



Core Document

IV. Key Measures for SARS Preparedness and Response

A. *Command and Control*

Rapid and decisive action in response to a recurrence of SARS-CoV transmission requires local, state, and federal public health authorities to work efficiently and in concert toward the common goal of containing the spread of infection. State and local officials provide the first line of response with respect to preparing and planning for an outbreak at the jurisdictional level; identifying, managing, and reporting cases; and exercising the necessary authority to impose individual and community containment measures. Given the complexity of responding to an outbreak of a serious respiratory illness and the sustained, coordinated efforts required to control transmission, states and localities must determine and clarify operational and legal authorities in advance and make the necessary preparations for a multi-agency, multi-jurisdictional response. Another essential preparedness step for command, control, and coordination of resources during a SARS outbreak response will be the development/adaptation of an incident management structure supported by adequate information systems.

Goals

- Determine and establish operational authority for the response to a SARS outbreak.
- Establish an incident management structure for the response to a SARS outbreak, supported by adequate information systems.
- Determine and establish legal authority for a response to a SARS outbreak.

Priority Activities

- Conduct local preparedness planning for a re-emergence of SARS-CoV, with participation by persons representing a range of disciplines and expertise. Draft and formally adopt a SARS response plan, or add SARS preparedness and response to an existing preparedness plan.
- Confirm the controlling authorities for actions such as declaring a public health emergency, activating the SARS response plan, and curtailing modes of transportation.
- Develop/reinforce relationships with health authorities of adjoining jurisdictions and with federal agencies to ensure effective communication and collaboration.
- Learn about the legal authorities and statutes for enforcing individual and community containment measures at the local, state, and federal levels.
- Develop/adapt a predetermined incident command system to coordinate and manage SARS response activities.
- Ensure the availability of information system(s) that can document, support, and coordinate the activities generated within an incident command system (e.g., integrate personnel and facilities, expedite real-time communication and flow of information, aid in logistics planning, resource allocation)

B. *Surveillance*

The SARS surveillance strategy is founded on complete and rapid identification of cases -- the key to which is maintaining an appropriate index of suspicion for SARS-CoV disease based on risk of exposure. With no known source of transmission, the most likely sites of SARS-CoV recurrence are locations where SARS-CoV transmission previously occurred, the original site of introduction of SARS-CoV from animals to

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humans, laboratories in which a break in technique leads to laboratory-acquired infections, and also large international travel hubs that serve as interconnecting nodes to high-risk locations.

The predilection for SARS-CoV transmission to occur among international travelers and in healthcare settings and to cause unusual clusters of pneumonia (Booth 2003; CDC 2003a; Hsu 2003; Lee 2003; Varia 2003) provides a focus for surveillance in the absence of SARS-CoV transmission (i.e., patients requiring hospitalization for pneumonia, pneumonia in healthcare workers, unusual clusters of pneumonia among travelers). If SARS-CoV reappears, then patients or known sites of SARS-CoV transmission become the most likely source of exposure. Contact tracing -- the identification and evaluation of persons who had close contact with a potential SARS case or were exposed to locations with known SARS-CoV transmission -- is important for the identification of persons at risk for SARS-CoV disease and the initiation of appropriate measures to reduce the possible spread of infection.

Goals

- Maximize early detection of cases and clusters of respiratory infections that might signal the global re-emergence of SARS-CoV disease while minimizing unnecessary laboratory testing, concerns about SARS-CoV, implementation of control measures, and social disruption.
- If SARS-CoV transmission recurs, maintain prompt and complete identification and reporting of potential cases to facilitate outbreak control and management.
- Identify and monitor contacts of cases of SARS-CoV disease to enable early detection of illness in persons at greatest risk.

Priority Activities

- Educate clinicians and public health workers on features that can assist in early recognition of SARS and on guidelines for reporting SARS-CoV cases.
- Develop tools to identify, evaluate, and monitor contacts of SARS-CoV patients.
- Establish an efficient data management system that links clinical, epidemiologic, and laboratory data on cases of SARS-CoV disease and allows rapid sharing of information.
- Identify surge capacity for investigation of cases and identification, evaluation, and monitoring of contacts in the event of a large SARS outbreak.

C. Preparedness and Response in Healthcare Facilities

In most settings with large SARS outbreaks in 2003, healthcare facilities accounted for a large proportion (often >50%) of cases (Booth 2003; CDC 2003b; CDC 2003d; CDC 2003e). In addition to healthcare workers who cared for patients, other hospital patients and visitors were often affected and in many instances propagated the outbreaks in the hospital and into the community. Therefore, rapid isolation of possible cases of SARS-CoV disease and strict adherence to infection control precautions are critical; prompt and decisive use of these measures has consistently been a key and effective part of SARS control strategies. Each hospital in a community should be prepared to identify, triage, and manage SARS patients. Hospital-specific infection control policies related to SARS should be guided by the level of SARS activity in the community and the hospital. Identifying adequate resources and staff for an effective response and surge capacity, if needed, are priorities.

Goals

- Rapidly identify and isolate all potential SARS patients.
- Implement infection control practices and contact tracing to interrupt SARS-CoV transmission.
- Ensure rapid communication within healthcare facilities and between healthcare facilities and health departments.

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Priority Activities

- Organize a planning committee to develop an institutional preparedness and response plan and a clear decision-making structure.
- Develop surveillance, screening, and evaluation strategies for various levels of SARS-CoV transmission.
- Develop plans to rapidly implement effective infection control measures and contact-tracing procedures.
- Determine the current availability of infrastructure and resources to care for SARS patients and strategies for meeting increasing demands.
- Develop strategies to meet staffing needs for SARS patient care and management.
- Develop strategies to communicate with staff, patients, the health department, and the public.
- Develop strategies to educate staff and patients about SARS and SARS control measures.

D. Community Containment Measures, Including Non-Hospital Isolation and Quarantine

Community containment strategies, including isolation, contact tracing and monitoring, and quarantine, are basic infectious disease control measures that proved to be critically important for control of the most severe SARS outbreaks in 2003. Isolation of SARS patients separates them from healthy persons and restricts their movement to prevent transmission to others, preventing healthy persons from becoming ill. It also allows for the focused delivery of specialized health care to ill persons. Quarantine of persons who have been exposed to SARS-CoV but are not ill is intended to prevent further transmission in the event that they develop SARS-CoV disease by reducing the interval between the onset of symptoms and the institution of appropriate precautions.

Given that most SARS patients have a clearly identified exposure to other SARS patients or to a setting with SARS-CoV transmission and that transmission occurs after onset of illness, rapid identification of exposed persons (contacts) and prompt isolation of contacts if they become ill is a highly effective control strategy. Quarantine of contacts is often a critical part of contact management and should be performed selectively, carefully, and with respect for human dignity. Isolation and quarantine are optimally performed on a voluntary basis, but many levels of government (local, state, federal) have the basic legal authority to compel mandatory isolation and quarantine of persons and communities when necessary to protect the public's health. Broader community containment through "snow day" measures, such as cancellation of public gatherings and closure of school and businesses, can also be used to reduce transmission by limiting social interactions at the population level. The rationale for such measures, as well as mechanisms to ensure due process and prevent stigmatization of affected persons, need to be clearly articulated.

Goal

- Prevent transmission of SARS-CoV through use of a range of community containment strategies chosen to provide maximum efficacy based on the characteristics of the outbreak while minimizing the adverse impact on civil liberties.

Priority Activities

- Identify, evaluate, and monitor contacts of SARS patients, and consider quarantine of contacts if needed.
- Continually monitor the course and extent of the outbreak, and evaluate the need for community containment measures.
- Establish the infrastructure to deliver essential goods and services to persons in quarantine and isolation.

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- Develop tools and mechanisms to prevent stigmatization and provide mental health resources for those in isolation and quarantine.
- Work with community partners to ensure that implementation and communication plans address the cultural and linguistic needs of affected persons.

E. Prevention of International Travel-Related Transmission Risk

In the absence of control measures, SARS-CoV can spread rapidly on a global scale through international travel. Screening and evaluating passengers for SARS-like symptoms, educating them about SARS, and reporting illnesses in travelers can decrease the risk of travel-associated infections.

Goals

- Prevent the introduction of SARS-CoV (and spread from an introduction) into the United States from SARS-affected areas.
- Prevent exportation of SARS-CoV from the United States if domestic transmission presents an increased risk of exportation.
- Reduce the risk of SARS-CoV disease among outbound travelers to SARS-affected areas.
- Prevent the transmission of SARS-CoV to passengers on a conveyance with a SARS patient, and evaluate and monitor other passengers to detect SARS-like illness and prevent further spread.

Priority Activities

- Screen incoming travelers from SARS-affected areas for SARS, and provide guidance about monitoring their health and reporting illness.
- Provide guidance to outbound travelers about active SARS-affected areas and measures to reduce risk of acquiring SARS-CoV disease during travel.
- If SARS-CoV transmission in the United States presents an increased risk of exporting SARS-CoV to other countries, then screen outbound travelers to prevent such exportation.
- Ensure the appropriate evaluation and management of SARS cases and potentially exposed passengers and crew members on conveyances.

F. Laboratory Diagnostics

Laboratory diagnostics are essential for detecting and documenting a resurgence of SARS, responding to and managing SARS outbreaks, and managing concerns about SARS-CoV disease in patients with other respiratory illnesses. The identification of the etiologic agent, SARS-CoV, led to rapid development of enzyme immunoassays (EIA) and immunofluorescence assays (IFA) for SARS antibody (Ksiazek 2003) and reverse-transcriptase PCR (RT-PCR) assays for SARS-CoV RNA (Emery 2003). These assays can be very sensitive and specific for detecting antibody and RNA, respectively, but are less sensitive for detecting infection, especially early in illness. Diagnostic assays for other respiratory pathogens may be helpful in differentiating SARS-CoV disease from other illnesses, but SARS patients may be simultaneously infected with SARS-CoV and another respiratory pathogen. CDC's laboratory diagnostics plan is based on the following goals and activities:

Goals

- Provide the public health community with ready access to high-quality SARS-CoV diagnostics
- Ensure that SARS-CoV laboratory diagnostics are used safely and appropriately and that results are interpreted appropriately

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Priority Activities

- Improve the ability to detect SARS-CoV infection by optimizing the selection and timing of specimen collection and processing.
- Provide SARS-CoV assays for RT-PCR testing through Laboratory Response Network (LRN) laboratories and for serologic testing to state public health laboratories.
- Distribute proficiency panels and questionnaires to participating laboratories to determine the ability of laboratories to provide valid SARS-CoV diagnostics.
- Provide guidance on laboratory safety for SARS-CoV and other respiratory diagnostic testing and for potentially SARS-CoV-containing specimens submitted for other tests.
- Provide guidance for interpreting test results, taking into account the potential for false-positive and false-negative results and the availability of applicable clinical and epidemiologic information.
- Identify surge capacity for laboratory testing in the event of a large SARS outbreak.

G. *Communication and Education*

Rapid and frequent communication of crucial information about SARS -- such as the level of the outbreak worldwide and recommended control measures -- are vital components of efforts to contain the spread of SARS-CoV. Specific communication needs and key messages will vary substantially by level of SARS activity. In the absence of SARS-CoV transmission globally, the preparation and dissemination of messages and materials are designed to maintain vigilance in the healthcare community and general awareness among all parties about the possibility of a SARS outbreak and the steps that would be indicated in such an event. The recurrence of SARS-CoV transmission anywhere in the world will generate immediate and intense media attention and require an enormous effort to respond to the demand from the public, the media, policymakers, and healthcare workers for information and guidance. A domestic outbreak of SARS will result in even greater demands to manage media requests, disseminate up-to-date outbreak information and messages, assist local hospitals and healthcare providers in responding to the public, and respond to inquiries from special interest groups.

Goals

- Instill and maintain public confidence in the nation's public health system and its ability to respond to and manage the reappearance of SARS-CoV.
- Contribute to the maintenance of order, minimization of public panic and fear, and facilitation of public protection through the provision of accurate, rapid, and complete information before, during, and after a SARS outbreak.
- Provide accurate, consistent, and comprehensive information about SARS-CoV disease.
- Address rumors, inaccuracies, and misperceptions as quickly as possible, and prevent stigmatization of specific groups.

Priority Activities

- Identify key messages about SARS-CoV disease for specific audiences and the most effective methods to deliver these messages.
- Issue local public health announcements and updated information on the outbreak and response.
- Provide a location for state, local, and federal communication and emergency response personnel to meet and work side-by-side in developing key messages and handling media inquiries.
- Respond to frequently occurring media questions by preparing fact sheets, talking points (key messages), and question-and-answer documents.
- Coordinate requests for spokespersons and subject matter experts.

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H. Plans for SARS Investigations and Epidemiologic Research

[This section is currently under development.]

I. Infection Control in Healthcare, Home, and Community Settings

Transmission of SARS-CoV in healthcare settings was a major factor in the propagation of the 2003 global SARS epidemic. In each of the major outbreak areas, SARS-CoV caused unprecedented levels of morbidity and mortality among healthcare personnel and disrupted healthcare delivery systems. Rapid implementation and adherence to infection control measures proved essential for controlling transmission in healthcare facilities and containing the outbreaks. Ensuring readiness for a reappearance for SARS-CoV therefore means maintaining emphasis on the importance of infection control in healthcare facilities and correcting any deficiencies in infection control training and practice.

If person-to-person SARS-CoV transmission recurs, many patients may be isolated in residential settings. In the United States, hospitalization of patients with SARS-CoV disease is recommended only when medically indicated. Given the risk of exposure to household members, strict infection control measures are also needed to prevent SARS-CoV transmission from patients isolated in residential settings. In addition, if a large outbreak overwhelms the capacity of the healthcare system, patients may be isolated in community facilities. As in the case of healthcare and residential settings, appropriate infection control measures will be required to prevent transmission of infection in these facilities.

Goals

- Ensure early recognition of patients at risk for SARS-CoV disease.
- Prevent transmission of SARS-CoV by implementing appropriate infection control precautions.

Priority Activities

- Reinforce basic infection control practices among healthcare workers.
- Take steps to reduce transmission of respiratory viruses from symptomatic persons at the time of initial encounter with the healthcare setting.
- Develop triage strategies that ensure early recognition of patients at risk for SARS-CoV disease.
- Develop plans for appropriate SARS infection control precautions in inpatient and outpatient healthcare facilities, homes, and community isolation facilities.
- Ensure appropriate management and follow-up monitoring of healthcare workers who have had exposures to and other contacts with SARS patients.

J. Information Technology

During the 2003 epidemic, the internet played an important part in global efforts to identify the etiologic agent of SARS and control its spread. Unfortunately, in many outbreak settings, the lack of useful information management systems made outbreak control less efficient in many areas and in some instances may have actually delayed the containment and control of SARS. Although a web-based system to manage all aspects of a SARS outbreak would be ideal, issues of confidentiality, data security, data ownership, and availability of technical expertise to support new information systems make the ideal system a long-term goal. In the short term, a web-based case reporting system -- plus efficient means to link clinical, epidemiologic, and laboratory data -- will provide an efficient process for quickly recording and reporting the status of SARS activity in the United States for federal, state, and local response needs.

Rapid identification, tracking, evaluation, and monitoring of contacts of SARS cases will be key to early detection of symptoms in persons at greatest risk of SARS, and development of a data management system to facilitate this process is vital. Contact tracing can be particularly challenging and resource

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intensive in large-scale outbreaks or among highly mobile populations such as international travelers. Ideally, such a system should be integrated with the case reporting system to allow rapid exchange of information. Finally, the tracking of contacts of SARS cases on conveyances (e.g., airplanes) will require rapid availability of electronic passenger manifests that provide information on the proximity of the contact to the case. This information needs to be rapidly assimilated and disseminated to a large number of state and local health departments for notification and monitoring of contacts.

Goal

- Deploy an integrated data management system that efficiently and effectively supports SARS outbreak response needs at the federal, state, and local levels.

Priority Activities

- Develop and deploy a case-reporting system for SARS surveillance that supports federal, state, and local health department needs and makes data readily available to the submitting health department. The system can be based on either web-based data entry or data downloads.
- Implement an outbreak-management system that can track and link clinical, laboratory, and epidemiologic data and can be used to monitor all aspects of an outbreak response at the local level. The system should allow state and local health departments to track the monitoring and follow-up of contacts for clinical illness and compliance with isolation and quarantine measures, as applicable.
- Collaborate with the Department of Transportation to rapidly obtain passenger manifests for conveyances with ill travelers.
- Use electronic communication mechanisms (e.g., Epi-X, Health Alert Network) to disseminate contact information to state and local health departments.

For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)