

Council of State and Territorial Epidemiologists
Position Statement

03-ID-12

Committee: **Infectious Disease**

Title: **Revision of the interim US surveillance case definition for Severe Acute Respiratory Syndrome (SARS), inclusion of SARS-associated coronavirus (SARS-CoV) disease in the National Public Health Surveillance System (NPHSS), and ongoing SARS-CoV surveillance and control in the United States.**

Statement of the problem:

The recent emergence of SARS in Asia, its subsequent importation into and spread within North America, its severe clinical manifestations, and its relative ease of transmission necessitate inclusion of cases of SARS-CoV disease as a notifiable disease in the NPHSS, and communication with CDC and WHO on suspect SARS cases that are under investigation and for whom prevention activities are being undertaken to limit transmission. In addition, revision of the interim U.S. case definition for SARS is required to distinguish between syndromes that require diagnostic testing and/or aggressive public health action because they could be SARS-CoV disease and disease caused by SARS-CoV infection, and to specify the laboratory and epidemiologic criteria for diagnosis of SARS-CoV disease. Further, criteria for whom to evaluate for possible SARS-CoV infection need to be broadened to include groups without a clear epidemiologic link by place or person that would be likely to include sentinel cases of SARS-CoV in the event that otherwise unrecognized new geographic foci of SARS became established. Finally, in the event that apparent SARS-CoV transmission ceases globally, surveillance and infection control standards need to be developed and applied to detect its re-emergence and limit its potential to become established.

Statement of the desired action (s) to be taken:

CSTE recommends that:

- The existing interim surveillance case definition for SARS be revised and be split into two definitions: a) a sensitive, non-specific case definition for SARS reports under investigation, and b) a more specific case definition for SARS-CoV disease;
- These definitions be reviewed and changed as needed. To the extent possible, they should be consistent with the published guidelines for uniform criteria for surveillance case definitions in the United States and the case definitions for surveillance of SARS used by the World Health Organization;
- CDC maintain, on the CDC website for purposes of surveillance, information on the current criteria for laboratory diagnosis of SARS-CoV infection and a current list of areas with recent local transmission of SARS;
- SARS-CoV disease be added as of July 1, 2003 to the list of conditions under surveillance as part of the NPHSS and reported through NETSS;
- SARS reports under investigation be reported to CDC as needed for national and international monitoring purposes per special instructions agreed upon by CDC and CSTE;
- CDC work with states to determine methods for surveillance to detect cases of SARS-CoV disease without a clear epidemiologic link by place or person;
- CDC work with states and hospitals to determine infection control standards needed for persons with a SARS-like illness to limit spread of SARS-CoV should measurable transmission stop and the ability to define epidemiologic links temporarily disappear;
- CDC work with states to identify resources needed to support the additional surveillance activities required.

Goals of surveillance:

1) Rapidly identify illness that could be SARS, to screen for SARS-CoV and monitor and contain the potential for transmission; 2) rapidly recognize SARS-CoV disease outbreaks and geographic areas with increased SARS activity; 3) identify areas of possible SARS transmission to implement appropriate infection control practices in health care settings; 4) identify imported cases that may serve as sentinels for SARS-CoV activity in other regions of the world; 5) improve our current understanding of the epidemiology of this emerging disease; 6) assess the national public health impact of SARS-CoV disease and monitor trends; and 7) demonstrate the need for public health intervention programs and federal resources, and provide data to allocate resources.

Methods for surveillance:

Clinician and laboratory reporting. Core surveillance data for cases meeting the SARS-CoV disease case definition will be reported to the Centers for Disease Control and Prevention's (CDC's) National Notifiable Disease Surveillance Systems (NNDSS, a component of the NPHSS), through the National Electronic Telecommunications System for Surveillance (NETSS). Core records will be the official source of the SARS-CoV disease case count. Selected additional clinical, epidemiologic, and laboratory data will be collected and linked to the core NNDSS data. All surveillance data from persons meeting the definitions for SARS-CoV disease (i.e., core NNDSS and clinical, laboratory, and case investigation data) will be reported to CDC using electronic methods consistent with the NEDSS and Public Health Information Network (PHIN) architecture. In particular, CDC will assure that the following actions be implemented:

- Establishment of a dedicated, secure Web-based data entry system for SARS.
- Inclusion of a SARS module in the NEDSS base system, including electronic transmission of laboratory test results.
- Establishment of an XML schema that states can use to transmit information related to SARS cases to CDC, using the CDC secure data network.

States should be offered the options to choose the reporting method that fits their information system best. CDC will work closely with the states to determine the method(s) and frequency of data reporting.

In addition, CDC will work closely with the states to define a system outside the NPHSS to report SARS cases under investigation and the method(s) and frequency of reporting these data.

Case definitions: See below.

Period of surveillance: Indefinite.

Background and justification:

SARS is a recently recognized, contagious, febrile lower respiratory illness that is associated with infection by a novel coronavirus, called SARS-CoV. Manifestations are often severe, including death, and severe illnesses often occur in previously healthy persons, including many health care workers. While the illness can be highly contagious, its overall rate of spread is slow enough that it can often be contained with early recognition and aggressive implementation of containment activities. The ongoing but now apparently waning pandemic of SARS-CoV disease appears to have originated in China in November 2002, and then spread rapidly globally through air travel. Although sustained local transmission has not occurred in the United States, it has occurred in several countries, most notably Canada, Hong Kong, Taiwan, Singapore, Vietnam, and China. Using a broad screening definition, as of June 4, 2003, a total of 8,402 persons with possible SARS-CoV disease, including 772 deaths, have been reported from 29 countries. In the United States, as of June 4, a total of 373 possible SARS-CoV disease cases have been reported from 41 states and Puerto Rico. Of these, 67 (18%) were classified as "probable" SARS cases and 306 (82%) cases were classified as "suspect" SARS cases, using the interim CDC case definition; no deaths have been reported in the United States. However, evidence of infection with SARS-CoV has been documented in only 8 persons (all probable SARS cases) and has

been excluded in 28 of 35 other probable cases in whom testing has been completed and 116 suspect cases. Of these 8 cases, 7 were attributed to exposure during international travel in a country with SARS transmission and one was likely related to household transmission within the United States. Seven of the 8 cases of SARS-CoV disease were identified before early April and the number of new cases meeting the screening definition in the United States has been decreasing in recent weeks. In addition, SARS appears to be coming under full control in all countries where sustained chains of transmission were established, and the prospect exists of measurable transmission ceasing. However, vigilance is critical to ensure rapid recognition and appropriate management of persons with SARS-CoV disease so that re-emergence can be recognized and transmission can be prevented.

Following the initial reports of SARS, a preliminary national surveillance case definition for suspected SARS cases was developed to identify persons with fever (temperature >100.4 F [>38 C]), respiratory symptoms, and an epidemiologic link within 10 days of illness onset of either travel to an area with possible transmission of SARS or close contact with a person with SARS. In recognition of the importance of developing a common international system for reporting SARS cases to the World Health Organization, this definition was updated and reporting of cases was expanded to include two categories: suspect and probable (more severe illnesses characterized by the presence of pneumonia or acute respiratory distress syndrome) cases. Later, criteria for defining laboratory infection with SARS-CoV and for excluding new or previously reported suspect or probable cases of SARS for whom an alternative diagnosis could fully explain the patient's illness were added to the definition. Because of the rapid emergence of SARS, the improved understanding of the characteristics of SARS-CoV disease, and the recognition that few illnesses meeting the interim case definition have laboratory evidence of SARS-CoV infection, the current case definition needs revision. Revision is needed to differentiate: 1) patients under investigation with non-specific clinical syndromes and less definitive epidemiologic associations due to the need for early, pro-active public health measures to prevent disease transmission in the event that SARS-CoV is later confirmed, and 2) cases for reporting for surveillance purposes which must be more likely to represent SARS-CoV due to laboratory confirmation or more definitive epidemiologic links. Because an outbreak of SARS-CoV may be initiated by an ill person without recognized links to geographic areas with known SARS activity, revision is also needed to include criteria for possible cases needing investigation in the absence of a clear geographical or epidemiologic link. In addition, appropriate consensus infection control standards need to be developed for management of persons with a SARS-like illness who merit diagnostic testing for SARS-CoV but who have no geographic or personal epidemiologic links.

In the United States, public health officials at state and territorial health departments and CDC collaborate in determining which diseases should be nationally notifiable. CSTE, in conjunction with CDC, makes recommendations annually for additions and deletions to the list of nationally notifiable diseases. As knowledge increases and diagnostic technology improves, some definitions will change to reflect those trends. Thus, future revisions of surveillance case definitions can be expected. In addition, surveillance case definitions are to be used for identifying and classifying cases, both of which are often done retrospectively, for national reporting purposes. For many conditions of public health importance, action to contain disease should be initiated as soon as a problem is identified; in many circumstances, appropriate public health action should be undertaken even though insufficient information is available to determine whether cases meet the case definition. Thus, surveillance case definitions should not be used as sole criteria for public health action.

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Clinical description:

SARS-CoV disease typically begins with a prodrome, often with fever, chills and rigors, headache, malaise, and myalgias. After 3--7 days, a lower respiratory illness develops in most cases with a dry, nonproductive cough or dyspnea, sometimes with hypoxemia. Diarrhea has been described in ~20% of SARS patients, and has been an early and prominent feature in some. Chest radiographs show evidence of focal or generalized interstitial infiltrates in most

patients; cavitation, lymphadenopathy, and pleural effusion are generally absent. Lymphopenia, thrombocytopenia, and elevated lactate dehydrogenase levels are common.

Laboratory criteria for diagnosis:

At present, no validated, widely and consistently available test for infection with SARS-CoV exists. Molecular assays must be performed using appropriate reagents and controls under strictly controlled conditions, and may not be positive in the early stages of illness using currently available reagents. Although many patients develop an antibody response by the second week of illness, the kinetics of the antibody response have not yet been determined. Preliminary data suggest that the antibody response may be delayed in immune-suppressed persons. Information on the current criteria for laboratory diagnosis of SARS-CoV infection is available at <<http://www.cdc.gov/ncidod/sars/labdiagnosis.htm>>.

Case Criteria and Classification:

Clinical Criteria

- o Early illness
 - Presence of two or more of the following features: fever (may be subjective); chills; rigors; myalgia; headache; diarrhea; sore throat; rhinorrhea.
- o Mild to moderate respiratory illness
 - Temperature of >100.4° F (>38° C)*, and
 - One or more clinical findings of lower respiratory illness (e.g., cough, shortness of breath, difficulty breathing).
- o Severe respiratory illness
 - Meets clinical criteria of mild-moderate respiratory illness, and
 - One or more of the following:
 - Radiographic evidence of pneumonia, or
 - Acute respiratory distress syndrome, or
 - Autopsy findings consistent with pneumonia or acute respiratory distress syndrome without an identifiable cause.

*Note: A measured documented temperature of >100.4° F (>38° C) is expected. However, clinical judgment may allow a small proportion of patients without a documented fever to meet this criterion. 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. Initial case classification based on reported information may change and reclassification may be required.

Epidemiologic Criteria

- o Possible exposure to SARS-CoV
 - Close contact** in the 10 days before onset of symptoms with a person who meets the WHO definitions for either suspect or probable SARS <<http://www.who.int/csr/sars/casedefinition/en/>>, or
 - Foreign travel in the 10 days before onset of symptoms to a location with documented or suspected recent local transmission of SARS-CoV. Transit through a foreign airport meets the epidemiologic criteria for possible exposure in a situation with suspected or documented community transmission of SARS in that location (i.e., when a CDC travel advisory is in effect for that location). The surveillance periods for documented or suspected local transmission of SARS in specific locations are available at <<http://www.cdc.gov/ncidod/sars/casedefinition.htm>>. Types of locations specified will vary, e.g., country, airport, city, building, or floor of building. The last date a location may be a criterion for exposure for illness onset is 10 days (one incubation period) after removal of that location from CDC travel alert notice. The case-patient's travel should have occurred on or before the last date the travel alert was in place. For assistance in determining appropriate dates, see <<http://www.cdc.gov/ncidod/sars/travel.htm>>.

- Exposure in the 10 days before onset of fever or symptoms to a domestic location with documented or suspected recent local transmission of SARS -CoV[†].
- o Probable exposure to SARS-CoV
 - Close contact** in the 10 days before onset of symptoms with a laboratory-confirmed case or an epidemiologically linked case of SARS-CoV. Epidemiologically linked is defined as close contact with a person with mild to moderate or severe respiratory illness for whom a chain of transmission can be linked to a laboratory-confirmed case in the 10 days before onset of symptoms.

****Note:** Close contact is defined as having cared for or lived with a person with SARS or having a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS (during encounters with the patient or through contact with materials contaminated by the patient), either during the period the person was clinically ill or within 10 days of resolution of fever. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, close conversation (<3 feet), physical examination, and any other direct physical contact between persons. Close contact does not include activities such as walking by a person or sitting across a waiting room or office for a brief time.

Exclusion Criteria

A case may be excluded as suspect or probable SARS-CoV if:

- An alternative diagnosis can fully explain the illness. Factors that may be considered in assigning alternate diagnoses include the strength of the epidemiologic exposure criteria for SARS, the specificity of the alternate diagnostic test, and the compatibility of the clinical presentation and course of illness for the alternative diagnosis.
- Antibody to SARS-CoV is undetectable in a serum specimen obtained >28 days after onset of illness. Current data indicate that more than 95% of SARS patients mount an antibody response to SARS-CoV. However, health officials may choose not to exclude a case based on lack of a serologic response if reasonable concern exists that an antibody response could not be mounted.

Note: If the case was reported on the basis of contact with a person who was subsequently excluded as a case of SARS, then the reported case is also excluded, provided other epidemiologic criteria or laboratory criteria are not present.

Case Classification

SARS reports under investigation

- Patients who meet the then current clinical criteria and epidemiologic criteria included in the WHO definitions for suspect and probable cases (available at <<http://www.who.int/csr/sars/casedefinition/en/>>). At present, the definitions are:
WHO Suspect
 - o Meets the clinical criteria for mild-moderate respiratory illness and the epidemiologic criteria for possible exposure to SARS-CoV, but does not meet any of the laboratory criteria and exclusion criteria, or
 - o Unexplained acute respiratory illness resulting in death in a person on whom an autopsy was not performed and who meets the epidemiologic criteria for possible exposure to SARS-CoV, but does not meet any of the laboratory criteria and exclusion criteria.

WHO Probable

- o Meets the clinical criteria for severe respiratory illness and the epidemiologic criteria for possible exposure to SARS-CoV, but does not meet any of the laboratory criteria and exclusion criteria.

- Patients who meet the clinical criteria for early or mild-moderate illness and epidemiologic criteria for probable exposure to SARS-CoV.
- Patients with severe illness compatible with SARS-CoV infection in groups likely to be first affected by SARS-CoV should SARS-CoV be introduced from a person without clear epidemiologic links to known SARS-CoV cases or place with known ongoing transmission of SARS-CoV. For example, health care providers who care for patients with fever and/or respiratory symptoms may be such a group. Persons with severe illness returning from areas known in the past to have had sustained transmission of SARS-CoV are another. *These groups will be defined by consultation between CSTE, CDC, and other partners, and the guidelines for identification, evaluation, and management of these persons will be available at a CDC website in late July 2003.*

SARS-CoV Disease Classification

- Probable case, epidemiologically linked to a confirmed case: meets the clinical criteria for severe respiratory illness and the epidemiologic criteria for probable exposure to SARS-CoV.
- Confirmed case: a clinically compatible illness that is laboratory confirmed.

Comment:

1. Surveillance case definitions are to be used for identifying and classifying cases, both of which are often done retrospectively, for national reporting purposes. For many conditions of public health importance, such as SARS-CoV disease, action to contain disease should be initiated as soon as a problem is identified; in many circumstances, appropriate public health action should be undertaken even though sufficient information is not yet available to determine whether cases meet the case definition. The surveillance case definitions outlined above should not be used to guide clinical management or as the only criterion for identifying or testing patients who might have SARS-CoV disease or for instituting infection control precautions.
2. Asymptomatic SARS-CoV infection might be identified through ongoing epidemiologic studies. Caution must be exercised in interpreting results from persons who are asymptomatic and in whom the only laboratory evidence is a positive RT-PCR result. In the absence of compatible symptoms, such persons are not counted as cases of SARS-CoV disease.