



SEVERE ACUTE RESPIRATORY SYNDROME

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement I: Infection Control in Healthcare, Home, and Community Settings

This new Supplement outlines the infection control recommendations for prevention of SARS-CoV transmission in healthcare, household, and community settings. During the 2003 global epidemic, SARS-CoV caused unprecedented levels of morbidity and mortality among healthcare personnel and disrupted healthcare delivery systems, leading in some instances to closure of hospitals. Rapid implementation and adherence to infection control measures proved essential for controlling transmission in healthcare settings. To assist healthcare facilities in controlling SARS-CoV transmission, CDC issued several infection control guidance documents that evolved with improved understanding of the virus and its modes of transmission. This Supplement consolidates, updates, and replaces the previous guidelines and provides new information to guide infection control practices for prevention of SARS-CoV transmission.

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DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
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Infection Control in Healthcare, Home, and Community Settings

Goals

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

Key concepts

- SARS-CoV can be efficiently transmitted in healthcare settings if patients with SARS-CoV disease are not immediately recognized and if infection control precautions are not applied.
- Basic infection control measures are effective in preventing SARS-CoV transmission.
- Administrative measures designed to facilitate early recognition of patients with SARS-CoV disease are a critical component of SARS prevention strategies.

Priority activities

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

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I. Rationale and Goals

Transmission of SARS-CoV appears to occur predominantly through close interactions with infected persons. Infectious respiratory secretions are the most likely source of infection, although fecal/oral transmission may have occurred in some settings. Contact with contaminated body substances, either directly (e.g., shaking hands) or indirectly (e.g., touching objects contaminated with respiratory secretions or stool), can lead to exposure. SARS-CoV may also be transmitted through close contact with respiratory droplets expelled when a patient coughs or sneezes. In some instances, however, true airborne transmission (i.e., via droplet nuclei) cannot be excluded as a possible mode of SARS-CoV transmission.

SARS-CoV has been transmitted in healthcare settings (e.g., inpatient settings, emergency departments, nursing homes) to and from patients, healthcare workers, and visitors. Transmission to healthcare workers has occurred primarily after close contact with symptomatic persons before implementation of infection control precautions. During the 2003 outbreaks, multiple hospitals reported cases of SARS-CoV disease among healthcare workers who were present during aerosol-generating procedures performed on patients with SARS-CoV disease, suggesting that aerosol-generating procedures may pose an increased risk of SARS-CoV transmission. Special precautions during these procedures are recommended.

Infection control guidance to prevent SARS-CoV transmission is necessary to help ensure the protection of healthcare workers and healthcare facilities. In addition, as hospitalization of patients with SARS-CoV disease is recommended only if medically indicated, patients with less severe disease will likely be isolated in personal residences and designated community facilities. Therefore, appropriate infection control measures will be required to prevent transmission of SARS-CoV in these facilities. The goals for all settings are to:

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

II. Lessons Learned

The following lessons learned from the global experience with SARS-CoV have been considered in developing this Supplement:

- Transmission of SARS-CoV appears to occur predominantly through close interactions with infected persons.
- Persons with unrecognized SARS-CoV disease can contribute to the initiation or expansion of an outbreak, especially in healthcare settings.
- Transmission of SARS-CoV in a single healthcare facility can have far-reaching public health effects.
- Transmission to healthcare workers has occurred primarily after close, unprotected contact with symptomatic persons before implementation of infection control precautions.
- Certain high-risk procedures and events can increase the risk of SARS-CoV transmission.
- Infection control is a primary public health intervention for containing the spread of SARS-CoV.
- Patients with SARS-CoV disease need to be isolated to minimize the risk of transmission to others.
- Patients with mild SARS-CoV disease can be safely isolated in locations other than acute-care facilities, such as at home or in community facilities designated for isolation of SARS patients.

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III. Infection Control in Healthcare Facilities

A. Preparedness Planning

SARS preparedness planning for healthcare facilities is addressed in Supplement C. One component with particular relevance to this Supplement is the education and training of healthcare workers on infection control measures. Observations of healthcare workers caring for SARS patients during the 2003 epidemic identified numerous breaches in infection control, especially in the use of personal protective equipment (PPE). These can be corrected through complete and comprehensive training, provision of properly selected PPE, and monitoring of PPE use. Most important, all healthcare settings need to re-emphasize the importance of basic infection control measures, including hand hygiene, for the control of SARS-CoV and other respiratory pathogens.

Objective: Reinforce basic infection control practices in healthcare facilities and among healthcare personnel.

Activities

- Educate staff about the importance of strict adherence to and proper use of standard infection control measures, especially hand hygiene (i.e., hand washing or use of an alcohol-based hand rub). For complete recommendations on hand hygiene, refer to: www.cdc.gov/handhygiene/.
- Reinforce education on the recommended procedures for Standard, Contact, and Airborne Infection Isolation (AII) Precautions (see www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).
- Ensure that personnel have access to appropriate PPE, instructions and training in PPE use, and respirator fit-testing.

B. Early Recognition and Prevention of Transmission in Outpatient Settings

Objective: Ensure early recognition and prevention of transmission of SARS-CoV and other respiratory viruses at the initial encounter with a healthcare setting.

The 2003 outbreaks identified weaknesses in the way infection control precautions are implemented at the time symptomatic patients first visit a healthcare facility for evaluation. To address this deficiency, CDC is *incorporating measures to prevent the transmission of all respiratory infections*, beginning at the first point of contact with a potentially infected person, as one component of Standard Precautions in healthcare settings (see Appendix I1 and www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

These simple preventive measures apply in the absence and presence of SARS-CoV transmission in the world. Once SARS-CoV transmission is detected, efforts to enhance the early detection of patients with SARS-CoV disease (described in Section III.C below) should be added to these new Standard Precautions measures.

Activities

Visual alerts

- Post visual alerts (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physicians' offices, outpatient clinics) instructing patient and the persons who accompany them to: 1) inform healthcare personnel of symptoms of a respiratory

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infection when they first register for care, and 2) practice respiratory hygiene/cough etiquette (www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm). Sample visual alerts will be posted on CDC's SARS website: www.cdc.gov/ncidod/sars/.

Respiratory hygiene/cough etiquette

To contain respiratory secretions, all persons with signs and symptoms of a respiratory infection, regardless of presumed cause, should be instructed to:

- Cover the nose/mouth when coughing or sneezing.
- Use tissues to contain respiratory secretions.
- Dispose of tissues in the nearest waste receptacle after use.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects/materials.

Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:

- Provide tissues and no-touch receptacles (i.e., waste container with pedal-operated lid or uncovered waste container) for used tissue disposal.
- Provide conveniently located dispensers of alcohol-based hand rub.
- Provide soap and disposable towels for hand washing where sinks are available.

Masking and separation of persons with symptoms of respiratory infection

- During periods of increased respiratory infection in the community, offer masks to persons who are coughing. Either procedure masks (i.e., with ear loops) or surgical masks (i.e., with ties) may be used to contain respiratory secretions; respirators are not necessary. Encourage coughing persons to sit at least 3 feet away from others in common waiting areas. Some facilities may wish to institute this recommendation year-round.

Droplet Precautions

- Healthcare workers should practice Droplet Precautions (i.e., wear a surgical or procedure mask for close contact), in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection. Droplet Precautions should be maintained until it is determined that they are no longer needed (see www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

C. Early Detection and Isolation of Patients Potentially at Risk for SARS-CoV Disease

Early detection and isolation of patients who may be infected with SARS-CoV are the most important interventions to prevent the introduction of SARS-CoV into a healthcare setting. However, because measures to control SARS-CoV can impose a considerable burden, especially if multiple patients with respiratory illnesses are being seen in an outpatient setting or admitted to a hospital for treatment of pneumonia, the intensity of early detection and control measures should be based on the level of SARS-CoV transmission in the world. See CDC's SARS website (www.cdc.gov/sars/) for current information on SARS-CoV transmission worldwide.

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Objective 1: *In the absence of SARS-CoV transmission in the world*, implement screening to detect the re-emergence of SARS-CoV, and ensure appropriate triage and management of patients with possible SARS-CoV disease.

In the absence of person-to-person SARS-CoV transmission, the likelihood that a patient being evaluated for fever or lower respiratory illness, with or without pneumonia, has SARS-CoV disease will be exceedingly low unless there are both typical clinical findings and some accompanying epidemiologic evidence that raises the suspicion of exposure to SARS-CoV. Therefore, patients with respiratory infections should not be considered as possible cases of SARS-CoV disease unless they have severe pneumonia (or acute respiratory distress syndrome) of unknown etiology that requires hospitalization *and* an epidemiologic history that raises the suspicion of SARS-CoV exposure.

Activities

Screening and triage

- Only patients requiring hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology should be screened for SARS epidemiologic risk factors. The suspicion for SARS-CoV disease is raised if, within 10 days of symptom onset, the patient:
 - Has a history of travel to mainland China, Hong Kong, or Taiwan,¹ or close contact² with an ill person with a history of recent travel to one of these areas, *OR*
 - Is employed in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV), or
 - Is part of a cluster of cases of atypical pneumonia without an alternative diagnosis

Evaluate persons with such a clinical and exposure history according to Figure 1 in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidanceframe1.htm).

Outpatient infection control

- Follow the infection control recommendations for respiratory hygiene/cough etiquette and Droplet Precautions outlined in Section III.B above.

¹ The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the large volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the local or state health department.

² 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.

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Disposition

- No special infection control measures are recommended following discharge from an outpatient setting.

Hospitalization

- Patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology and who have one of the potential SARS risk factors should be placed on Droplet Precautions until it is determined that the cause of the pneumonia is not contagious. If the health department and clinicians *strongly* suspect SARS-CoV disease, then the patient should be placed on Contact and Airborne Infection Isolation Precautions, in addition to Standard Precautions (See Section C below and *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness*, www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Objective 2: *In the presence of person-to-person transmission of SARS-CoV in the world*, ensure the prompt identification and appropriate management of patients with possible and known SARS-CoV disease.

Activities

Screening and triage

Once person-to-person SARS-CoV transmission has been documented anywhere in the world, the probability that a patient presenting with early clinical symptoms of SARS actually has SARS-CoV disease increases if the patient has an epidemiologic link to a geographic location in which SARS-CoV transmission has been documented.

- Screen all patients with fever or lower respiratory symptoms, with or without pneumonia, to determine if, within 10 days of the onset of symptoms, they had:
 - Close contact with a person suspected of having SARS-CoV disease, *or*
 - A history of foreign travel (or close contact with an ill person with a history of travel) to a location with documented or suspected SARS-CoV transmission, *or*
 - Exposure to a domestic or occupational location with documented or suspected SARS-CoV (including a laboratory that contains live SARS-CoV), or close contact with an ill person with such an exposure history
- For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or respiratory symptoms, the presence of any other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea). The more common early symptoms include chills, rigors, myalgia, and headache. In some patients, myalgia and headache may precede the onset of fever by 12-24 hours. However, diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

Evaluate persons with an exposure history suggesting possible SARS-CoV disease according to Figure 2 in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease*

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among Persons Presenting with Community-Acquired Illness

(www.cdc.gov/ncidod/sars/clinicalguidanceframe2.htm).

- Patients who require hospitalization for pneumonia and who do not have a known epidemiologic link to a setting in which SARS-CoV has been documented should be screened for additional risk factors using the questions that apply when no SARS-CoV is documented in the world (i.e., employment in an occupation at particular risk for SARS-CoV exposure; part of a cluster of atypical pneumonias without an alternative diagnosis).
- Healthcare workers who are the first points of contact (e.g., triage and reception) should be trained to perform SARS-CoV screening. If screening personnel are not available, healthcare providers should screen symptomatic patients for SARS-CoV disease risk factors before initiating history-taking and physical examination. If SARS symptoms and risk factors are present, follow the clinical algorithm for patient management (www.cdc.gov/ncidod/sars/clinicalguidanceframe2.htm).

Outpatient infection control

- Patients with fever or lower respiratory symptoms, with or without pneumonia, who have been exposed to SARS-CoV or who have SARS risk factors should be suspected of having SARS-CoV disease and isolated as soon as possible. Such patients should be given a mask (surgical or procedure) to wear and immediately placed in a private examination room or cubicle. If available, an AII room (AIIR) should be used.
- Where limited space and examination room capacity preclude these measures, the patient should sit as far away as possible from other patients in the waiting area.
- Family members or friends who accompany the patient should be considered at risk for SARS-CoV disease and screened for fever and lower respiratory symptoms. If either is present, infection control measures to prevent SARS-CoV transmission should be applied.
- Healthcare workers should wear gown, gloves, respiratory protection, and eye protection (if needed) as described in Section III.D.5 below.

Disposition

- Hospital admission or discharge of a possible SARS patient should generally be based on the patient's clinical condition and healthcare needs. If diagnostic, therapeutic, or supportive regimens do not necessitate hospitalization, patients with possible SARS-CoV disease should not be hospitalized.
- Exceptions include persons for whom no other alternative for providing safe infection control is available. Such persons include travelers, homeless persons, and persons who would be returned to an environment where infection control measures are not feasible or practical (e.g., crowded dormitories, prisons and jails, detention centers, homeless shelters, other multi-person single-room dwellings). These persons should be hospitalized and isolated as recommended in Section D below. As soon as appropriate arrangements can be made for out-of-hospital care, the patient can be discharged. Alternatively, the patient may be admitted to a designated residential facility for isolation of convalescing SARS-CoV disease cases, if one exists.
- During transport between locations, patients should wear a mask. Public transportation (e.g., bus, train) should be avoided. Recommendations for emergency medical transport are provided in Section IV below.

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Hospitalization

- Follow recommended precautions for hospitalization of a patient with known or possible SARS-CoV disease as described in Section D below.

D. Infection Control Precautions for Hospitalized SARS Patients

The following recommendations apply to patients who have laboratory evidence of SARS-CoV disease or for whom the attending clinicians and health department strongly suspect SARS-CoV disease. The level of precautions described will rarely be needed in the absence of SARS-CoV transmission in the world but will be used increasingly once SARS-CoV transmission is detected.

Contact and All Precautions, in addition to Standard Precautions, should be applied when caring for patients with known or possible SARS-CoV disease. (Droplet Precautions also are required but are subsumed within All Precautions.) These precautions should be maintained for the duration of potential infectivity (see (www.cdc.gov/ncidod/sars/clinicalguidance.htm) or until a diagnosis of SARS-CoV disease has been ruled out. See Appendix I2.

The objective of all of the following activities is to prevent the transmission and acquisition of SARS-CoV in the hospital.

1. Patient placement

- Admit patients with SARS-CoV disease to an AIIR. An AIIR is a single-patient room in which environmental conditions are controlled to minimize the possibility of airborne transmission of infectious agents. These rooms have specific requirements for controlled ventilation, including: 1) a specified number of required air exchanges per hour (ACH) (i.e., 6 for old buildings; 12 for new construction or renovation), 2) monitored negative pressure relative to hallways, and 3) air exhausted directly to the outside preferably or passed through a high-efficiency purifying air (HEPA) filter if recirculated. These requirements are detailed in the *Guideline for Environmental Infection Control in Healthcare Facilities, 2003* (www.cdc.gov/ncidod/hip/enviro/guide.htm).
- If there is a lack of AIIRs and/or a need to concentrate infection control efforts and resources, patients may be cohorted on a floor or nursing unit designated for the care of SARS patients only, rather than placed in AIIRs throughout the hospital. This strategy physically isolates SARS patients and also makes it possible to dedicate resources and appropriately trained staff to their care. Experience in some settings in Taiwan and Toronto demonstrated that cohorting SARS patients, without use of AIIRs, effectively interrupted transmission. Thus, although single AIIRs are recommended for SARS isolation, other strategies may provide effective overall infection control, particularly if air-handling systems in existing rooms/units/floors can be modified to allow these areas to operate under negative pressure relative to surrounding areas.
- Even if a facility has chosen to cohort SARS patients, properly designed and operated AIIRs are preferred for 1) patients who are known to have transmitted SARS-CoV to other persons and 2) patients in whom the risk of SARS is being assessed.
- Designate "clean" and "dirty" areas for isolation materials. Maintain a stock of clean patient care and PPE supplies outside the patient's room. Decide where contaminated linen and waste will be placed. Locate receptacles close to the point of use and separate from the clean supplies. Also designate the location where reusable PPE (e.g., goggles, face shields) will be placed for cleaning and disinfection before reuse.

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- Limit the amount of patient-care equipment brought into the room to that which is medically necessary. Provide each patient with patient-dedicated equipment (e.g., thermometer, blood pressure cuff, stethoscope).
- Limit staff to the number sufficient to meet patient-care needs. Using staff who have been specially trained to care for patients with SARS may reduce opportunities for exposure, increase adherence to recommended infection control practices, and promote continuity of care.

2. Patient transport

- Limit patient movement and transport outside the AIIR to medically necessary purposes. Whenever possible, use portable equipment to perform x-rays and other procedures in the patient's room.
- If transport or movement is necessary, ensure that the patient wears a surgical mask, puts on a clean patient gown, and performs hand hygiene before leaving the room. If a mask cannot be tolerated (e.g., due to the patient's age or deteriorating respiratory status), apply the most practical measures to contain respiratory secretions.
- Limit contact between SARS patients and others by using less traveled hallways and elevators when possible.

3. Visitors

- Limit visits to patients with known or possible SARS-CoV disease to persons who are necessary for the patient's emotional well-being and care.
- Visitors who have been in contact with the patient before and during hospitalization are a possible source of SARS-CoV. Therefore, schedule and control visits to allow for appropriate screening for SARS-CoV disease before entering the hospital and appropriate instruction on use of PPE and other precautions (e.g., hand hygiene, limiting surfaces touched) while in the patient's room.

4. Hand hygiene

Hand hygiene (i.e., hand washing or use of an alcohol-based hand rub) should be performed after contact with a patient on precautions for SARS-CoV disease or their environment of care. Current guidelines for hand hygiene are provided at: www.cdc.gov/handhygiene/.

5. Personal protective equipment (PPE)

Gloves, gown, respiratory protection, and eye protection (as needed) should be donned before entering a SARS patient's room or designated SARS patient-care area. This level of protection is required for the majority of patient contacts. Additional guidance for performing an aerosol-generating procedure on patients with SARS Co-V disease is provided in Section III.D.11 below. Instructions on how to safely don, use, and remove PPE are being developed and will be provided at www.cdc.gov/ncidod/sars/ when available. Removal of PPE in a manner that prevents contamination of clothing and skin is a priority.

- Gown and gloves – Wear a standard isolation gown and pair of nonsterile patient-care gloves for all patient contacts. The gown should fully cover the front torso and arms and should tie in the back. Gloves should cover the cuffs of the gown.

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- **Respiratory protection** – Wear a NIOSH-certified N-95 filtering facepiece respirator for entering an AIIR or designated SARS patient-care area.³ If N-95 or higher level of respiratory protection is not available, then wear a snug-fitting surgical mask to prevent nose and mouth contact with large respiratory droplets. Discard respirators upon leaving the patient room or area.
- **Eye and face protection** -- It is not yet known whether routine eye protection is needed to prevent SARS-CoV transmission. Routinely wear eye protection when within 3 feet of a patient with SARS-CoV. If splash or spray of respiratory secretions or other body fluids is likely, protect the eyes with goggles or a face shield, as recommended for Standard Precautions. The face shield should fully cover the front and wrap around the side of the face. Corrective eyeglasses or contact lenses alone are not considered eye protection.
- Use safe work practices when wearing PPE:
 - Avoid touching the face with contaminated gloves
 - Avoid unnecessary touching of surfaces and objects with contaminated gloves

6. Medical waste

Medical waste has not been implicated in the transmission of SARS-CoV. Therefore, no special handling procedures are recommended for SARS-CoV-contaminated medical waste.

- Contain and dispose of SARS-CoV-contaminated medical waste in accordance with facility-specific procedures and/or local or state regulations for handling and disposal of medical waste, including used needles and other sharps.
- Discard as routine waste used patient-care supplies that are not likely to be contaminated (e.g., paper wrappers).
- Wear disposable gloves when handling waste. Perform hand hygiene after removal of gloves.

7. Textiles (linen and laundry)

Contact with textiles has not been implicated in the transmission of SARS-CoV. Therefore, no special handling procedures are recommended for linen and laundry that may be contaminated with SARS-CoV.

- Store clean linen outside patient rooms, taking into the room only linen needed for use during the shift.
- Place soiled linen directly into a laundry bag in the patient's room. Contain linen in a manner that prevents the linen bag from opening or bursting during transport and while in the soiled linen holding area.
- Wear gloves and gown when directly handling soiled linen and laundry (e.g., bedding, towels, personal clothing) as per Standard and Contact Precautions. Do not shake or otherwise handle soiled linen and laundry in a manner that might aerosolize infectious particles.
- Wear gloves for transporting bagged linen and laundry.
- Perform hand hygiene after removing gloves that have been in contact with soiled linen and laundry.

³ Respirators should be used in the context of a complete respiratory protection program as required by the Occupational Safety and Health Administration (OSHA). This includes training, fit-testing, and fit-checking to ensure appropriate respirator selection and use. To be effective, respirators must provide a proper sealing surface on the wearer's face. Detailed information on a respiratory protection program is provided at www.osha.gov/SLTC/etools/respiratory/.

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- Wash and dry linen according to routine standards and procedures (www.cdc.gov/ncidod/hip/enviro/guide.htm).

8. Dishes and eating utensils

Dishes and eating utensils have not been implicated in SARS-CoV transmission. Therefore, no special precautions, beyond those for Standard Precautions, are recommended for dishes and eating utensils used by a patient with known or possible SARS-CoV disease.

- Wash reusable dishes and utensils in a dishwasher with recommended water temperature (www.cdc.gov/ncidod/hip/enviro/guide.htm).
- Wear gloves when handling patient trays, dishes, and utensils.

9. Patient-care equipment

- Follow standard practices for handling and reprocessing used patient-care equipment, including medical devices. Wear gloves when handling and transporting used patient-care equipment. Wipe heavily soiled equipment with an EPA-approved hospital disinfectant before removing it from the patient's room. Follow current recommendations for cleaning and disinfection or sterilization of reusable patient-care equipment.
- Wipe external surfaces of portable equipment for performing x-rays and other procedures in the patient's room with an EPA-approved hospital disinfectant upon removal from the patient's room.

10. Environmental cleaning and disinfection

Cleaning and disinfection of environmental surfaces are important components of routine infection control in healthcare facilities. Although little is known about the extent of environmental contamination in SARS patients' rooms, epidemiologic and laboratory evidence suggests that the environment could play a role in transmission. Therefore, cleaning and disinfection are critical to the control of SARS-CoV transmission. Environmental cleaning and disinfection for SARS-CoV follows the same principles generally used in healthcare settings.

Cleaning and disinfection of occupied patient rooms

- Consider designating specific, well-trained environmental services personnel for cleaning and disinfecting of SARS patient rooms/units. Fully define the scope of cleaning that will be done each day; identify who will be responsible for cleaning and disinfecting the surfaces of patient-care equipment (e.g., IV pumps, ventilators). Consider using a checklist to promote accountability for cleaning responsibilities.
- Environmental services personnel should wear PPE as described in Section III.D.5 above. These staff should be trained in proper procedures for PPE use, including removal of PPE, and the importance of hand hygiene.
- Keep cleaning supplies outside the patient room (e.g., in an anteroom or storage area).
- Keep areas around the patient free of unnecessary supplies and equipment to facilitate daily cleaning.
- Use any EPA-registered hospital detergent-disinfectant. Follow manufacturer's recommendations for use-dilution (i.e., concentration), contact time, and care in handling.

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- Clean and disinfect SARS patients' rooms at least daily and more often when visible soiling/contamination occurs. Give special attention to frequently touched surfaces (e.g., bedrails, bedside and over-bed tables, TV control, call button, telephone, lavatory surfaces including safety/pull-up bars, doorknobs, commodes, ventilator surfaces) in addition to floors and other horizontal surfaces.
- Because so little is known about environmental transmission of SARS-CoV, placement of patients in rooms that do not have carpeting is preferred because non-carpeted floors are easier to clean and disinfect. If use of carpeted rooms cannot be avoided, vacuuming should be done daily, and personnel should wear the recommended PPE. Follow current CDC environmental guidelines for vacuuming and shampooing carpeted floors in patient rooms (www.cdc.gov/ncidod/hip/enviro/guide.htm).
- After an aerosol-generating procedure (e.g., intubation), clean and disinfect horizontal surfaces around the patient. Clean and disinfect as soon as possible after the procedure.
- Clean and disinfect spills of blood and body fluids in accordance with current recommendations for Standard Precautions (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

Cleaning and disinfection after patient discharge or transfer

Follow standard facility procedures for terminal cleaning of an isolation room.

- Clean and disinfect all surfaces that were in contact with the patient or may have become contaminated during patient care.
- Wipe down mattresses and headboards with an EPA-approved hospital disinfectant.
- Privacy curtains should be removed, placed in a bag in the room and then transported to be laundered.
- No special treatment is necessary for window curtains, ceilings, and walls unless there is evidence of visible soil.
- Do not spray (i.e., fog) occupied or unoccupied rooms with disinfectant. This is a potentially dangerous practice that has no proven disease control benefit.

11. Aerosol-generating procedures

Because aerosol-generating procedures may pose a greater risk of SARS-CoV transmission, additional precautions are recommended for healthcare workers who perform or assist with these procedures. Procedures that stimulate coughing and promote the generation of aerosols include aerosolized or nebulized medication administration, diagnostic sputum induction, bronchoscopy, airway suctioning, endotracheal intubation, positive pressure ventilation via face mask (e.g., BiPAP, CPAP), and high-frequency oscillatory ventilation.

Healthcare facilities should review their strategies to protect healthcare workers during these procedures, including the use of PPE and safe work practices. Healthcare workers who perform these procedures should be alerted to the fact that there may be an increased risk for SARS-CoV transmission when these procedures are performed.

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Infection control measures

- Limit performance of aerosol-generating procedures on SARS patients to those that are considered medically necessary. Clinically appropriate sedation during intubation and bronchoscopy may minimize resistance and coughing during the procedure.
- Limit the number of healthcare workers in the room during an aerosol-generating procedure to those essential for patient care and support.
- Perform aerosol-generating procedures in an AIIR. If an AIIR is not available, perform the procedure in a private room, away from other patients. If possible, increase air exchanges, create a negative pressure relative to the hallway, and avoid recirculation of the room air. If recirculation of air from such rooms is unavoidable, pass the air through a HEPA filter before recirculation, as recommended for *Mycobacterium tuberculosis* (www.cdc.gov/mmwr/preview/mmwrhtml/00035909.htm).
- Air-cleaning devices, such as portable HEPA filtration units, may be used to further reduce the concentration of contaminants in the air. Keep doors closed except when entering or leaving the room, and minimize entry and exit during the procedure.
- Submicron filters on exhalation valves of mechanical ventilators may prevent contaminated aerosols from entering the environment. Although the effectiveness of this measure in reducing the risk of SARS-CoV transmission is unknown, the use of such filters is prudent during high-frequency oscillatory ventilation of patients with SARS-CoV disease.

PPE for aerosol-generating procedures

The optimal combination of PPE for preventing SARS-CoV transmission during aerosol-generating procedures has not been determined. Wearing PPE during these procedures protects the respiratory tract from inhalation of droplet nuclei and the mucous membranes, skin, and clothing from contact with infectious respiratory secretions. PPE should cover the torso, arms, and hands as well as the eyes, nose, and mouth. PPE must be compatible with the needs of healthcare worker protection and patient care. The following PPE is recommended:

- Disposable isolation gown, preferably with fluid-resistant properties, to protect the body and exposed areas of the arms. A disposable full-body isolation suit is an option and may provide greater protection of the skin, especially around the neck. Surgical hoods, which fully cover the head, neck, and face, (with the addition of an N-95 or higher-level disposable particulate respirator), have been used in some settings. It is unknown whether covering exposed areas of skin or hair on the head will further reduce the risk of transmission.
- Pair of disposable gloves that fit snugly over the gown cuff.
- Eye protection (i.e., goggles) to protect the eyes from respiratory splash or spray. Goggles should fit snugly (but comfortably) around the eyes. A face shield may be worn over goggles to protect exposed areas of the face but should not be worn as a primary form of eye protection for these procedures.
- Respiratory protection -- During aerosol-generating procedures, there must be minimal respirator face-seal leakage to fully protect the worker from exposure to aerosolized infectious droplets. The following respiratory protection options should be considered:
 - Disposable particulate respirators (e.g., N-95, N-99, or N-100) are sufficient for routine respiratory protection for Airborne Infection Isolation and are the minimum level of respiratory protection required for healthcare workers who are performing aerosol-generating procedures. To ensure adequate protection, healthcare workers must be fit-

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tested to the respirator model that they will wear (www.cdc.gov/niosh/99-143.html) and also know how to check the face-piece seal. A fit-check should be performed each time a respirator is put on, before entering the patient room. Workers who cannot wear a disposable particulate respirator because of facial hair or other fit limitations should wear a loose-fitting (i.e., helmeted or hooded) PAPR.

- o Healthcare facilities in some SARS-affected areas routinely used higher levels of respiratory protection for performing aerosol-generating procedures on patients with SARS-CoV disease. It is unknown whether these higher levels of protection will further reduce transmission. Factors that should be considered in choosing respirators in this setting include availability, impact on mobility, impact on patient care, potential for exposure to higher levels of aerosolized respiratory secretions, and potential for reusable respirators to serve as fomites for transmission. Higher levels of respiratory protection include:
 - PAPR with loose-fitting face piece that forms a partial seal with the face
 - PAPR with hood that completely covers the head and neck and may also cover portions of the shoulder and torso
 - PAPR with tight-fitting face piece (half and full face-piece)
 - Full face-piece elastomeric negative-pressure (non-powered) respirators with N, R, or P-100 filters.

IV. Infection Control for Prehospital Emergency Medical Services (EMS)

Effective communication among clinicians requesting emergency transport of a patient with possible or known SARS-CoV disease, EMS personnel, and receiving facilities is necessary to ensure the appropriate protection of healthcare workers. Prehospital care personnel should follow the updated Standard Precautions recommendations to prevent the spread of respiratory infections described in III.B above. These include promoting respiratory hygiene/cough etiquette (www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm) and using Droplet Precautions (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm), in addition to Standard Precautions, for all patients with symptoms of a respiratory infection. When SARS is suspected in a patient needing emergency transport, ***prehospital care providers and healthcare facilities should be notified in advance that they may be transporting or receiving a patient who may have SARS-CoV disease.***

A. Patient Transport

Objective: Safely transport patients with known or possible SARS-CoV disease.

Activities

Patients who may have SARS-CoV disease may be safely transported in any emergency vehicle with the proper precautions.

- Involve the fewest EMS personnel required to minimize possible exposures.
- Family members and other contacts of SARS patients should not ride in the ambulance if possible. If necessary, they should be evaluated for fever and lower respiratory symptoms and, if either is present, asked to wear a surgical or procedure mask when riding in the vehicle.
- When possible, use vehicles that have separate driver and patient compartments that can provide separate ventilation to each area. Close the door/window between these compartments before bringing the patient on board. Set the vehicle's ventilation system to the non-recirculating mode to maximize the volume of outside air brought into the vehicle. If the

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vehicle has a rear exhaust fan, use it to draw air away from the cab, toward the patient-care area, and out the back end of the vehicle. Some vehicles are equipped with a supplemental recirculating ventilation unit that passes air through HEPA filters before returning it to the vehicle. Such a unit can be used to increase the number of ACH (NIOSH HETA report 95-0031-2601 [www.cdc.gov/niosh/hhe/reports/pdfs/1995-0031-2601.pdf]).

- If a vehicle without separate compartments and ventilation must be used, open the outside air vents in the driver area and turn on the rear exhaust ventilation fans to the highest setting. This will create a negative pressure gradient in the patient area.
- If possible, place a surgical mask on the patient to contain droplets expelled during coughing. If this is not possible (i.e., would further compromise respiratory status, difficult for the patient to wear), have the patient cover the mouth/nose with tissue when coughing.
- Oxygen delivery with a non-rebreather face mask may be used to provide oxygen support during transport. If needed, positive-pressure ventilation should be performed using a resuscitation bag-valve mask, preferably one equipped to provide HEPA or equivalent filtration of expired air.
- If a patient has been mechanically ventilated before transport, HEPA or equivalent filtration of airflow exhaust should be available. (EMS organizations should consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive-pressure ventilation.)
- Cough-generating procedures (e.g., mechanical ventilation, nebulizer treatment) should be avoided during prehospital care.

B. Personal Protective Equipment

Objective: Ensure the safety of prehospital care providers who transport patients with known or possible SARS-CoV disease.

Activities

- Prehospital care providers who directly handle a patient with SARS-CoV disease or who are in the compartment with the patient should wear PPE as recommended for Standard, Contact, and All Precautions (www.cdc.gov/ncidod/hip/ISOLAT/isopart2.htm). These include the following:
 - Disposable isolation gown, pair of disposable patient examination gloves, eye protection (i.e., goggles or face shield).
 - Respiratory protection (i.e., N-95 or higher-level respirator)
- Personnel in the driver's compartment who will have no direct patient contact should wear an N-95 or higher-level respirator during transport. Drivers who also provide direct patient care (e.g., moving patients on stretchers) should wear the recommended PPE for patient contact. This PPE, with the exception of the respirator, should be removed and hand hygiene performed after completing patient care and before entering driver's compartment to avoid contaminating the compartment. Instructions on how to safely don, use, and remove PPE is being developed and will be provided when available on CDC's SARS website: www.cdc.gov/ncidod/sars/.

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C. Safe Work Practices

Objective: Ensure safe work practices among EMS personnel to prevent transmission of SARS-CoV.

Activities

- Avoid touching one's face with contaminated gloves.
- Avoid unnecessary touching of surfaces in the ambulance vehicle.
- Arrange for the receiving facility staff to meet the patient at the ambulance door to limit the need for EMS personnel to enter the emergency department in contaminated PPE. (It may not be practical to change PPE before patient transfer into the facility.) Remove and discard PPE after transferring the patient at the receiving facility and perform hand hygiene. Treat used disposable PPE as medical waste.

D. Clinical Specimens

Objective: Safely collect clinical specimens from SARS patients during transport.

Activities

- Handle clinical specimens that must be collected during transport (e.g., blood gas) in accordance with standard operating procedures.

E. Post-Transport Management of the Contaminated Vehicle

Objective: Safely clean vehicles used for transport of SARS patients to prevent SARS-CoV transmission.

Activities

- Follow standard operating procedures for the containment and disposal of regulated medical waste.
- Follow standard operating procedures for containing and reprocessing used linen. Wear appropriate PPE when removing soiled linen from the vehicle. Avoid shaking the linen.
- Clean and disinfect the vehicle in accordance with standard operating procedures. Personnel performing the cleaning should wear a disposable gown and gloves (a respirator should not be needed) during the clean-up process; the PPE should be discarded after use. All surfaces that may have come in contact with the patient or materials contaminated during patient care (e.g., stretcher, rails, control panels, floors, walls, work surfaces) should be thoroughly cleaned and disinfected using an EPA-registered hospital disinfectant in accordance with manufacturer's recommendations.
- Clean and disinfect reusable patient-care equipment according to manufacturer's instructions.

F. Follow-up of EMS Personnel

Objective: Ensure appropriate follow-up and care of EMS personnel who transport SARS patients.

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Activities

- Manage EMS personnel who transport SARS patients as recommended for hospital personnel (see Section IX).

V. Infection Control for Care of SARS Patients at Home

Patients with SARS-CoV disease who do not require hospitalization for medical indications may be isolated at home.

A. *Assessment of the Residence*

Objective: Ensure that the residential setting is suitable and appropriate for isolation of a SARS patient.

Activities

- Before a SARS patient occupies a residence for home isolation, there should be an assessment (by phone or direct observation) to ensure that the residence has the features necessary for provision of appropriate care and infection control precautions. Because of the variability of household settings, professional judgment is needed in determining whether a home is an appropriate location for a patient with SARS-CoV disease.
- There should be a bathroom in the home for use by the patient and household members only. If there are multiple bathrooms, one should be designated solely for the patient's use, especially if the patient has diarrhea.
- The patient should have a bed and preferably a private room for sleeping.
- If the home is a multiple family dwelling (e.g., apartment building), the area in which the patient will be housed should have a separate air-handling system (if one is present).
- Basic amenities, such as heat, electricity, potable and hot water, sewer, and telephone access, should be available.
- There should be a primary caregiver to assist the patient with basic needs in the home and social service support for obtaining groceries, prescriptions, and other personal needs.

B. *Infection Control Precautions for SARS Patients Isolated at Home*

Objective: Ensure the use of proper infection control precautions in the home setting to minimize the potential for SARS-CoV transmission.

Infection control principles used in healthcare settings also apply in the home care setting. However, due to practical limitations, there are some differences between what can be done in the home and the healthcare setting. For example, All Precautions cannot be practiced completely outside of fully controlled settings such as healthcare facilities. Since SARS-CoV is most likely transmitted through contact and droplet spread, the use of modified precautions that focus on preventing droplet and contact spread are recommended for isolation in the household setting.

Activities

Duration of infection control measures

- Continue the infection control precautions outlined below until 10 days following resolution of fever (given respiratory symptoms are absent or resolving) or until the health department has

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determined that home isolation precautions can be safely discontinued (e.g., diagnosis of SARS-CoV disease is ruled out).

Home isolation precautions

- Patients should not leave the home for the duration of the isolation period, except as necessary for follow-up medical care. When movement outside the home is necessary, the patient should wear a mask, if tolerated, and should not use public transportation.
- Separate the patient from other persons in the household to the extent possible. Use a separate room and bathroom if available.
- Limit the number of persons in the household to those who are essential for patient support. Other household members should either be relocated or minimize contact with the patient in the home. This is particularly important for persons at risk of serious SARS-CoV disease complications (e.g., persons with underlying heart or lung disease, diabetes mellitus, older age).
- Unexposed persons who do not have an essential need to be in the home should not visit.

Infection control measures in the home

- Hand hygiene -- All persons in the household should carefully follow recommendations for hand hygiene (i.e., hand washing with soap and water or use of an alcohol-based hand rub) after touching body fluids (e.g., respiratory secretions, stool, urine, vomitus) and potentially contaminated surfaces and materials (e.g., linen). Hand hygiene supplies (soap/water, alcohol-based hand rub, disposable towels) should be available and replenished as needed. (See www.cdc.gov/handhygiene/.)
- Source control -- Patients should cover the nose/mouth when coughing and dispose of tissues in a lined waste container. If possible, the patient should wear a surgical mask when others are present. If the patient cannot wear a mask, persons in close contact with the patient should wear a mask. Masks should fit snugly around the face and should not be touched or handled during use. If masks will be reused by persons in the home, procedures for identifying each person's mask and containing it between uses should be in place. A supply of masks should be available based on the volume needed each day.
- Gloves and other protective attire -- Use of disposable gloves should be considered for any direct contact with the body fluids of a patient with possible or known SARS-CoV disease. **However, gloves are not intended to replace proper hand hygiene.** Immediately after gloves are removed, they should be discarded and hand hygiene should be performed. Gloves must never be washed or reused.
- Laundry (e.g., bedding, towels and clothing) -- Towels and bedding should not be shared. Laundry may be washed in a standard washing machine with warm water and detergent; bleach may be added but is not necessary. Gloves should be worn when handling soiled laundry, and care should be used when handling soiled laundry to avoid direct contact of skin and/or clothing with contaminated material. Soiled laundry should not be shaken or otherwise handled in a manner that may aerosolize infectious particles.
- Dishes and other eating utensils -- Objects used for eating should not be shared, but separation of eating utensils for use by the SARS patient is not necessary. Soiled dishes and eating utensils should be washed either in a dishwasher or by hand with warm water and soap.

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- Household waste -- Gloves, tissues, and other waste generated in the care of a SARS patient should be bagged and placed in another container for disposal with other household waste.
- Cleaning and disinfection of environmental surfaces -- Environmental surfaces that are frequently touched by the patient or are soiled with body fluids should be cleaned and disinfected with a household disinfectant. The bathroom used by the patient should be cleaned daily, if possible. Household utility gloves should be worn during the cleaning process.

C. Follow-up of Contacts

Objective: Ensure appropriate follow-up and care of exposed close contacts of SARS patients in home isolation.

Activities

- Household members and other close contacts of SARS patients should be vigilant for fever (i.e., measure temperature at least daily) and/or respiratory symptoms.
- If household contacts develop fever or respiratory symptoms, arrangements should be made immediately for a medical evaluation. ***In advance of the evaluation, healthcare providers should be informed that the person (and those who may accompany him or her) is a close contact of a SARS patient so arrangements can be made, to prevent transmission to others in the healthcare setting.***
- Symptomatic household or other close contacts should follow the same precautions recommended for the SARS patient.
- In the absence of fever or respiratory symptoms, household contacts need not limit their activities outside the home, unless otherwise required by quarantine regulations.

VI. Infection Control for Care of SARS Patients in Community Isolation Facilities

If a surge in patients overwhelms existing healthcare capacity or if home isolation is not feasible for individual patients, jurisdictions might need to use alternative facilities in the community for the isolation of SARS patient. In most situations, community isolation facilities will house and care for patients with milder cases of SARS-CoV disease. These patients can be expected to care for themselves and are not expected to have significant healthcare needs. The specific precautions that will be required will depend in part of the type of facility designated for community isolation (e.g., motel, hotel, hospital). The same infection control principles that apply to home isolation apply to community isolation facilities. However, in community settings, personnel who are in the facility should be trained and fit-tested for an N-95 respirator.

- Community isolation facilities should have rooms with private bathrooms.
- Personnel who enter the room should wear an N-95 respirator. If there will be direct contact with the patient or the patient's environment, a disposable isolation gown and gloves should be worn.
- Receptacles for soiled linen/laundry and contaminated waste should be placed in designated locations. Follow home care guidelines above for handling these materials.

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VII. Infection Control for Public Health and Outreach Workers

Objective: Ensure the safety of public health and outreach workers who meet with SARS patients or their contacts in the home or a community isolation facility.

Activities

- Public health workers and other personnel who work in the field and may be visiting patients in home or community isolation facilities should wear PPE that is commensurate with the degree of patient contact. These personnel should be trained and fit-tested in N-95 respirator use. Personnel who enter the home or room of a SARS patient should wear an N-95 respirator.
- If there will be direct contact with the patient or the patient's environment, a disposable isolation gown and gloves should be worn.
- PPE should be removed outside the home or facility and bagged for disposal; hand hygiene should be performed.

VIII. Infection Control for Laboratory and Pathology Procedures

Despite the processing of several thousand diagnostic specimens from patients with SARS-CoV disease in routine clinical laboratories around the world, to date there have been no reported clusters of SARS-CoV disease among laboratory workers. To date, the only confirmed episode of SARS-CoV transmission to a laboratory worker occurred in a research laboratory. The risk of transmission to laboratory personnel is most likely during specimen processing and handling of virus cultures.

A. Specimen Collection and Handling

Objective: Safely collect and handle specimens from SARS patients to prevent transmission of SARS-CoV.

Activities

- Healthcare workers who collect specimens from SARS patients should wear PPE as appropriate for Standard, Contact, and All Precautions.
- Standard facility procedures for specimen collection and transport to the clinical laboratory should be followed.
- All specimens should be appropriately contained (bagged if necessary) and have a completed laboratory requisition slip attached. Information on the requisition slip should indicate that the patient is or could be infected with SARS-CoV. Laboratory personnel should be alerted to the possibility of SARS-CoV to ensure safe handling procedures.

B. Laboratory Procedures

Objective: Safely process SARS-CoV specimens to prevent transmission.

Activities

- Biosafety levels 2 and 3, according to specimen type, are recommended for processing SARS-CoV specimens. The specifics of these recommendations are provided in Supplement F.

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C. *Postmortem Handling of Human Remains*

Objective: Safely handle human remains during autopsy procedures to prevent transmission of SARS-CoV.

Activities

In general, safety procedures for human remains infected with SARS-CoV should be consistent with those used for any autopsy procedure. However, additional respiratory protection is needed during an autopsy procedure that generates aerosols (e.g., use of oscillating saws).

Personal protective equipment (PPE)

- Wear standard autopsy PPE, including a scrub suit worn under an impervious gown or apron, eye protection (i.e., goggle, face shield), double surgical gloves with an interposed layer of cut-proof synthetic mesh gloves, surgical mask or respirator, and shoe covers.
- Add respiratory protection if aerosols might be generated. This includes N-95 or N-100 disposable particulate respirators or PAPR. Autopsy personnel who cannot wear a disposable particulate respirator because of facial hair or other fit limitations should wear a loose-fitting (i.e., helmeted or hooded) PAPR.
- Remove PPE before leaving the autopsy suite and disposed in accordance with facility policies and procedures.

Engineering controls

- Whenever possible, perform autopsies on human remains infected with SARS-CoV in autopsy settings that have adequate air-handling system. This includes a minimum of 6 (old construction) to 12 (new construction) ACH, negative pressure relative to adjacent areas as per recommendations for AIIRs, and direct exhaust of air to the outside or passed through a HEPA filter if air is recirculated. Exhaust systems around the autopsy table should direct air (and aerosols) away from healthcare workers performing the procedure (e.g., exhaust downward).
- Use containment devices whenever possible. Use biosafety cabinets for the handling and examination of smaller specimens. When available, use vacuum shrouds for oscillating saws to contain aerosols and reduce the volume released into the ambient air environment.

Prevention of percutaneous injuries

- Follow standard safety procedures for preventing percutaneous injuries during autopsy.

IX. Occupational Health Issues

A. *Surveillance and Monitoring of Healthcare Workers*

Objective: Establish/adapt a healthcare personnel surveillance system to ensure that workers who may have had exposure to SARS-CoV are identified and monitored and that those who develop illness receive appropriate care.

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Activities

- Establish a process to identify personnel who enter the rooms or units where SARS patients are provided care. Possible mechanisms include self-reports, sign-in sheets, or logs.
- Instruct personnel who have unprotected contact with patients with SARS-CoV disease or who have early symptoms of SARS-CoV disease to immediately notify occupational health, infection control, or a designee.
- Develop a system to identify healthcare personnel who provided care to a patient who was later identified as having SARS-CoV disease.
- See Supplement F, Appendix F6 for guidance on medical surveillance of exposed laboratory workers.

B. Management of Exposures and Other Contacts with SARS Patients

Objective: Ensure appropriate management and follow-up monitoring of healthcare workers who have had exposures and other contacts with SARS patients.

Activities

Clinical judgment should be used in deciding when a worker has been exposed and needs follow-up monitoring.

Management of asymptomatic healthcare workers with unprotected high-risk exposures

An unprotected high-risk exposure occurs when a healthcare worker is in a room with a SARS patient during an aerosol-generating procedure or event *and* the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected high-risk exposure but has no symptoms of SARS-CoV disease, the worker:

- Should be excluded from duty (e.g., administrative leave) for 10 days after the date of the last high-risk exposure.
- Should be vigilant for the development of fever and/or respiratory symptoms.
- Should be actively monitored for the development of fever and/or respiratory symptoms for 10 days after the date of the last high-risk exposure.

Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

The combination of close monitoring for symptoms and exclusion from duty protects the hospital and community without imposing unnecessary restrictions on a healthcare worker.

Management of asymptomatic healthcare workers with unprotected exposures that are not high risk

Unprotected exposures that are not high risk occur when a healthcare worker is in a room or patient-care area with a SARS patient (not during a high-risk procedure) and the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected, non-high-risk exposure and has no symptoms of SARS-CoV disease, the healthcare worker:

- Need not be excluded from duty.

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- Should be vigilant for the development of fever and/or respiratory symptoms (i.e., measure and record body temperature twice daily for 10 days following the date of last unprotected exposure, and immediately notify the healthcare facility if symptoms develop.)
- Should be actively monitored for the development of fever and lower respiratory symptoms before reporting to duty.

Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

Surveillance of asymptomatic healthcare workers who have cared for SARS patient(s) but have no known unprotected exposures

- Instruct workers to be vigilant for the development of fever and/or respiratory symptoms, measure and record body temperature twice daily throughout the 10-day period following the date of last protected contact with a SARS patient, and immediately notify the healthcare facility if symptoms develop.
- Implement active follow-up surveillance of these workers for 10 days following the last protected exposure.
- Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

Management of symptomatic healthcare workers

- Any healthcare worker who has cared for or been exposed to a SARS patient and who develops fever and/or respiratory symptom(s) within 10 days after exposure or patient care should:
 - Immediately contact infection control, occupational health or designee in each facility where s/he works; and
 - Report to the predetermined location for clinical evaluation. (During periods of increased SARS activity in the healthcare facility and/or community, this recommendation extends to all symptomatic personnel working in the facility, regardless of whether they have had contact with a SARS patient.)
- Any healthcare worker who develops symptoms or fever while at work should immediately put on a surgical mask and notify the appropriate facility contact (e.g., occupational health, infection control, or other designee) and then report to the designated location for clinical evaluation.
- Symptomatic healthcare personnel should be managed in accordance with the recommendations in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). Decisions on return to work should be guided by policies or regulation defined by the facility or health department.

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Appendix I 1
Recommendations for Application of Standard Precautions
for the Care of All Patients in All Healthcare Settings

<i>Component</i>	Recommendations
Hand hygiene	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts
Personal protective equipment (PPE)	
Gloves	For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and nonintact skin
Mask, eye protection, face shield	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions
Gown	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated
Soiled patient-care equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas
Textiles (linen and laundry)	Handle in a manner that prevents transfer of microorganisms to others and to the environment
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; use safety features when available; place used sharps in puncture-resistant container
Patient resuscitation	Use mouthpiece, resuscitation bag, other ventilation devices to prevent mouth contact
Patient placement	Prioritize for single patient room if patient is at increased risk of transmission, is likely to contaminate the environment or does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection
Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter)	Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, > 3 feet if possible

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**Appendix I2
Summary of Recommendations for Expanded Precautions**

Category	Elements
Contact Precautions	<ul style="list-style-type: none"> • Single patient room (preferred) • Gloves for all contact with patient and environment of care • Isolation gown for all patient contact
Droplet Precautions	<ul style="list-style-type: none"> • Single patient room (preferred) • Surgical mask within 3 feet of patient • Eye protection within 3 feet of patient with SARS – CoV
Airborne Infection Isolation	<ul style="list-style-type: none"> • Private room with monitored negative air pressure relative to surrounding areas and 6-12 air exchanges per hour • Appropriate discharge of the air to the outdoors or monitored high-efficiency filtration of room air before recirculation • Doors closed except as needed for entry and exit • NIOSH-approved respiratory protection (e.g., N-95 respirator) for entry to rooms of patients with infectious pulmonary or laryngeal <i>M. tuberculosis</i>, draining skin lesions with <i>M. tuberculosis</i>, SARS-CoV disease, smallpox, and viral hemorrhagic fevers

For more detailed information about infection control precautions, please see www.cdc.gov/ncidod/hip/isolat/isolat.htm.

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