

The science and sociology of SARS

Part 2: Science, internationalism and the profit motive

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The outbreak of a new virus responsible for what is known as severe acute respiratory syndrome (SARS) raises a number of scientific, medical and social problems. Thanks in part to the quick response and collaborative effort of a team of international scientists, the virus has remained fairly well contained. However, it has infected 7,000 people worldwide and has killed over 500. It is still an enormous health risk in China, and there is still the possibility of an international epidemic that would have devastating consequences.

This is the second of two articles on the science and sociology of SARS. The first article explained some of the scientific understanding of viruses, and particularly the virus that causes SARS [see “The science and sociology of SARS—Part 1: Viruses and the nature of present outbreak”]. This article will consider the social significance of the effort to contain the disease.

By all accounts, the scientific effort that has gone into combating SARS has been extraordinary. The outbreak is thought to date back to November of last year. At the end of February 2003, the virus had spread from China to Vietnam, where it infected 22 hospital workers. It was not until March that the seriousness of the outbreak became clear to international scientists. On March 12, the World Health Organization (WHO) issued a global alert warning of a number of cases in Asia of severe atypical pneumonia. After SARS continued to spread, with no apparent treatment for those who came down with the disease, the WHO increased the level of its global alert, issuing a rare emergency travel advisory.

At that time, the cause was unknown, with suspicions that it might be a variety of influenza. Within two weeks of the WHO global health alert, the suspected cause of the disease was determined to be a particularly virulent strain of the coronavirus. Within two weeks of isolating the virus, the entire genetic sequence and exact structure of the virus had been determined and is now publicly available.

On April 16, the coronavirus was scientifically confirmed to be the cause of SARS, after monkeys infected with the virus produced the symptoms associated with the disease. This provided the fourth of the so-called Koch postulates to determine the cause of an infection: the virus must be found in all cases of the disease, it must be isolated from the host and grown separately, it must reproduce the disease when introduced in a non-infected host, and it must be re-isolated from the newly infected host.

In contrast to this rapid pace of scientific understanding, it took two years in the 1980s to identify HIV as the cause of AIDS. This is not to disparage the enormous effort that has gone into the understanding of AIDS. Rather, it is a testament to the power of modern science.

With the identification and genetic sequencing of the coronavirus, efforts can now be centered on working to develop vaccines and more direct treatments for the disease. The rapidity of the WHO response to the disease once it was known to be a serious threat has prevented it, at least for the time being, from spreading to the general population in countries such as Vietnam, Singapore and Canada. SARS was originally introduced into these countries by visitors from China, but new incidents of the

disease are beginning to fall, and in Vietnam have halted all together.

A product of international collaboration

The danger posed by the virus is very real. It continues to spread throughout China, and undoubtedly many of the students and workers who have returned home from Beijing and other major cities in recent weeks have brought the virus with them. As the virus spreads it will continue to kill—the death rate is now estimated at about 15 percent. It will have an especially devastating effect if it spreads into China’s large AIDS population, which because of weakened immune systems will be even less capable of surviving the disease.

The more the virus spreads, the greater the possibility that it will entrench itself as a global disease. According to David Heymann, executive director of WHO’s communicable diseases department, “If the SARS virus maintains its present pathogenicity and transmissibility, [it] could become the first severe new disease of the twenty-first century with global epidemic potential. As such, its clinical and epidemiological features, though poorly understood, give cause for particular concern.”

Most new diseases of the past century have had features that limit their capacity to propagate. “In contrast, SARS is emerging in ways that suggest great potential for rapid international spread under the favorable conditions created by a highly mobile, closely interconnected world,” said Heymann. If it develops into a global disease, it is possible that it could become another influenza-type problem, requiring constant monitoring to keep up with rapid mutations and to develop new vaccines and treatments.

If the virus has spread thanks to the interactions of global society (as the May 2 issue of *Science* noted, “Infectious diseases do not respect national boundaries”), the process of combating it has relied on these same forces. Every success in combating the disease has relied on international collaboration, while every block has been bound up with national competition and narrow social interests.

Scientists around the world have been able to pool their respective resources and expertise toward the unified aim of understanding the disease. The effort, coordinated by the WHO, was described by Heymann: “These laboratory directors have put aside profit, certainly prestige, and national pride to work together to help put into the public domain the information that is so necessary to learn about this disease. And it has been done in record time.”

Karl Stöhr, a WHO virologist and coordinator of the WHO’s global network, echoed Heymann’s remarks, noting in addition, “In this globalized world, such collaboration is the only way forward in tackling emerging diseases.”

The importance of global efforts in combating the disease have been so clear that they have forced a token recognition from the Bush

administration in Congressional testimony of Tommy Thompson, the secretary of health and human services, and Dr. Julie Gerberding, director of the Centers for Disease Control and Prevention (CDC).

In her testimony, Gerberding noted, “SARS also highlights that US health and global health are inextricably linked and that fulfilling CDC’s domestic mission...requires global awareness and collaboration with domestic and international partners to prevent the emergence and spread of infectious diseases...SARS presents a major challenge, but it also serves as an excellent illustration of the intense spirit of collaboration among the global scientific community to combat a global epidemic.”

“The SARS experience,” she continued, “reinforces the need to strengthen global surveillance, to have prompt reporting, and to have this reporting linked to adequate and sophisticated diagnostic laboratory capacity. It underscores the need for strong global public health systems, robust health service infrastructures, and expertise that can be mobilized quickly across national boundaries to mirror disease movements.”

It is also important to note the role played by modern communication systems, and in particular the Internet. Scientists in disparate regions of the globe were able to communicate instantaneously, sharing information and results. Heymann noted, “Collaboration is virtual. Members of the [scientific] network confer in daily teleconferences coordinated by WHO, and use a secure web site to post electron microscopic pictures of candidate viruses, sequences of genetic material for virus identification and characterization, descriptions of experiments, and results...The collaboration has resulted in the identification of the suspected causative agent, and the development of three diagnostic tests, with unprecedented speed.”

Steven Jones of the British Columbia Cancer Agency noted that the Canadian research team that he headed posted their sequencing of the genome on the Internet immediately after completing it. “People were, within minutes of that, able to download the sequence and analyze it in their own laboratories and their own computers. The Internet has had a profound impact on how this data has been shared and how scientists have collaborated.”

The latest information on the spread of the disease, as well as diagnostic guidelines and public recommendations to contain the spread of the virus, is constantly updated on web sites run by the WHO and CDC.

The profit motive asserts itself

The spirit of international collaboration, even altruism, on the part of scientists taking part in the SARS research is no doubt real. However, science in capitalist society is not capable of transcending the outmoded constraints placed on it by the profit motive and national competition.

Indeed, from the very beginning of the disease, national interests hindered progress. The Stalinist bureaucracy in China sought for months to cover up the extent of the outbreak in order to prevent it from hindering the integration of that country into the world capitalist economy. There can be no doubt that the Chinese government bears much responsibility for the extent of the disease’s spread in China and elsewhere.

Wherever the virus has gone, economies have suffered as people stay home rather than spend and tourism falls sharply. The WHO estimates that economic consequences could be as high as \$30 billion, with the brunt being felt in Asia. It is the threat to local businesses and the national economy more than anything else that has determined government action in the affected countries. In Canada, for example, the government bitterly resented travel warnings issued by the WHO with respect to Toronto. The primary fear was the effect on the city’s tourist industry, and government officials did their best to downplay the significance of the threat even as

documented cases emerged of Canadians taking the disease to other countries.

Moreover, even as the development of treatments is just beginning, biotechnology companies, governments and some universities are already rushing to patent everything from diagnostic tests to the new coronavirus itself.

Universities in Canada and Hong Kong have filed separate patent applications, as has the US CDC. The CDC has asserted that it wants the patent only to ensure that the scientific material remains open to all, but the growing struggle for ownership is reminiscent of the sharp battle that emerged between France and the US over credit for the discovery and sequencing of HIV. At stake are royalties and profits made from the sale of vaccines and diagnostic tests.

Researchers at the University of Hong Kong were the first to observe the virus in a microscope. According to Halison Yu, deputy manager of Versitech Ltd., which handles the university’s patent portfolio, this makes the university “the early bird,” giving them rights to the virus. A university that is able to secure such a patent is in prime position to attract investments from biomedical companies seeking to profit from the disease. According to Dr. Malik Peiris, a researcher at the university, the patent was only filed after it became clear that other universities were seeking to make a claim themselves.

The British Columbia Cancer Agency in Canada, whose scientists were the first to decode the virus’s genome, have filed a patent application in the US for the commercial rights to the genetic sequence. To their credit, some scientists have refused to go along with the rush to patent. Marco Marra, head of the Canadian team that did the sequencing, said he would not allow his name to be placed on the patent application, thus forfeiting any revenues the agency would receive. He told the *Wall Street Journal* that he does not believe genes should be patented.

Several biotechnology companies have filed patent applications for specific treatment methods. While most of these methods will never be used successfully, the hope among these companies is, as one executive put it, that they will “win the lottery” by patenting the right treatment.

What will be the response of world governments to this crisis? The lessons from SARS are clear: in order to combat the threat of viral epidemics in a modern globalized society, it is necessary to develop a globally integrated health system that includes extensive funding of public health monitoring systems in underdeveloped regions and throughout the world. It is necessary, moreover, to end the “underdeveloped” character of these regions and alleviate unsanitary conditions that can be a breeding ground for new diseases as well as a fertile ground for the spread of old ones. The modern advances in science and telecommunications provide the necessary technological basis to combat the threat.

However, these requirements are in fundamental contradiction to the tendencies of world capitalism, which are precisely to break down all constraints on private accumulation, including in particular public health systems. The US government, in particular, chafes at subordinating its policies to an international effort, seeing it as an unacceptable restraint on what the American ruling elite views as its inalienable right to pursue its own interests.

Here the war in Iraq—which has brought with it the complete destruction of the basic infrastructure of Iraqi society, including its health care systems—is instructive. The Iraqi people are currently facing a growing cholera epidemic, a disease whose spread is generally impossible so long as basic sanitation conditions are present. At the same time as the United States is gutting public health services within the country, it is devastating social conditions around the world in pursuit of the interests of a small section of the American population.

The devastating crisis presented by AIDS is also indicative of the inability of capitalist society to deal with such problems. Private companies that own patents on AIDS medications have collaborated with

the American government in preventing the production of generic medication that could be made available to underdeveloped countries, especially those in Africa, to help combat the catastrophe that the disease represents there. The inability of AIDS patients throughout the world to get necessary medications cheaply because of the profit interests of a handful of pharmaceutical companies amounts to a crime against humanity, resulting in the needless premature death and suffering of millions.

Can there be any doubt that SARS, if it were to become a global threat, would be treated in the same way—that public health would be subordinated to private profit? The fundamental lesson of the SARS outbreak—illustrated both in the positive by the international collaboration that went into the efforts to contain the disease, and in the negative, by the rush to patent its treatment—is that the health of the world's population in modern society is incompatible with a social system based upon private profit.



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