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Severe acute respiratory syndrome (SARS): Update on a moving target

Editor's note: *Much of the information in this article was taken directly from Centers for Disease Control and Prevention resources, either published on their web site or in the* Morbidity and Mortality Weekly Report, *or issued in health advisories.*

WE ARE NOW IN the early stages of yet another emerging infectious disease—severe acute respiratory syndrome (SARS)—a respiratory illness that has recently been reported in Asia, North America, and Europe. The World Health Organization (WHO) has determined that SARS is caused by a novel member of the coronavirus family, and has named the new virus "SARS virus."

Just how significant SARS will be is unclear. On one hand, its apparent ease of transmission, coupled with international mobility, prompted the WHO to declare the illness a "worldwide health threat." On the other hand, the death rate from the illness appears to be less than 4%, and, as this article goes to press in mid-April, no one in the United States has died of it.

When a new disease appears on the scene, it is sometimes easy to forget that in the United States, influenza-related complications result in the hospitalization of an average of 114,000 people each year and the death of 36,000.

From November 1, 2002, to April 17, 2003, 3,389 suspected cases of SARS and 165 SARS-related deaths were reported by the WHO, including 205 suspected cases (35 probable) and no deaths in the United States.

This article provides a brief summary of what we know about SARS to date, taken from Centers for Disease Control and Prevention (CDC) resources. However, given the fast-breaking changes in our knowledge of SARS, some things may have changed from the time this article was sent to the printer to when it appears in your mailbox. Thus, to keep abreast of the latest findings, including new diagnostic tests and treatment options, consult the CDC and WHO web sites regularly (TABLE 1).

TABLE 1

For the latest information on SARS, go to the web

Centers for Disease Control and Prevention (CDC)
www.cdc.gov/ncidod/sars

World Health Organization (WHO)
www.who.int/csr/sars

Recent articles on SARS have been published on the following medical journal web sites:

New England Journal of Medicine
www.nejm.org

The Lancet
www.thelancet.com

Physicians with questions or concerns can contact:

CDC Emergency Operations Center
(770) 488-7100

SIGNS AND SYMPTOMS

SARS usually begins with fever, sometimes associated with chills or other symptoms, including headache, general feeling of discomfort, and body aches. After 2 to 7 days, patients may develop a dry, nonproductive cough.

The incubation period for SARS is typically 2 to 7 days; however, isolated reports have suggested an incubation period as long as 10 days.

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CDC case definition

The CDC has established the following definition for suspected cases of SARS:

- Respiratory illness of unknown etiology with onset since February 1, 2003, and meeting the following criteria:
- Measured temperature > 100.4°F (38°C), and
- One or more clinical findings of respiratory illness (eg, cough, shortness of breath, difficulty breathing, hypoxia, or radiographic findings of either pneumonia or acute respiratory distress syndrome), and one of the following:
- Travel within 10 days of onset of symptoms to an area with documented or suspected community transmission of SARS, ie, mainland China, Hong Kong, Hanoi, and Singapore; excludes areas with secondary cases limited to health care workers or direct household contacts. (Travel includes transit in an airport in an area with documented or suspected community transmission of SARS.) Or
- Close contact within 10 days of onset of symptoms with a person known to be a suspect SARS case. Close contact is defined as having cared for, having lived with, or having had direct contact with respiratory secretions or body fluids of a patient with suspected SARS.

Note: Suspected cases with either radiographic evidence of pneumonia or acute respiratory distress syndrome or evidence of unexplained acute respiratory distress syndrome by autopsy are designated "probable" cases by the WHO case definition.

Report suspected cases, watch for updates

SCREENING FOR SARS

To identify patients who may have SARS in ambulatory care settings, health care workers should ask targeted screening questions concerning fever, respiratory symptoms, and recent travel at triage or as soon as possible after patient arrival. The most recent case definition for SARS should be used as a basis for such screening questions.

Health care personnel who are the first points of contact should be trained for SARS screening. In the absence of systematic triage, providers caring for patients in ambulatory care settings should perform such screening before close contact.

Clinicians should evaluate persons meeting the case description and, if indicated, admit them to the hospital. Close contacts and health care workers should seek medical care for symptoms of respiratory illness.

TRANSMISSIBILITY OF SARS

The principal way the SARS virus appears to be spread is through droplet transmission, ie, when someone sick with SARS coughs or sneezes droplets into the air and someone else breathes them in.

Information to date suggests that people are most likely to be infectious when they have symptoms, such as fever or cough. However, it is not known how long before or after their symptoms begin that patients with SARS might be able to transmit the disease to others.

Cases of SARS continue to be reported primarily among people who have had direct, close contact with an infected person, such as those sharing a household with a SARS patient and health care workers who did not use infection control procedures while caring for a SARS patient. In the United States, there is no indication of community transmission at this time.

Most documented cases of transmission of SARS have occurred in either health care workers or household contacts of patients with SARS. In addition, other persons may be exposed to SARS, eg, international travelers from areas with community transmission or persons identified as a result of a public health investigation.

INFECTION CONTROL MEASURES

If a patient is suspected of having SARS, the following should be applied:

- **A surgical mask** on the patient
- **Contact precautions** (eg, gloves, gown, and eye protection)
- **Hand hygiene**
- **Airborne precautions.** The patient should be placed in an isolation room with negative pressure relative to the surrounding area. People entering the room should use an N95 disposable respirator (ie, one that can filter particles measuring 1 micron with at least 95% efficiency). If respirators are not avail-

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able, health care personnel evaluating and caring for patients with suspected SARS should wear a surgical mask.

DIAGNOSTIC TESTING

Initial diagnostic testing should include:

- Chest radiography
- Pulse oximetry
- Blood cultures
- Sputum Gram stain and culture
- Testing for viral respiratory pathogens, notably influenza A and B and respiratory syncytial virus.

Clinicians should save any available clinical specimens (respiratory, blood, and serum) for additional testing until a specific diagnosis is made.

CDC staff are working to develop specific laboratory tests for SARS, such as serologic testing, indirect fluorescent antibody testing, enzyme-linked immunosorbent assays (ELISAs) that are specific for antibody produced after infection, and a reverse transcriptase-polymerase chain reaction (RT-PCR) test for the SARS virus.

Save clinical specimens for later testing

Clinicians should regularly consult the www.cdc.gov web site for updated information on diagnostic testing.

EMPIRIC THERAPY

Although the SARS virus has been identified and genetically sequenced, and corticosteroids and a variety of antiviral agents bave been tried, no specific treatment recommendation can be made at this time. Articles on SARS have recently been published on the web sites of the *New England Journal of Medicine* and *The Lancet*. The genetic sequence of the virus has been published on the CDC web site.

Empiric therapy should include coverage for organisms associated with any community-acquired pneumonia of unclear etiology, including agents with activity against both typical and atypical respiratory pathogens. Treatment choices may be influenced by severity of the illness. Infectious disease consultation is recommended.

FOR POSSIBLE EXPOSURES

The following measures are recommended for persons other than health care workers or household contacts who may have been exposed to SARS. These recommendations are based on the experience in the United States to date and may be revised as more information becomes available:

- Persons who may have been exposed to SARS should be vigilant for fever or respiratory symptoms, and those who develop fever or respiratory symptoms should seek health care evaluation. When possible, before the evaluation, health care providers should be informed that the patient may have been exposed to SARS.
- Persons who may have been exposed to SARS and who develop fever or respiratory symptoms should limit their interactions outside the home and should not go to work, school, out-of-home child care, or other public areas until 10 days after the fever and respiratory symptoms resolve. During this time, infection control precautions at home should be used to minimize the potential for transmission.
- At this time, in the absence of fever or respiratory symptoms, persons who may have been exposed to SARS patients need not limit their activities outside the home and should not be excluded from school or work.

TO REPORT SUSPECTED CASES OF SARS

Any clinician who identifies a suspected SARS case should collect information about the case and report it to the local or state health department. Information will be provided on the collection and transport of clinical samples through the state public health laboratory for analysis at the CDC.

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