



## SEVERE ACUTE RESPIRATORY SYNDROME

# NOTICE

Since 2004, there have not been any known cases of SARS reported anywhere in the world. The content in this PDF was developed for the 2003 SARS epidemic. But, some guidelines are still being used. Any new SARS updates will be posted on this Web site.



## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

### Summary of Changes in Version 2

This version of Supplement D includes editorial changes throughout the text that are intended to clarify the rationale for and explanations of the recommendations.

Several new components have been added:

The text box "Graded Implementation of Community Containment Measures" provides a rationale for selection among the various community containment interventions.

Section V provides guidance for de-escalation of interventions.

Appendix D1 defines and describes the applications, benefits, challenges, and required resources for various containment interventions.

Appendix D2 answers frequently asked questions about the use of community containment measures.

Appendices related to considerations for persons in isolation at home and in non-hospital facilities have been revised and condensed. More detailed information on these topics is provided in Supplement I.

The Community Containment Matrices included in the previous draft were deleted in favor of more complete coverage of the information in the text.

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

**Contents**

- I. Rationale and Goals
- II. Lessons Learned
- III. Management of SARS Patients in Isolation
- IV. Management of Contacts of SARS Cases
- V. Community-Based Control Measures
- VI. Enforcement of Community Containment Measures
- VII. Roles and Responsibilities
- VIII. Preparedness Planning

- Appendix D1: Interventions for Community Containment
- Appendix D2: Frequently Asked Questions about Use of Community Containment Measures
- Appendix D3: Guidelines for Evaluating Homes and Facilities for Isolation and Quarantine
- Appendix D4: Threshold Determinants for the Use of Community Containment Measures
- Appendix D5: Preparedness Checklist for Community Containment Measures

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

### Community Containment Measures, Including Non-Hospital Isolation and Quarantine

#### *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 personal liberties.

#### *Key concepts*

- Prevention and control of SARS-CoV transmission in the community rely on prompt identification and management of both SARS patients and their contacts.
- Isolation is a standard public health practice applied to persons who have a communicable disease. Isolation of SARS patients prevents transmission of SARS-CoV by separating ill persons from those who have not yet been exposed.
- Rapid identification, evaluation, and management of contacts of SARS patients (i.e., the persons most at risk for development of SARS) is resource intensive yet critical to controlling transmission.
- Contacts can be managed by use of a range of strategies, all of which facilitate close monitoring (active or passive) for symptoms and rapid initiation of isolation if symptoms develop.
- Quarantine is a contact management strategy that consists of active monitoring plus activity restrictions; quarantine may be voluntary or mandatory.
- As an outbreak evolves, measures to increase social distance (e.g., cancellation of public events; implementation of community “snow days”) may become necessary; extensive transmission may call for activity restrictions applied to large groups.
- Isolation, quarantine, and other activity restrictions raise legal, social, financial, and logistical challenges that should be anticipated and addressed.
- Implementation of quarantine must ensure delivery of medical care and support to affected persons and protection of individual personal liberties.
- Implementation of quarantine requires understanding of the roles and legal authorities of local, state, and federal public health officials and collaboration with traditional and non-traditional community partners.
- Implementation of all community containment measures relies on public trust. Community officials can generate public trust by communicating clear messages about the rationale for and the role and duration of community containment measures and ways in which affected persons will be supported.

#### *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.
- 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.

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

### I. Rationale and Goals

Community containment strategies, including isolation and quarantine, are fundamental public health measures used to control the spread of communicable diseases. All such strategies have in common the primary goal of preventing person-to-person spread of disease by separating those with disease or at increased risk for developing disease from those at lower risk. Although the terms “isolation” and “quarantine” have often been used interchangeably, they actually represent distinct concepts (see Box).

*Isolation* is a commonly used practice in modern public health. Isolation refers to the separation of ill persons with a communicable disease (e.g., *SARS patients*) from those who are healthy. A prototypical example is the isolation of persons with potentially infectious tuberculosis. Isolation not only prevents transmission of infection to others but also allows for the focused delivery of specialized health care to ill persons. SARS patients can be isolated in a hospital, at home, or in a designated community-based facility.

*Quarantine* is the separation or restriction of activities of persons who are not ill but who are believed to have been exposed to a communicable disease and are therefore at highest risk of becoming infected (e.g., *close contacts of SARS patients*<sup>1</sup>). Although rarely used in the modern era -- due in part to the advent of antibiotics and antiviral agents and to the negative connotations associated with past use -- quarantine and other community containment strategies were valuable for the control of the 2003 global SARS outbreaks.

Contacts of SARS patients can be managed through a range of strategies, all of which are designed to facilitate early recognition of illness in persons at high risk and thereby to prevent transmission to others. Key to each of these strategies is the ability to closely monitor contacts of SARS patients for the onset of symptoms. Monitoring may be *passive*, in which contact themselves report the appearance of symptoms, or *active*, in which healthcare officials periodically assess contacts for symptoms.

In this document, “quarantine” refers to interventions -- either voluntary or compulsory -- in which active monitoring is accompanied by a restriction on the activities of persons exposed to SARS-CoV to prevent transmission if they develop SARS-CoV disease. Quarantine may also have a specific legal definition that may differ among jurisdictions based on applicable laws. Although quarantine, by definition, restricts some personal liberties, it is a collective action implemented for the common good. Modern quarantine is predicated on the need to aid persons who are infected with or exposed to infectious agents while protecting others from the dangers of inadvertent exposure. As such, it differs substantially from the quarantine of the past.

In addition to separating exposed persons from unexposed persons, quarantine can have other potential benefits. For diseases, such as measles, that can be transmitted from asymptomatic persons (i.e., persons who appear healthy and have not yet developed symptoms), quarantine can reduce the risk of further spread. Although transmission from asymptomatic persons is considered unlikely for SARS-CoV disease, symptom onset may be insidious and quarantine can reduce the risk of transmission from those in whom symptoms are yet to be recognized and acknowledged. In addition, restricting the activities of exposed but asymptomatic persons should facilitate careful monitoring of these persons for development of symptoms and thereby reduce delays in their recognition. In this way, closer follow-up can expedite

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<sup>1</sup> Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

the implementation of appropriate precautions, thereby preventing additional transmission. The utility of quarantine in this context is to:

- Identify through contact tracing those at greatest risk for the onset of SARS symptoms,
- Separate them from others by restricting their movements,
- Actively monitor them, and
- Rapidly institute appropriate isolation procedures as soon as symptoms are detected.

In this way, quarantine reduces both the period during which transmission might occur and the number of persons who might be exposed during this period.

Whereas isolation and contact management strategies such as active monitoring are directed to individuals, broader *community containment measures* may be applied to groups of persons or to communities during outbreaks characterized by extensive transmission. These interventions range from *measures to increase social distance* among community members (e.g., cancellation of public gatherings, use of masks, implementation of community-wide "snow days") to *community-wide quarantine*.

Although all of these interventions are designed to prevent transmission by limiting social interactions and preventing inadvertent exposures, the less stringent actions may be easier to implement on a large scale. For example, in the "snow day" approach, community members are asked to stay home as they would during a major snowstorm. Schools are closed, work sites are closed or restricted, large public gatherings are cancelled, and public transportation is halted or scaled back. Implementation requires fewer resources than are needed to activate and maintain community-level quarantine. In addition, as snow days are a familiar concept in most communities, implementation can occur quickly. Implementation of quarantine, on the other hand, can be resource intensive, requiring mechanisms for enforcement and provision of necessities. Snow days and other measures to increase social distance are therefore the preferred community-level responses, with quarantine reserved for situations in which less drastic measures have not been successful in containing an outbreak.

Appendix D1 provides detailed descriptions of the interventions for community containment, including definitions, applications, benefits, challenges, and required resources. Answers to frequently asked questions about community containment measures, including quarantine, are provided in Appendix D2.

Although isolation, quarantine, and other containment measures are optimally performed voluntarily, many levels of government (local, state, federal) have the legal authority to compel mandatory isolation and quarantine of persons and communities to protect the public's health. (See Supplement A and Section VI: Enforcement of Community Containment Measures.)

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### **II. Lessons Learned**

During the 2003 epidemic, the community containment strategy for the United States consisted mainly of coordinating SARS response activities through CDC's Emergency Operations Center and providing information and education to the public, healthcare workers, and others. Activities included issuing guidelines and fact sheets, holding press conferences, and meeting with groups and communities to address their concerns about stigmatization. CDC also recommended isolation of SARS patients until they were believed to be no longer infectious. This practice allowed patients to receive appropriate care and helped contain the spread of infection. Severely ill persons were cared for in hospitals; those with mild illnesses were cared for at home. Sick persons in home isolation were asked to avoid contact with others and to remain at home until 10 days after the resolution of fever, provided respiratory symptoms were absent or improving. In the United States, where there was little or no transmission of SARS-CoV, neither individual nor population-based quarantine of contacts was recommended. CDC advised persons who were exposed but not symptomatic to monitor themselves for symptoms and advised home isolation and medical evaluation if symptoms appeared.

Large-scale quarantine was used for the first time in decades in several countries that were severely affected by the 2003 SARS outbreak. Strategies included quarantine of close contacts in healthcare and household settings, work and school contacts, travelers arriving from other SARS-affected areas, and, in some cases, of entire apartment complexes or areas of a city. Other strategies used to control and prevent SARS-CoV transmission in these countries included 1) requiring fever screening before entry to schools, work sites, and other public buildings, 2) requiring use of face masks in certain settings, such as public transportation systems, 3) implementing population-wide temperature monitoring and SARS fever hotlines and referral services, and 4) implementing community-level disinfection strategies.

The impact and effectiveness of individual isolation and quarantine measures and community- and population-level interventions undertaken to contain the SARS epidemic globally are not yet fully understood, but some important generalizations can be made. Overall, strategies associated with timely and successful control of local outbreaks were characterized by rapid and aggressive use of case and contact identification and community containment strategies. Other lessons learned from this modern experience with community containment include the following:

- Most, but not all, SARS patients have a clear history of exposure to another SARS patient or to a specific setting with recognized SARS-CoV transmission.
- Strict infection control measures are needed for isolation of SARS patients; these may be difficult to implement in home and community settings.
- Tracing and monitoring of contacts of SARS patients are resource intensive but critical to the containment and early recognition of illness in persons at greatest risk for development of disease.
- Community control measures such as cancellation of public events and other "snow day" measures may reduce the risk of exposure to SARS-CoV at the population level by limiting social interactions.
- Although quarantine of individual contacts was an integral part of SARS control in most settings, quarantine of large groups was used only in selected settings where transmission was extensive.
- To be effective, quarantine does not have to be mandatory and compliance does not have to be 100%; voluntary compliance with quarantine requests was >90% in most settings.
- A variety of quarantine strategies (e.g., home quarantine, working quarantine) may be used, depending on specific needs.
- Isolation and quarantine raise legal, social, financial, and logistical challenges (e.g., financial support, provision of services, prevention of stigma) that should be anticipated and addressed. Meeting the social, financial, and psychological needs of persons with SARS and their contacts is key to the successful application of containment measures.

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

- Effective implementation of quarantine requires a clear understanding of the roles and legal authorities of local, state, and federal public health officials.
- Effective implementation of quarantine requires identification of appropriate traditional and non-traditional partners (e.g., law enforcement) and their engagement in coordinated planning and response.
- The financial, social, and psychological impact of quarantine measures is substantial; preparedness planning should include measures to reduce this impact.
- Obtaining and maintaining public trust are key to successful implementation of these measures; clear messages about the criteria and justification for and the role and duration of quarantine and ways in which persons will be supported during the quarantine period will help generate public trust.

### Isolation and Quarantine

**Isolation** is the separation and restriction and movement or activities of ill infected persons who have a contagious disease, for the purpose of preventing transmission to others.

- Isolation allows for the focused delivery of specialized health care to persons who are ill, and it protects healthy persons from becoming ill.
- Ill persons are usually isolated in a hospital, but they may also be isolated at home or in a designated community-based facility, depending on their medical needs.
- "Isolation" is typically used to refer to actions performed at the level of the individual patient.

**Quarantine** is the separation and restriction of movement or activities of persons who are not ill but who are believed to have been exposed to infection, for the purpose of preventing transmission of diseases.

- Persons are usually quarantined in their homes, but they may also be quarantined in community-based facilities.
- Quarantine can be applied to an individual or to a group of persons who are exposed at a large public gathering or to persons believed exposed on a conveyance during international travel.
- Quarantine can also be applied on a wider population- or geographic-level basis. Examples of this application include the closing of local or community borders or erection of a barrier around a geographic area (*cordon sanitaire*) with strict enforcement to prohibit movement into and out of the area.

Isolation and quarantine are optimally performed on a voluntary basis, in accordance with instructions of healthcare providers and health officials. However, many levels of government (local, state, federal) have the basic legal authority to compel mandatory isolation and quarantine of individuals and communities when necessary to protect the public's health.

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

### III. Management of SARS Patients in Isolation

Preventing transmission from SARS patients is critical to controlling SARS. This requires limiting the public interactions of possible or known SARS patients (e.g., at work, school, out-of-home child care) and preventing transmission wherever the patients are housed during the period of infectivity (10 days after the resolution of fever, provided respiratory symptoms are absent or improving).

SARS patients should be isolated in a hospital only if medically necessary. Local and state authorities should also be prepared to isolate patients at home or in alternative facilities designated for this purpose. SARS preparedness planning must address home isolation of SARS patients, the availability and use of existing or temporary structures as alternative facilities for isolation, the management of patients housed at home or in alternative facilities, and resources for supplies and services.

**Objective:** Separate and confine patients who meet the case definition for probable or confirmed SARS-CoV disease or SARS report under investigation (RUI) during the period of communicability (See MMWR 52(49):1202-1206 [[www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm)]).

Activities aimed at separating persons with known or possible SARS-CoV disease should be modulated as needed based on the status of the outbreak. Basic activities should be initiated with the identification of the first confirmed or probable case or SARS RUI. Enhanced activities may become necessary as an outbreak evolves and the number of persons requiring isolation increases.

#### Basic Activities

- SARS patients should be admitted to a healthcare facility for isolation only if clinically indicated or if isolation at home or in a community facility cannot be achieved safely and effectively. **Isolation of SARS patients in hospitals is described in detail in Supplement C.**
- Before a SARS patient is placed in a residence or community facility for isolation, arrangements should be made to ensure that the residence has the features necessary for provision of appropriate care to the patient and to determine if sufficient infection control measures can be established to prevent/limit exposures to household members, other primary caregivers, and the community. Guidelines on evaluation of residences for isolation are provided in Appendix D3 and in Supplement I.
- During the period of home isolation, household members not providing care should be relocated if possible so that only the primary caregiver and the patient remain in the residence. If household members cannot be relocated, they should minimize their contact with the SARS patient. Persons at risk for serious SARS complications (e.g., persons with underlying heart or lung disease, persons with diabetes mellitus, elderly persons) should not have contact with the patient.
- The SARS patient in home isolation and all persons in contact with the patient should follow the infection control recommendations described in Supplement I.
- Close contacts of SARS patients<sup>2</sup> should be vigilant for fever (i.e., measure temperature twice daily), respiratory symptoms, and other symptoms of early SARS-CoV disease, such as chills,

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<sup>2</sup> Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

rigors, myalgia, headache, or diarrhea. If symptoms develop, the designated health department should be contacted to arrange for immediate medical evaluation and follow-up.

### Enhanced Activities

If a surge in patients overwhelms healthcare capacity or if home isolation is not feasible, health departments may need to use alternative facilities for isolation of SARS patients. Additional information on community isolation of SARS patients is provided in Appendix D3 and in Supplement I.

## IV. Management of Contacts of SARS Cases

**Objective 1:** Monitor and evaluate contacts of SARS patients (probable and confirmed cases of SARS-CoV disease; SARS RUIs) to ensure early identification of illness and rapid institution of infection control precautions to prevent further spread (See MMWR 52(49):1202-1206 [[www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm)]).

### Basic Activities: Passive or Active Monitoring

- In a limited SARS outbreak, contacts of SARS patients may be managed by using passive or active monitoring. Monitoring consists of direct contact – by phone or in person – with the health department or a designee at least once a day to assess the affected person for symptoms and address any needs. Frequent monitoring (e.g., twice a day) can reduce the interval between the onset of symptoms and the institution of precautions. *Passive monitoring* relies on the affected person to contact health authorities if symptoms develop. *Active monitoring* involves direct assessment of each contact at least once a day by a designee of the health department.

Persons with high-risk exposures (e.g., healthcare workers involved in aerosol-generating procedures on a SARS patient) may require activity restrictions in addition to monitoring (see *Enhanced Activities* below).

- Regardless of the type of monitoring recommended, all contacts of SARS cases should be advised to:
  - Be vigilant for fever (i.e., measure temperature twice a day), respiratory symptoms, and other symptoms of early SARS-CoV illness for 10 days after exposure (See MMWR 52(49):1202-1206 [[www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm)]).
  - If symptoms develop, contact a designated health department staff member so that clinical evaluation can be performed without delay.
  - Before visiting a healthcare facility for evaluation, inform the healthcare provider in advance about the possible exposure to SARS-CoV.

### Enhanced Activities: Quarantine of Contacts

During a large outbreak or in situations of high-risk exposures (e.g., if transmission from a particular case has been demonstrated by emergence of secondary cases among one or more

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contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

contacts), consideration should be given to managing contacts with activity restrictions in addition to active monitoring. This combined approach is referred to as *quarantine*. The purpose of quarantine is to reduce transmission by 1) separating contacts of SARS patients from others, 2) monitoring contacts for symptoms, and 3) instituting appropriate infection control precautions as soon as symptoms are detected.

Implementation of quarantine for contacts can be complicated and resource intensive, and the activity restrictions can be difficult for affected persons to endure. In deciding when to use quarantine and which persons should be included in a quarantine order, public health officials must strike a balance based on the epidemiologic situation and available resources. Limiting quarantine to only high-risk contacts may be more labor intensive at the outset but will be easier to maintain since fewer resources will be needed for provision of services and enforcement of restrictions. Applying quarantine too narrowly in the midst of an extensive outbreak can, however, blunt the efficacy of the policy if missed cases result in additional generations of transmission. If the resources required for investigation and risk stratification of contacts are not available, broader application of quarantine may be more practical. Whenever quarantine is implemented, close clinical monitoring and provision of essential services and needs must be ensured.

- Based on the situation, select among the three main options for quarantine of contacts: home quarantine, quarantine in designated facilities, and working quarantine.

**Home quarantine** -- Home quarantine is most suitable for contacts with a home environment that can meet their basic needs and in which unexposed household members can be protected from exposure.

- Persons in home quarantine must be able to monitor their own symptoms (or have them monitored by a caregiver).
- As is the case for isolation, a home should be evaluated for suitability before being used for quarantine. Because the infection control requirements for healthy contacts in quarantine are less stringent than those for ill persons in isolation, this evaluation may be performed by use of a questionnaire administered to the quarantined person or the caregiver. Additional guidance on use of a residence for quarantine is provided in Appendix D3 and Supplement I.
- Household members require no specific precautions as long as the quarantined person remains asymptomatic. However, because the onset of symptoms can be insidious, it may be prudent for the quarantined contact to minimize interactions with other household members to prevent exposure during the interval between the development and the recognition of symptoms. Precautions might include 1) sleeping and eating in a separate room, 2) using a separate bathroom, and 3) wearing a surgical mask when in a room with others.
- Persons in quarantine may be assessed for symptoms by either active or passive monitoring. Delayed recognition of symptoms and a resulting delay in the institution of isolation contributed to extensive chains of transmission in several areas during the 2003 SARS outbreaks, even when the areas were under heightened surveillance. Active monitoring of contacts in quarantine might overcome any delays resulting from the insidious onset of symptoms or denial among those in quarantine.
- Persons who develop symptoms should immediately notify the designated health department to arrange for medical evaluation. The health department should provide

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

explicit instructions for isolation and other infection control precautions to be observed in the home while the ill person is awaiting evaluation. At minimum, persons with symptoms should be separated from others in the household.

- o Household members may go to school, work, etc., without restrictions unless the quarantined person develops symptoms. If the quarantined person develops symptoms, household members should remain at home in a room separate from the symptomatic person and await additional instructions from health authorities.
- o Household members can provide valuable support to quarantined persons by helping them feel less isolated and ensuring that essential needs are met.

**Quarantine in designated facilities** -- Contacts who do not have an appropriate home environment for quarantine or who choose not to be quarantined at home may be quarantined in facilities designated for this purpose. Facilities designated for quarantine of persons who cannot or choose not to be quarantined at home should meet the same criteria listed for home quarantine. Evaluation of potential sites for facility-based quarantine is an important part of preparedness planning. Additional guidance on use of a residence for quarantine is provided in Appendix D3 and Supplement I.

**Working quarantine** -- This restriction applies to healthcare workers or other essential personnel who have been exposed to SARS patients and may need to continue working (with appropriate infection control precautions) but who are quarantined either at home or in a designated facility during off-duty hours (See Supplement C). When off duty, contacts on working quarantine should be managed in the same way as persons in quarantine at home or in a designated facility. Local officials will also need to develop:

- o Systems for monitoring persons in working quarantine for symptoms during work shifts
  - o Mechanisms for immediate medical evaluation of anyone who develops symptoms
  - o Provisions for transportation to and from work, if needed
- The recommended duration of quarantine for SARS is generally 10 days from the time of exposure. During that period, contacts should be monitored at least daily for fever and respiratory symptoms. In addition, health officials should provide the necessary support to enable contacts to comply with quarantine appropriately. Recommendations for monitoring of contacts include the following:
    - o Monitor daily, or more frequently if feasible, for fever, respiratory symptoms, and other symptoms of early SARS-CoV disease.
    - o Monitor compliance with quarantine through daily visits or telephone calls.
    - o Provide a hotline number for quarantined persons to call if they develop symptoms or have other immediate needs.
    - o If a quarantined person develops symptoms suggestive of SARS, arrangements should be in place for immediate medical evaluation of the patient. The health department should provide explicit instructions on the isolation and infection control precautions to be observed while the ill person is awaiting evaluation. At a minimum, symptomatic persons should be isolated from others in a separate room.
    - o Provide persons in quarantine with all needed support services, including 1) psychological support, 2) food, 3) household and medical supplies, and 4) care for family members. Financial issues, such as medical leave, may also need to be considered.

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

- At the end of the designated quarantine period, contacts should have a final assessment for fever and respiratory symptoms. Persons without fever or respiratory symptoms may return to normal activities.

**Objective 2:** Compile and analyze the information on contacts needed to evaluate and monitor the effectiveness of contact management strategies and containment interventions.

Contact tracing and monitoring require substantial data management resources. The information technology needs for timely surveillance, monitoring, and management of contacts of SARS cases are currently under discussion among CDC and partners in state and local health departments, and development of a contact tracing and monitoring database is under way.

### **Basic Activities**

- Public health officials responsible for contact tracing and management should compile and analyze information collected from contacts during the investigation and in the course of monitoring to evaluate the effectiveness of control measures. These data will inform decision making about the need for more stringent measures such as quarantine. Information should be collected for contacts of all SARS cases to determine the following:
  - Number of contacts identified per case
  - Number of days between onset of symptoms and reporting to health officials and between reporting and isolation
  - Number of cases occurring with unknown exposure

### **Enhanced Activities**

If quarantine is implemented, information gathered during the investigation and monitoring of contacts should be analyzed on an ongoing basis to evaluate the effectiveness of the intervention. This information will be critical in determining the need for broader application of quarantine and the timing of withdrawal of containment measures. In addition to the parameters listed above, which should be determined for contacts of all SARS cases, the proportion of contacts in quarantine (by risk group) who develop SARS-CoV disease should be determined.

## **V. Community-Based Control Measures**

Whereas decisions on use of containment measures in individual situations depend primarily on the characteristics of the exposure and the affected contact, the decision to institute broader use of community measures is more complex. The different options – e.g., active monitoring with voluntary activity restrictions, legally mandated quarantine, institution of snow days – will vary in their effectiveness in controlling the outbreak and their impact on personal liberties. Other measures that might prevent inadvertent SARS-CoV exposures (e.g., temperature monitoring in public places; use of masks) should also be considered. Decisions should be based primarily on the epidemiologic characteristics of the outbreak. Other considerations will include the healthcare and public health resources available and the level of community cooperation (see Appendix D4).

Local officials will face enormous logistic, economic, ethical, and psychological challenges in implementing community-level containment measures. Preparedness planning should include development of essential partnerships to address: 1) provision of essential services and support (e.g., food, household and medical supplies, medical attention, caretaking, continuation of work/school via telecommuting or home-based

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

curricula, financial support), 2) mental health (e.g., stigma management and prevention, psychological support), and 3) enforcement (e.g., controlling entry into and exit from narrowly defined geographic areas; border surveillance/monitoring; travel permits and credentials).

Even with the most comprehensive planning, however, officials must be prepared to make decisions on the basis of incomplete or inadequate information and to modify strategies as the situation unfolds. Although control measures should never be used indiscriminately or in a manner out of proportion to the situation, undue caution should not inhibit the bold and swift implementation of the interventions upon which effective control depends.

**Objective 1:** Reduce the risk of transmission of SARS-CoV at the community level by implementing large-scale measures that limit social interactions and prevent inadvertent exposures.

**Activities**

- Implement community containment measures based on the epidemiologic characteristics of the outbreak, according to the graded response outlined in the Box below.
- In the absence of SARS-CoV transmission in the world, activities should focus on *preparedness, planning and surveillance* for the first case(s). Public health and healthcare officials should provide community members with information about SARS and promote hand hygiene and respiratory hygiene/cough etiquette (See Supplement C).

<b>Graded Implementation of Community Containment Measures</b>	
<b><i>Level of SARS activity</i></b>	<b><i>Response</i></b>
No SARS-CoV transmission globally	Preparedness planning
SARS-CoV transmission in the world, but all cases Locally either are imported or have an identifiable epidemiologic link to other cases at the time of initial evaluation	Passive or active surveillance/monitoring of contacts
SARS activity in the area, with either a small number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation or increased occurrence of SARS among known contacts	Quarantine of close contacts
SARS activity in the area, with a large number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation; control measures are believed to be effective	Focused measures to increase social distance; consider community-level measures to increase social distance
SARS activity in the area, with a large number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation; control measures are believed to be ineffective	Community-level measures to increase social distance; consider community-wide quarantine.
Decreases in the number of new cases, unlinked (or “unexpected”) cases, and generations of transmission	Quarantine of contacts
Transmission has been controlled/eliminated; no new cases reported	Active monitoring in high-risk populations; Continue for 2-3 incubation periods after control or elimination of transmission.

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

- If SARS-CoV transmission is occurring in the world but the United States is reporting only a few imported cases and no or limited local transmission from those cases, then officials in areas with SARS cases should consider passive (at minimum) or active *monitoring of close contacts*. Although active monitoring promotes early identification of non-specific or insidious symptoms and reliable assessment of fever and symptoms, it also requires substantial resources. Local conditions therefore may dictate at least initial use of passive monitoring, particularly in the management of contacts with lower-risk exposures. For persons with high-risk exposures (e.g., healthcare workers with unprotected exposure to a SARS case, especially during a high-risk procedure), home quarantine with either passive or active monitoring may be considered.
- Jurisdictions should consider *more restrictive measures* for any of the following situations:
  - Identification of cases without known epidemiologic links (i.e., cases occurring in persons who, at the time of diagnosis, are not known to have had contact with a known SARS case or exposure to a known transmission setting)
  - Increasing number of cases among contacts of SARS patients
  - Significant interval between the onset of symptoms and the isolation of cases
  - Inadequate resources for continued isolation of cases and tracing and monitoring of contacts

Measures to be considered include *quarantine of close contacts*, such as family members or healthcare workers who provided care to SARS patients. This approach has the advantage of limiting the use of quarantine to those at greatest risk, but implementation requires time, effort, and availability of skilled interviewers.

Whenever possible, contacts should be *quarantined at home*. Home quarantine requires the fewest additional resources, although arrangements must still be made for monitoring patients, reporting symptoms, transporting patients for medical evaluation, and providing essential supplies and services.

In some cases, affected persons may not have access to an appropriate home environment for quarantine. Examples include travelers; persons living in dormitories, homeless shelters, or other group facilities; and persons whose homes do not meet the minimum requirements for quarantine. In other instances, contacts may have an appropriate home environment but may not wish to put family members at risk. In these situations, health officials should identify a *facility with the appropriate characteristics for quarantine of contacts*. Monitoring may be either passive or active, although active monitoring may be more appropriate in a facility setting.

- Jurisdictions with large numbers of cases without known epidemiologic linkages should consider instituting *measures to increase social distance*. Identification of an unlinked case can mean either that transmission is occurring from undetected cases or that contact tracing efforts are not identifying all potential contacts. Increasing social distance can reduce the likelihood that unexposed community members will be exposed to SARS-CoV and that persons who have already been exposed will unknowingly transmit to others if they become symptomatic. Interventions to increase social distance are usually applied to groups of persons in settings where there might have been exposure to SARS-CoV (e.g., a school in which several cases of SARS have been diagnosed). In a community with ongoing transmission, these measures may be applied to settings without known exposure (e.g., cancellation of concerts or sporting events; restricted use of public transportation).

The “snow day” approach may be an effective way to increase social distance and reduce transmission because it is a concept with which most Americans are familiar. This intervention would likely be instituted for an initial 10-day period, with final decisions on duration based on

## Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

(continued from previous page)

assessment of current epidemiologic information. Other community-level measures, such as community-wide temperature monitoring, temperature screening before entering public buildings, or recommended or mandatory mask use, may also be considered. Although the effectiveness of these interventions has not been quantified, they might enhance public awareness and facilitate early detection of cases.

- In extreme circumstances, when control measures do not appear to be effective or resources are overwhelmed, more restrictive measures such as *widespread or community-wide quarantine* may be considered.

**Objective 2:** Scale back community containment measures as soon as appropriate.

Communities may scale back community containment measures as the outbreak comes under control. For example, with significant declines in the number of new cases, unlinked cases, and generations of transmission, the community measures can be halted and efforts can be refocused on quarantine of known contacts.

The process by which community containment measures are lifted requires as much thought and planning as their implementation. When applied to individuals, movement restrictions such as quarantine can be removed as soon as the exposed contact has remained without signs or symptoms of disease for a complete incubation period for SARS-CoV disease (i.e., 10 days).

A decision to discontinue the broader use of community-level measures is more complex. A decision on the optimal time to remove these measures must balance the need to restore personal liberties against community safety. Premature removal of containment strategies can increase the risk of additional transmission and recurrent outbreaks. Decisions should be based on evidence of improving local/regional control, such as 1) consistent decrease in the number of confirmed cases, 2) reduction in the number of probable and known cases, and 3) confirmation that all cases either were imported or have a known source or well-defined epidemiologic link.

### Activities

- When there is reasonable evidence of improved control of the outbreak, discontinue quarantine of contacts of persons meeting the criteria for SARS RUI (see MMWR 52(49):1202-1206 [[www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm)]). Continue quarantine of contacts of persons with probable or confirmed SARS-CoV disease, particularly those with known exposures or well-defined epidemiologic links.
- When three incubation periods have elapsed since the last reported confirmed case of SARS-CoV disease, discontinue quarantine of contacts. Also discontinue maintenance of designated facilities for quarantine.
- As soon as appropriate, discontinue use of community-level containment measures. Withdraw the most stringent measures (e.g., geographic or population-based movement restrictions, mass transit interruptions, travel restrictions) first. Begin scaling back community-level measures when three incubation periods have elapsed after identification of the last unlinked or probable case of SARS-CoV disease (i.e., all cases are imported or have known exposures or well-defined epidemiologic links).

## VI. Enforcement of Community Containment Measures

Data from modeling studies suggest that community containment measures such as quarantine are effective for controlling an outbreak even if compliance is less than perfect. Optimally, quarantine applied

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

on a voluntary basis will afford sufficient compliance to attain the necessary effect. Nevertheless, protocols must be established for enforcement of both individual and community measures when higher levels of compliance are required.

**Objective 1:** Enforce individual quarantine restrictions as necessary.

### **Activities**

- Develop protocols for follow-up of persons who cannot be reached by telephone. Protocols might include a threshold period for non-responsiveness that should trigger a home visit or other means to locate the person. Partnerships with law enforcement and other community-based resources will be helpful in tracing the whereabouts of persons who have violated restrictions.
- Consider and plan for the use of alternative arrangements for persons who cannot or will not comply with voluntary home quarantine. These might include:
  - Issuing official, legally binding quarantine orders
  - Posting a guard outside the home
  - Using electronic forms of monitoring
  - Using guarded facilities

**Objective 2:** Enforce community-level containment measures as necessary.

### **Activities**

Enforcement of community-wide containment measures is necessarily more complex given the larger number of persons involved. Although some measures, such as cancellation of public events or scaling back of mass transit services, are self-enforcing, others (e.g., restrictions on travel between areas) may require use of physical measures such as checkpoints. Implementation will require close partnerships and cooperation with law enforcement at the local and state levels. Federal law enforcement resources may also be available in some situations.

## **VII. Roles and Responsibilities**

Historical precedents, both legal and practical, suggest that states have primary authority to invoke and enforce quarantine in their own jurisdictions. This authority derives from the states' "police power," i.e., the inherent authority of a government to enact laws and promote regulations to safeguard the health and welfare of its citizens. As a result of this authority, the individual states are responsible for intrastate isolation and quarantine practices and conduct their activities in accordance with their respective statutes. Of note, quarantine is not the only public health action that can be compelled by state health authorities. Other frequently enforced actions include school immunization and tuberculosis treatment laws.

Current quarantine laws, regulations, and enforcement procedures vary widely from state to state, as do states' lists of notifiable and quarantinable diseases. Many of these laws date back to the nineteenth century. In response to a request from CDC, the Center for Law and the Public's Health at Georgetown and Johns Hopkins Universities has developed a "Model State Emergency Health Powers Act" ([www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf](http://www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf)) to assist state governments in reviewing emergency public health powers to ensure they are adequate to respond to modern disease and bioterrorism concerns.

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

At the federal level, the HHS Secretary has statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases from foreign countries into the United States (e.g., at international ports of arrival and from one state or possession to another). The communicable diseases for which federal isolation and quarantine are authorized are set forth by executive order of the President. An executive order adding SARS to the list of detainable communicable diseases was issued in April 2003. By statute, the HHS Secretary may accept state and local assistance in the enforcement of federal quarantine regulations and may also assist state and local officials in the control of communicable diseases. For more information on legal authorities and a checklist on legal considerations for SARS preparedness, see Supplement A.

**VIII. Preparedness Planning**

A checklist for preparedness planning for community containment measures is provided in Appendix D5.

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

**Appendix D1  
Interventions for Community Containment**

Contacts of SARS patients can be managed by use of a range of interventions, all of which are designed to facilitate early recognition of illness in persons at greatest risk of becoming infected and thereby to prevent transmission to others. Whereas many of these interventions are applied individually to persons identified as contacts of a person with possible or known SARS-CoV disease, others are applied to larger groups of persons, or communities, who share a similar risk of exposure. The interventions include the following:

***Passive Monitoring***

<b><i>Definition</i></b>	The contact is asked to perform self-assessment at least twice daily and to contact authorities immediately if respiratory symptoms or fever occur
<b><i>Application</i></b>	Situations in which 1) the risk of exposure and subsequent development of disease is low, and 2) the risk to others if recognition of disease is delayed is also low.
<b><i>Benefits</i></b>	Requires minimal resources Places few constraints on individual freedoms
<b><i>Challenge</i></b>	Relies on self-reporting Affected persons may not perform an adequate self-assessment
<b><i>Resources Required</i></b>	Supplies (thermometer; symptom log; written instructions) Hotline to notify authorities about symptoms or needs Staff to receive telephone reports and provide in-person evaluation and care
<b><i>Partners</i></b>	Household members
<b><i>Forms/Templates</i></b>	Symptom logs Instructions for patients and healthcare workers

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

***Active Monitoring without Explicit Activity Restrictions***

<b><i>Definition</i></b>	A healthcare or public health worker evaluates the contact on a regular (at least daily) basis by phone and/or in person for signs and symptoms suggestive of SARS-CoV disease
<b><i>Application</i></b>	Situations in which 1) the risk of exposure to and subsequent development of disease is moderate to high, 2) resources permit close observation of individuals, and 3) the risk of delayed recognition of symptoms is low to moderate
<b><i>Benefits</i></b>	Places few constraints on individual liberties
<b><i>Challenges</i></b>	Requires adequate staffing Requires a system to track information and to verify monitoring and appropriate actions based on findings
<b><i>Resources Required</i></b>	Trained staff to provide in-person and/or telephone evaluations Contingency plans for managing noncompliant persons Contingency plans for rapid isolation of persons who develop symptoms Hotline to notify authorities about symptoms or needs
<b><i>Partners</i></b>	Professional and lay healthcare workers to perform evaluations on behalf of the health department Possible need for law enforcement to assist with management of noncompliant persons
<b><i>Forms/Template</i></b>	Checklist for assessment of active monitoring Template for recording results of clinical evaluation

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### ***Active Monitoring with Activity Restrictions (Quarantine)***

#### ***Definition***

The contact remains separated from others for a specified period (generally 10 days after potential exposure), during which s/he is assessed on a regular basis (in person at least once daily) for signs and symptoms of SARS-CoV disease. Persons with fever, respiratory, or other early SARS-CoV symptoms (See MMWR 52(49):1202-1206 [[www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm)]) require immediate evaluation by a trained healthcare provider. Restrictions may be voluntary or legally mandated; confinement may be at home or in an appropriate facility.

No specific precautions are required for those sharing the household with a person in quarantine as long as the person remains asymptomatic. However, because onset of symptoms may be insidious, it may be prudent to minimize interactions with household members during the period of quarantine.

#### ***Application***

Situations in which the risk of exposure and subsequent development of disease is high and the risk of delayed recognition of symptoms is moderate

#### ***Benefits***

Reduces risk of spread from persons with subacute or subclinical presentations or from delayed recognition of symptoms

#### ***Challenges***

Infringes on personal freedom of movement  
May lead to a feeling of isolation from family and friends  
May lead to loss of income or employment  
Requires plans/protocols for provision of essential services  
Requires plan for provision of mental health support  
Risk of noncompliance, particularly as duration increases  
May require enforcement for noncompliance

#### ***Resources Required***

Staff for monitoring and evaluation  
Appropriate facility if home setting is unavailable or inadequate  
Staff, funding, goods for provision of essential services  
Hotline for notification of symptoms or personal needs  
Mechanisms to communicate with family members outside the household or facility  
Mental health and social support services  
Delivery systems for food and other essential supplies

#### ***Partners***

Professional and lay healthcare workers to perform assessments on behalf of the health department  
Community volunteers/workers to assist with provision of essential services  
Potential need for law enforcement to assist with noncompliant persons

#### ***Forms/Templates***

Checklist for active monitoring  
Template for recording results of clinical evaluation  
Checklist and guidelines for evaluation of homes for quarantine  
Checklist and guidelines for evaluation of community-based sites for quarantine

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

Guidelines for monitoring compliance with home quarantine  
Guidelines for monitoring compliance with quarantine in community-based facilities  
Forms for recording compliance with quarantine

***Examples***

Home quarantine (voluntary or mandatory)  
Facility quarantine (voluntary or mandatory)

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### ***Working Quarantine***

<b><i>Definition</i></b>	Persons are permitted to work but must observe activity restrictions while off duty. Monitoring for fever and other symptoms before reporting for work is usually required. Use of appropriate PPE while at work is required.
<b><i>Application</i></b>	Persons for whom activity restrictions (home or facility quarantine) are indicated but who provide essential services (e.g., healthcare workers)
<b><i>Benefits</i></b>	Reduces risk of community spread from high-risk contacts while minimizing adverse impact of activity restrictions on provision of essential services Clinical monitoring at work reduces the staff required for active monitoring at the quarantine site
<b><i>Challenges</i></b>	Need for close and consistent pre-shift monitoring at the work site to prevent inadvertent exposures May require means of transporting persons to and from work site to minimize interactions; persons in working quarantine should wear appropriate PPE during transport. Must maintain close cooperation and communication between work-site and local health authorities
<b><i>Resources Required</i></b>	Appropriate facility for off-duty quarantine if home is unavailable or inadequate Staff, funding, goods for provision of essential services Hotline for notification of symptoms and personal needs System to track results of work-site monitoring and location(s) of off-duty quarantine Mental health and psychosocial support services, especially if work includes care of SARS patients
<b><i>Partners</i></b>	Work-site administrators and infection control personnel Community volunteers/workers Staff/volunteers to assist with transportation to and from work Potential need for law enforcement to assist with noncompliant persons
<b><i>Forms/Templates</i></b>	Guidelines and instructions for persons in working quarantine Instructions for supervisors of persons in working quarantine Checklist to evaluate homes for quarantine Guidelines for monitoring compliance Checklist for active monitoring at work site Template for recording results of clinical evaluation Forms for recording compliance

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### ***Focused Measures to Increase Social Distance***

***Definition***

Intervention applied to specific groups, designed to reduce interactions and thereby transmission risk within the group. When focused, the intervention is applied to groups or persons identified in specific sites or buildings, most but not necessarily all of whom are at risk of exposure to SARS-CoV

***Application***

Groups or settings where transmission is believed to have occurred, where the linkages between cases is unclear at the time of evaluation, and where restrictions placed only on persons known to have been exposed is considered insufficient to prevent further transmission

***Benefits***

Applied broadly, reduces the requirement for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions. May enable reductions in transmission among groups of persons without explicit activity restrictions (quarantine)

***Challenges***

May be difficult to solicit cooperation, particularly if popular buildings are closed or popular events are cancelled  
Requires excellent communication mechanisms to notify affected persons of details and rationale  
May need to provide replacement for affected activities (e.g., school, essential services)  
Generally relies on passive monitoring

***Resources Required***

Systems to communicate relevant messages  
May require enforcement, particularly if closure of popular buildings or gathering places is necessary  
Requires resources for passive monitoring  
Hotlines to report symptoms and obtain follow-up instructions  
Transportation for medical evaluation, with appropriate infection control precautions

***Partners***

News media and communication outlets  
Law enforcement  
Community groups

***Forms/Templates***

Messages for affected persons  
Messages for employers of affected persons  
Messages for persons supplying essential services

***Examples***

Closure of schools or office buildings  
Suspension of public markets

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### ***Community-Wide Measures to Increase Social Distance***

<b><i>Definition</i></b>	Intervention applied to an entire community or region, designed to reduce personal interactions and thereby transmission risk. The prototypical example is implementation of a "snow day," in which offices, schools, transportation systems are cancelled as for a major snowstorm.
<b><i>Application</i></b>	All members of a community in which 1) extensive transmission of SARS-CoV is occurring, 2) a significant number of cases lack clearly identifiable epidemiologic links at the time of evaluation, and 3) restrictions on persons known to have been exposed are considered insufficient to prevent further spread
<b><i>Benefits</i></b>	Reduces need for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions May enable reductions in transmission among groups without explicit activity restrictions (quarantine) "Snow days" are familiar concepts and thus easy to implement on short notice
<b><i>Challenges</i></b>	May be difficult to solicit cooperation Requires excellent communication mechanisms to notify persons of details and rationale May need to provide replacement for affected activities (e.g., school, essential services) May need to address mental health and financial support issues When an entire community is involved, requires cooperation with neighboring jurisdictions that may not be using a similar intervention, particularly in situations where persons live in one city and work in another and only one locale is affected by the intervention. Generally relies on passive monitoring
<b><i>Resources Required</i></b>	Communication outlets Enforcement Resources for passive monitoring Hotlines and other communication systems to report symptoms and obtain follow-up instructions Transportation for persons requiring medical evaluation, with appropriate infection control precautions
<b><i>Partners</i></b>	News media and other communication outlets Law enforcement Transportation officials to enforce restrictions (e.g., closure of bridges, roads, or mass transit systems), plan detours, and maintain critical infrastructure supplies
<b><i>Forms/Templates</i></b>	Messages for affected persons Messages for employers of affected persons Messages for persons supplying essential services
<b><i>Examples</i></b>	Community-wide "snow day"

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

Scaling back of mass transportation  
Closure of bridges and tunnels  
Closure of schools and work sites

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### ***Widespread Community Quarantine, Including Cordon Sanitaire***

#### ***Definition***

Legally enforceable order that restricts movement into or out of the area of quarantine of a large group of people or community; designed to reduce the likelihood of transmission of SARS-CoV among persons in and to persons outside the affected the area. When applied to all inhabitants of an area (typically a community or neighborhood), the intervention is referred to as *cordon sanitaire* (sanitary barrier).

#### ***Application***

All members of a group in which 1) extensive transmission is occurring, 2) a significant number of cases lack identifiable epidemiologic links at the time of evaluation, and 3) restrictions placed on person known to have been exposed are considered insufficient to prevent further spread. Widespread quarantine is unlikely to be necessary because other less restrictive measures (e.g., snow days) may be equally effective.

#### ***Benefits***

Reduces need for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions

#### ***Challenges***

Most extreme of the potential containment measures  
May be controversial because of infringement on personal liberties  
May be difficult to solicit cooperation for extended periods, particularly if the rationale is not readily apparent or was not clearly explained  
Requires excellent communication mechanisms to inform affected persons and to maintain public confidence in the appropriateness of the chosen course of action  
May need to provide replacements for affected activities (e.g., school, essential service providers)  
Must address mental health and financial support for affected population  
When an entire community is involved, requires cooperation with neighboring jurisdictions that may not be using a similar intervention, particular in situations where persons live in one city and work in another and only one locality is affected by the intervention  
Generally relies on passive monitoring  
Need to provide mechanisms for isolating symptomatic persons with minimal delay

#### ***Resources Required***

Systems to communicate relevant messages  
Will likely require enforcement to maintain security at borders  
Resources for passive monitoring  
Transportation for persons requiring medical evaluation, with appropriate infection control precautions  
Staff and supplies to maintain access to and availability of essential services and goods, including food, water, medicine, medical care, utilities  
Plan to divert flow of critical infrastructure supplies and materials that normally transit through quarantined area

#### ***Partners***

News media and other mass communication outlets  
Public and private groups, industries, and officials to coordinate supply and provision of essential services to affected area

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

Law enforcement to maintain security at borders and to enforce movement restrictions

Transportation industry

***Forms/Templates***

Messages for affected persons

Messages for employers of affected persons

Messages for persons supplying essential services

***Examples***

Quarantine (*cordon sanitaire*) of a city or town

Quarantine of occupants of a housing complex or office building

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### **Appendix D2 Frequently Asked Questions about Use of Community Containment Measures**

#### **If SARS-CoV reappears in the United States, will quarantine definitely be required and used?**

No. Quarantine is only one of a spectrum of actions that may be considered during a future SARS outbreak in the United States. Although rapid control is likely to require bold and swift action, measures that are less drastic than legally enforced quarantine may suffice, depending on the epidemiologic characteristics of the outbreak. For example, active monitoring without activity restrictions may be adequate when most cases are either imported or have clear epidemiologic linkages at the time of initial evaluation. When the epidemiology of the outbreak indicates a need for stronger measures, jurisdictions can adopt a voluntary quarantine approach and reserve legal measures only for those who fail to comply. When an outbreak progresses to include large numbers of cases for which no epidemiologic linkages can be identified, community-level interventions may become necessary. Even at this stage, however, measures designed to increase social distance, such as snow-days, may be preferred alternatives. Wider use of quarantine is generally reserved for situations in which all other control measures are believed to be ineffective.

The choice of containment measures requires frequent and ongoing assessment of an outbreak and evaluation of the effectiveness of existing control measures. Officials must be prepared to make decisions based on limited information and then modify those decisions as additional information becomes available.

#### **Does the effectiveness of containment measures require 100% compliance?**

No. Containment measures, including quarantine, are effective even if compliance is less than 100%. Even partial or “leaky” quarantine can reduce transmission. Therefore, strict legal enforcement is not necessarily always needed; in most cases, jurisdictions can rely on voluntary cooperation. Modeling studies of the relative contributions of quarantine and vaccination in control of smallpox outbreaks suggest a benefit from quarantine even when compliance is as low as 50%. The incremental benefit of quarantine approaches a maximum at a compliance rate of approximately 90%, with little additional benefit from higher rates of compliance. Therefore, containment measures can be important components of the response to a communicable disease outbreak even when compliance is not high.

#### **Does “quarantine” always mean using a legal order to restrict someone’s activity?**

No. The term “quarantine” is often defined narrowly to refer to the legally mandated separation of well persons who have been exposed to a communicable disease from those who have not been exposed. Although the precise legal definition of quarantine may differ from jurisdiction to jurisdiction, when used clinically or programmatically, quarantine may be defined more broadly to include all interventions, both mandatory and voluntary, that restrict the activities of persons exposed to a communicable disease. Therefore, whenever an exposed person is placed under a regimen of monitoring that includes an activity restriction, even when those restrictions are adhered to voluntarily, the person is said to be under quarantine.

#### **Must quarantine be mandatory to be effective?**

No. Although the federal government and nearly all states have the legal authority to place persons exposed to certain communicable diseases under quarantine and enforce the required restrictions on activity, use of this authority may not always be necessary or practical. Previous experiences with the use of quarantine, including those during the 2003 SARS outbreaks, suggest that the majority of persons comply voluntarily with requests from health authorities to remain in quarantine and observe the recommended activity restrictions.

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

During the 2003 outbreaks, at least one jurisdiction outside the U.S. used an incremental approach to institution of quarantine. A request for voluntary quarantine resulted in compliance by more than 90% of affected persons. Those who did not adhere to the request were served with a legally enforceable order. This approach has the advantage of being perceived by the public as being less severe, since compliance with the initial request is voluntary. In addition, in jurisdictions where prevailing statutory quarantine authorities require separate orders for each person placed under activity restrictions, this approach reduces the legal workload to a more practical level.

### **Does being placed in quarantine increase a person's risk for acquiring disease?**

Historically, placement in quarantine has been associated with increased disease transmission. One reason may be that separation between ill and well persons was not maintained. One of the fundamental principles of modern quarantine is that persons in quarantine are to be closely monitored so that those who become ill are efficiently separated from those who are well. A second principle is that persons in quarantine should be among the very first to receive any available disease-prevention interventions. Adherence to these two principles of modern quarantine should prevent an increase in risk for acquiring disease while in quarantine.

### **Is quarantine really necessary if everyone who develops symptoms is rapidly placed in isolation?**

Although theoretically true, it would be unrealistic to believe that even the most efficient system for initiation of isolation will minimize delays to the extent required to prevent transmission. Among the factors contributing to delays in recognition of symptoms are the insidious nature of disease onset and denial that symptoms have developed. Early in the 2003 outbreak in Singapore, the average delay from onset of symptoms to initiation of isolation was 7 days. Officials were able to reduce this delay only to 3 days, even with an aggressive public awareness campaign on the importance of symptom recognition and isolation.

Quarantine helps to reduce transmission associated with delays in isolation in two ways. First, quarantine enables health officials to quickly locate symptomatic persons who should be placed in isolation. Second, although quarantine locations may not be as efficient as isolation facilities in preventing transmission, quarantine reduces the number of persons who might be exposed while awaiting transfer to an isolation facility. If quarantine was not used, symptomatic and infectious persons could move about freely in public places, potentially exposing large numbers of additional persons and thereby fueling the outbreak.

### **Is quarantine useful only for diseases in which transmission is possible before the onset of symptoms?**

No. Although quarantine clearly has benefits for prevention of diseases in which the period of communicability precedes onset of symptoms, a second, often overlooked, benefit is relevant to diseases such as SARS, in which infectiousness is likely to coincide with the onset of symptoms. Quarantine facilitates both close monitoring and prompt follow-up of persons who are at high risk for developing disease. Both these factors are likely to reduce the delay in initiation of isolation following onset of symptoms. Quarantine also limits the number of additional persons exposed if the quarantined person develops disease. Thus, quarantine can be a useful strategy even with diseases that are infectious only after symptoms develop.

### **Is quarantine useful only for diseases that are spread by the airborne route?**

No. Quarantine simply refers to the separation and restriction of activity of persons exposed to a communicable disease who are not ill. It is designed to minimize interactions between those exposed to a disease and those not yet exposed. As such, quarantine can be used for any disease that is spread from

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

person to person. In practice, however, because the activity restrictions associated with quarantine infringe on personal liberties, the intervention is generally reserved for diseases that are easily and rapidly spread from person to person. The indication for quarantine for diseases purely transmitted by the airborne route is clear. However, this tool can also be useful where transmission can occur through close personal contact with secretions or objects contaminated by an ill person. Smallpox is an excellent example of a disease where quarantine can be effective in controlling spread although transmission may occur by means other than the airborne route.

**Will the public accept the use of quarantine?**

Yes. The negative connotations associated with quarantine likely stem from its misuse or abuse in the past. Although inappropriate use of quarantine, either voluntary or mandatory, would not and should not be accepted by the public, efforts should be made to gain public acceptance when use of this measure is indicated. Experiences with the use of quarantine during the SARS outbreaks of 2003 suggest that public acceptance of quarantine may be greater than previously thought. In Canada, almost all persons asked to observe quarantine restrictions did so willingly, with only a small number requiring a legal order to gain cooperation. In all cases, cooperation and acceptance was achieved through clear and comprehensive communication with the public about the rationale for use of quarantine.

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### **Appendix D3 Guidelines for Evaluating Homes and Facilities for Isolation and Quarantine**

#### **I. Isolation Facilities**

##### **A. Home isolation**

Ideally, persons who meet the criteria for a confirmed or probable case of SARS-CoV disease or a SARS RUI and who do not require hospitalization for medical reasons should be isolated in their homes. The home environment is less disruptive to the patient's routine than isolation in a hospital or other community setting.

Any home being considered as an isolation setting should be evaluated by the patient's physician, health department official, or other appropriate person to verify its suitability. The assessment should center on the following minimum standards for home isolation of a SARS patient:

##### Infrastructure

- Functioning telephone
- Electricity
- Heat source
- Potable water
- Bathroom with commode and sink
- Waste and sewage disposal (septic tank, community sewage line)

##### Accommodations

- Ability to provide a separate bedroom for the SARS patient
- Accessible bathroom in the residence; if multiple bathrooms are available, one bathroom designated for use by the SARS patient

##### Resources for patient care and support

- Primary caregiver who will remain in the residence and who is not at high risk for complications from SARS-CoV disease
- Meal preparation
- Laundry
- Banking
- Essential shopping
- Social diversion (e.g., television, radio, internet access, reading materials)
- Masks, tissues, hand hygiene products

##### **B. Isolation in a community-based facility**

When persons requiring isolation cannot be accommodated either at home or in a healthcare facility, a community-based facility for isolation will be required. The availability of a community-based facility will be particularly important during a large outbreak.

Much of the work in identifying and evaluating potential sites for isolation should be conducted in advance of an outbreak as part of preparedness planning. Each jurisdiction should assemble a team to identify appropriate locations and resources for community SARS isolation facilities,

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

establish procedures for activating them, and coordinate activities related to patient management. The team should consider the use of both existing and temporary structures. Options for existing structures include community health centers, nursing homes, apartments, schools, dormitories, and hotels. Options for temporary structures include trailers, barracks, tents, and “bubble systems.” Considerations include the following:

### Basic infrastructure requirements

- Meets all local code requirements for a public facility
- Functioning telephone system
- Electricity
- Heating, ventilating, and air conditioning (HVAC)
- Potable water
- Bathroom with commode and sink
- Waste and sewage disposal (septic tank, community sewage line)
- Multiple rooms for housing ill patients

### Ventilation capacity

- Preferably, rooms with individual ventilation systems (e.g., room or window fan coil units that do not recirculate to other parts of the building)
- Alternatively, facility with a non-recirculating ventilation system that permits redirection of the air flow from corridors and staff areas into patient rooms.

### Access considerations

- Proximity to hospital
- Parking space
- Ease of access for delivery of food and medical and other supplies
- Handicap accessibility

### Space requirements

- Administrative offices
- Offices/areas for clinical staff
- Holding area for contaminated waste and laundry
- Laundry facilities (on- or off-site)
- Meal preparation (on- or off-site)

### Social support resources

- Television and radio
- Reading materials

To determine priorities among available facilities, consider these features:

- Separate rooms for patients or areas amenable to isolation of patients with minimal construction
- Single pass (non-recirculating) ventilation for each room or isolation area
- Feasibility of modifying existing infrastructure as needed to meet AIIR standards (see Supplement I)
- Feasibility of controlling access to the facility and to each room
- Availability of potable water, bathroom, and shower facilities
- Facilities for patient evaluation, treatment, and monitoring
- Capacity for providing basic needs to patients

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

- Rooms and corridors that are amenable to disinfection
- Facilities for accommodating staff
- Facilities for collecting, disinfecting, and disposing of infectious waste
- Facilities for collecting and laundering infectious linens and clothing
- Ease of access for delivery of patients and supplies
- Legal/property considerations

Additional considerations include:

- Staffing and administrative support
- Training
- Ventilation and other engineering controls
- Ability to support appropriate infection control measures
- Availability of food services and supplies
- Ability to provide an environment that supports the social and psychological well-being of patients
- Security and access control
- Ability to support appropriate medical care, including emergency procedures
- Access to communication systems that allow for dependable communication within and outside the facility
- Ability to adequately monitor the health status of facility staff

## **II. Quarantine Facilities**

### **A. Home quarantine**

A person's residence is generally the preferred setting for quarantine. As with isolation, home quarantine is often least disruptive to a person's routine. Because persons who have been exposed to SARS-CoV may need to stay in quarantine for as long as 10 days, it is important to ensure that the home environment meets the ongoing physical, mental, and medical needs of the individual. An evaluation of the home for its suitability for quarantine should be performed, ideally before the person is placed in quarantine. This evaluation may be performed on site by a health official or designee. However, from a practical standpoint, it may be more convenient to evaluate the residence through the administration of a questionnaire to the individual and/or the caregiver. Points to be considered in the evaluation include:

- Availability of/access to educational materials about SARS and quarantine
- Basic utilities (water, electricity, garbage collection, and heating or air-conditioning as appropriate)
- Basic supplies (clothing, food, hand-hygiene supplies, laundry services)
- Mechanism for addressing special needs (e.g., filling prescriptions)
- Mechanism for communication, including telephone (for monitoring by health staff, reporting of symptoms, gaining access to support services, and communicating with family)
- Accessibility to healthcare workers or ambulance personnel
- Access to food and food preparation
- Access to supplies such as thermometers, fever logs, phone numbers for reporting symptoms or accessing services, and emergency numbers (these can be supplied by health authorities if necessary)
- Access to mental health and other psychological support services

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### **B. Quarantine in a community-based facility**

Although the home is generally the preferred setting for quarantine, alternative sites for quarantine may be necessary in certain situations. For example, persons who do not have a home situation suitable for this purpose or those who require quarantine away from home (e.g., during travel) will need to be housed in an alternative location. Because persons who have been exposed to SARS-CoV may require quarantine for as long as 10 days, it is important to ensure that the environment is conducive to meeting the ongoing physical, mental, and medical needs of the individual. Ideally, one or more community-based facilities that could be used for quarantine should be identified and evaluated as part of SARS preparedness planning. The evaluation should be performed on site by a public health official or designee. Additional considerations, beyond those listed above for home quarantine, include:

- Separate rooms and bathrooms for each contact
- Delivery systems for food and other needs
- Staff to monitor contacts at least daily for fever and respiratory symptoms
- Transportation for medical evaluation for person who develop symptoms
- Mechanisms for communication, including telephone (for monitoring by health staff, reporting of symptoms, gaining access to support services, and communicating with family)
- Services for removal of waste. (Note: No special precautions for removal of waste are required as long as persons remain asymptomatic)

**Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

**Appendix D4**  
**Threshold Determinants for the Use of Community Containment Measures**

Parameter	Variable
<b>Epidemiologic parameters of the outbreak</b>	Absolute number of cases
	Rate of incident cases
	Number of hospitalized cases
	Number and percent of cases with no identified epidemiologic link
	Morbidity (including disease severity) and mortality
	Number of contacts under surveillance and/or quarantine
<b>Healthcare resources</b>	Hospital/facility bed capacity
	Isolation/negative pressure room capacity
	Staff resources
	Patient/staff ratio
	Number of isolated or quarantined staff
	Availability of specifically trained specialists and ancillary staff
<b>Equipment and supplies</b>	Availability of ventilators
	Availability of other respiratory equipment
	Availability of personal protective equipment and other measures
	Availability of therapeutic medications (SARS and non-SARS specific)
<b>Public health resources</b>	Investigator to case and contact ratios
	Number of contacts under active surveillance
	Number of contacts under quarantine
	Ability to rapidly trace contacts (number of untraced/interviewed contacts)
	Ability to implement and monitor quarantine (staff to contact ratio)
	Ability to provide essential services (food, water, etc.)
<b>Community cooperation, mobility and compliance</b>	Degree of compliance with voluntary individual isolation
	Degree of compliance with active surveillance and voluntary individual quarantine
	Degree of movement out of the community
	Degree of compliance with community-containment measures

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

### **Appendix D5 Preparedness Checklist for Community Containment Measures**

#### ***General***

- Establish an incident command structure that can be used for SARS response.
- Establish a legal preparedness plan
- Establish relationships with partners, such as law enforcement, first responders, healthcare facilities, and the legal community.
- Plan to monitor and assess factors that will determine the types and levels of response, including the epidemiologic profile of the outbreak, available local resources, and level of public acceptance and participation.
- Develop communication strategies for the public, government decision makers, healthcare and emergency response providers, and the law enforcement community.

#### ***Management of cases and contacts (including quarantine)***

- Develop protocols, tools, and databases for:
  - Case surveillance
  - Clinical evaluation and management
  - Contact tracing, monitoring, and management
  - Reporting criteria
- Develop standards and tools for home and non-hospital isolation and quarantine
- Establish supplies for non-hospital management of cases and contacts
- Establish a telecommunications plan for "hotlines" or other services for:
  - Case and contact monitoring and response
  - Fever triage
  - Public information
  - Provider information
- Plan to ensure provision of essential services and supplies to persons in isolation and quarantine, including:
  - Food and water
  - Shelter
  - Medicines and medical consultations
  - Mental health and psychological support services
  - Other supportive services (e.g., day care).
  - Transportation to medical treatment, if required
- Plan to address issues of financial support, job security, and prevention of stigmatization

#### ***Non-hospital-based isolation of cases***

- Identify appropriate community-based facilities for isolation of patients who have no substantial healthcare requirements.
- Develop policies related to use of these facilities.
- Identify facilities for persons for whom home isolation is indicated but who do not have access to an appropriate home setting, such as travelers and homeless populations.
- Ensure that required procedures for assessment of potential isolation or quarantine sites are available and up to date.

#### ***Community containment measures***

- Ensure that legal authorities and procedures are in place to implement the various levels of movement restrictions as necessary.

## **Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine**

(continued from previous page)

- ❑ Identify key partners and personnel for the implementation of movement restrictions, including quarantine, and the provision of essential services and supplies:
  - Law enforcement
  - First responders
  - Other government service workers
  - Utilities
  - Transportation industry
  - Local businesses
  - Schools and school boards
- ❑ Develop training programs and drills
- ❑ Ensure fit-testing and training in PPE for responders and providers as necessary
- ❑ Develop plans for the mobilization and deployment of public health and other community service personnel

For more information, visit [www.cdc.gov/ncidod/sars](http://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)