cumulative # of Reported Probable Cases of SARS." June 2, 2003. [<http://www.who.int>]

## Improving U.S. Response Capability

The rapid spread of the SARS virus has demonstrated the need to quickly and effectively respond to an intentional or natural infectious disease outbreak. Congress appropriated \$77.5 million to the CDC Epidemic Services and Response program in FY2003. The Senate version of the FY2004 Labor, HHS and Education appropriations bill increases funding for those efforts to \$127.5 million in FY2004. The CDC Epidemic and Response program provides resources and scientific expertise for operating and evaluating surveillance systems; develops and refines research methods and strategies for public health practitioners; and trains public health professionals who respond to public health emergencies and outbreaks. The Senate version also directs over \$578 million to the Health Resources and Services Administration (HRSA) to combat bioterrorism.<sup>89</sup>

## Future Challenges

The SARS outbreak has provided lessons that may have future application. The WHO/CDC intervention greatly increased the effectiveness of the global response. A number of factors influenced the outcome, such as the system of global alerts and awareness, and access to immediate, high-level research and scientific collaboration. Coordinated efforts through the WHO/CDC, national governments, and the public health professionals also led to positive results, as in the case of Vietnam. Dr. Julie Gerberding, Director of the Centers for Disease Control and Prevention, had high praise for WHO's leadership during the crisis and emphasized communication and transparency as key to responding to international health crises. Areas in which improvements have been called for in the global response to infectious disease threats include:

### Global Interdependence and Transparency

Lack of transparency in promptly reporting and monitoring SARS outbreaks directly contributed to the spread of the disease worldwide and had wide-ranging impacts beyond the obvious health factors. The case of SARS demonstrated that state responsibility within a globalized world does not end at its borders and that future containment relies on openness and cooperation in the interests of all populations.

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<sup>89</sup> For more information on Congressional efforts to combat SARS, see CRS Report RL31937, *Severe Acute Respiratory Syndrome (SARS): Public Health Situation and U.S. Response*.

## Developing Surge Capacity

The ability of public health systems and the availability of resources to deal with a threat like SARS were clearly inadequate. Addressing the need and ability to mobilize additional resources, both within the country itself, and through the WHO network during an emergency, would improve the response to similar challenges in the future. Some have expressed concern about the impact SARS could have had if the outbreak had reached developing countries with minimal health care infrastructures, particularly those already weakened by HIV/AIDS. Others have argued that SARS has underscored the importance of boosting aid efforts that offer structural support, such as aiding in the training of health care professionals, donating medical supplies and equipment, upgrading health technologies, and ensuring universal inoculation against resurgent diseases such as tuberculosis.

## Public Fear and Information Disclosure

The WHO had to strike a balance. On the one hand it was pressed to give information, and use aggressive tactics of containment. On the other hand, the information about SARS may have contributed to public panic and anxiety, discrimination in some cases, and other impacts, such as economic losses. Some argue that the WHO did not take into account the impact of its decision-making concerning travel advisories and global alert warnings and that the SARS risk sometimes did not demonstrate the need for such a response.<sup>90</sup> Some governments in the future may be hesitant rapidly and openly to share outbreak information, because they may want to avoid potential negative economic impacts, such as job losses, hotel closures and flight cancellations as occurred at the height of the SARS crisis. For example, 60,000 restaurant and hotel workers in Hong Kong lost their jobs or were placed on unpaid leave during the SARS outbreak.<sup>91</sup> In Singapore, year-by-year comparisons showed that tourist arrivals fell 15% in March 2003 and 67% in April 2003, and hotels reported occupancy rates of only 10 to 30%, compared to usual occupancy rates of 70% or more during the first quarter of the year.<sup>92</sup>

## National Response

The weakness of national surveillance systems and health networks within any one country can dramatically affect the area and rate at which a disease spreads. If the SARS virus had spread more rapidly and extensively throughout the affected countries and for a sustained period, it could have had a significant impact on the health care systems, and other systems. Those in need of health care, such as those with cancer, requiring surgery, or those requiring immediate medical attention may not have been able to receive care. In order to contain the SARS virus, hospital wards and, at times, entire hospitals were shut down for weeks at a time to

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<sup>90</sup> *Far Eastern Economic Review*, "SARS: A WHO-Induced Panic?" May 22, 2003.

<sup>91</sup> MSNBC, "Record SARS deaths in Hong Kong." April 15, 2003. [<http://www.msnbc.com>]

<sup>92</sup> Channel News Asia, "National Wages Council (NWC) wage guidelines for July 2003 to June 2004." May 27, 2003. [<http://www.channelnewsasia.com>]

decontaminate them. Significant resources were used to quarantine SARS-infected individuals, schools were closed, and other private facilities were adversely impacted. Such problems caused by SARS illustrate the need to develop effective national response systems.

### **Inadequate Funding**

WHO officials and others have argued that there is a need for increased funding for laboratories and epidemiological research in the fight to contain diseases like SARS. Improvements to the existing surveillance network and national capacity to address emergency health issues are also badly needed. For example, GOARN reportedly needs \$200 million to reinforce its network.<sup>93</sup>

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<sup>93</sup> Associated Press, "New WHO Chief Plans More Action on SARS," May 21, 2003.