

Updated SARS case definition using laboratory criteria

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Background and epidemiology: The identification of the SARS-associated coronavirus (SARS-CoV)^{1,2} has led to the development of serologic and virologic tests for the disease. As of Apr. 30, 2003, the US Centers for Disease Control and Prevention (CDC) has revised their surveillance case definitions for SARS to include laboratory criteria for evidence of infection³ (see Box [on next page] and Figure).

Clinical implications: Serologic testing can be done using indirect fluorescent antibody or enzyme-linked immunosorbent assays specific for SARS-CoV antibody. Because some patients do not have detectable coronavirus antibodies during the acute phase of their illness, a definitive diagnosis of SARS should be made

with antibody testing more than 21 days after the onset of initial symptoms.

Detection of the SARS-CoV itself has been done using clinical specimens of serum, nasal secretions and stool. This was done through viral isolation and electron microscopy, viral culture, or reverse transcription polymerase chain reaction (RT-PCR) to test for viral RNA.^{1,2} Although PCR results have been positive during the acute phase of SARS illness in some patients, the natural course of the viremia and viral shedding is unknown. Thus, a negative PCR test or viral culture result does not exclude coronavirus infection. Similarly, a negative serum antibody test result obtained less than 21 days after symptom onset is not reliable enough to rule out infection.

Prevention: Fundamental public health measures of respiratory isolation of patients and quarantine of close contacts should remain in effect. Suspect and probable SARS cases should be reported to public health authorities. In addition, clinicians should report the results of serologic tests if available. It is important, both for patients and for public health authorities, to obtain convalescent serum samples to make a definitive determination of SARS.

Although no cases of SARS-CoV infection (determined by serologic tests) have been found among exposed asymptomatic people, it remains possible that SARS-CoV infection might be asymptomatic in some, or cause nonrespiratory symptoms in others. This possibility has not been fully explored; however, testing of close contacts of infected cases who have not manifested symptoms will provide a better answer. Until then, the CDC cautions that there is insufficient evidence to exclude the possibility that asymptomatic, or atypical, infected people can transmit the disease.

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References

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2. Drosten C, Günther S, Preiser W, van der Werf S, Brodt HR, Becker S, et al. Identification of a novel coronavirus in patients with severe acute respiratory syndrome. *N Engl J Med* [online early release 2003 Apr 10]. Available: <http://content.nejm.org/cgi/reprint/NEJMoa030747v2.pdf> (accessed 2003 Apr 30).
3. US Centers for Disease Control and Prevention (CDC). Updated interim U.S. case definition of severe acute respiratory syndrome (SARS). Atlanta: The CDC; 2003 Apr 30. Available: www.cdc.gov/ncidod/sars/casedefinition.htm (accessed 2003 Apr 30).

Clinical criteria	Mild respiratory* illness/ Asymptomatic			
	Mild respiratory illness			
	Severe respiratory illness	Reported to World Health Organization		
		Laboratory-confirmed	Undetermined	Negative
Laboratory criteria for SARS-CoV				

Suspect case*
 Probable case*
 *Meets epidemiologic criteria

Figure: Clinical and laboratory criteria for probable and suspect severe acute respiratory syndrome (SARS) cases and SARS-associated coronavirus (SARS-CoV) infection. [Source: US Centers for Disease Control and Prevention (www.cdc.gov/ncidod/sars/casedefinition.htm) [released 2003 Apr. 30]].

Box: Updated CDC interim surveillance case definition for severe acute respiratory syndrome (SARS)***Clinical criteria**

- Asymptomatic or mild respiratory illness
- Moderate respiratory illness
 - Temperature of > 100.4° F (> 38°C),† and
 - One or more clinical findings of respiratory illness (e.g., cough, shortness of breath, difficulty breathing, or hypoxia)
- Severe respiratory illness
 - Temperature of > 100.4° F (> 38°C),† and
 - One or more clinical findings of respiratory illness (e.g., cough, shortness of breath, difficulty breathing, or hypoxia), and
 - Radiographic evidence of pneumonia, or
 - Respiratory distress syndrome, or
 - Autopsy findings consistent with pneumonia or respiratory distress syndrome without an identifiable cause

Epidemiologic criteria

- Travel (including transit in an airport) within 10 days of onset of symptoms to an area with current or recently documented or suspected community transmission of SARS,‡ or
- Close contact§ within 10 days of onset of symptoms with a person known or suspected to have SARS infection

Laboratory criteria¶

- Confirmed
 - Detection of antibody to SARS-CoV in specimens obtained during acute illness or > 21 days after illness onset, or
 - Detection of SARS-CoV RNA by RT-PCR confirmed by a second PCR assay, by using a second aliquot of the specimen and a different set of PCR primers, or
 - Isolation of SARS-CoV
- Negative: Absence of antibody to SARS-CoV in convalescent serum obtained > 21 days after symptom onset
- Undetermined: Laboratory testing either not performed or incomplete

Case classification**

- *Probable case*: meets the clinical criteria for severe respiratory illness of unknown cause with onset since Feb. 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative or undetermined
- *Suspect case*: meets the clinical criteria for moderate respiratory illness of unknown cause with onset since Feb. 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative or undetermined

Note: SARS-CoV = SARS-associated coronavirus, RT-PCR = reverse transcription polymerase chain reaction.

*Source: US Centers for Disease Control and Prevention (www.cdc.gov/ncidod/sars/casedefinition.htm [released 2003 Apr. 30]).

†A measured documented temperature of > 100.4° F (> 38°C) is preferred. However, clinical judgement should be used when evaluating patients for whom a measured temperature of > 100.4° F (> 38°C) has not been documented. Factors that might be considered include patient self-report of fever, use of antipyretics, presence of immunocompromising conditions or therapies, lack of access to health care or inability to obtain a measured temperature. Reporting authorities might consider these factors when classifying patients who do not strictly meet the clinical criteria for this case definition.

‡Areas with current documented or suspected community transmission of SARS include mainland China and Hong Kong Special Administrative Region, People's Republic of China; Singapore; Taiwan; and Toronto. Hanoi, Vietnam, is an area with recently documented or suspected community transmission of SARS.

§Close contact is defined as having cared for or lived with a person known to have SARS or having a high likelihood of direct contact with respiratory secretions or body fluids, or both, of a patient known to have SARS. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, close conversation (< 3 ft [< 1 m]), physical examination, and any other direct physical contact between people. Close contact does not include activities such as walking by a person or sitting across a waiting room or office for a brief period of time.

¶Assays for the laboratory diagnosis of SARS-CoV infection include enzyme-linked immunosorbent assay, indirect fluorescent-antibody assay and RT-PCR assays of appropriately collected clinical specimens (source: CDC. Guidelines for collection of specimens from potential cases of SARS. Available: www.cdc.gov/ncidod/sars/specimen_collection_sars2.htm). Absence of SARS-CoV antibody from serum obtained \leq 21 days after illness onset, a negative PCR test result or a negative viral culture result does not exclude coronavirus infection and is not considered a definitive laboratory result. In these instances, a convalescent serum specimen obtained > 21 days after illness onset is needed to determine infection with SARS-CoV. All SARS diagnostic assays are under evaluation.

**Asymptomatic SARS-CoV infection or clinical manifestations other than respiratory illness might be identified as more is learned about SARS-CoV infection.