GUIDELINES AND RECOMMENDATIONS

Interim Domestic Infection Control Precautions for Aerosol-Generating Procedures on Patients with Severe Acute Respiratory Syndrome (SARS)

Worldwide, several health-care workers (HCWs) have been reported to develop severe acute respiratory syndrome (SARS) after caring for patients with SARS. Multiple hospitals have reported cases among HCWs who were present during aerosol-generating procedures performed on patients with SARS, suggesting that aerosol-generating procedures may increase the risk of SARS transmission.

Procedures capable of stimulating cough and promoting the generation of aerosols include: administration of aerosolized medication treatment; diagnostic sputum induction; bronchoscopy; airway suctioning; endotracheal intubation; positive pressure ventilation via facemask (e.g.,BiPAP,CPAP), during which air may be forced out around the facemask; and high frequency oscillatory ventilation (HFOV). CDC is recommending healthcare facilities to review their strategies to protect HCWs during these procedures, including the use of personal protective equipment and safe work practices, and to alert HCWs performing such procedures that there may an be increased risk for transmission of SARS.

The following recommendations apply to the performance of aerosol-generating procedures in patients with suspect or probable SARS. These recommendations should be considered interim in nature, and may be revised as more information becomes available.

Limit opportunities for exposure.

- Limit the use of aerosol-generating procedures on SARS patients to those that are deemed medically necessary. Use clinically appropriate sedation during intubation and bronchoscopy to minimize resistance and coughing during the procedure.

- Limit the number of HCWs present in the room during an aerosol-generating procedure to those who are essential for patient care and support.

Perform aerosol-generating procedures in an airborne isolation environment

- If the patient is in an airborne isolation room, perform the procedure in that environment.

- If an airborne isolation room is not available, the procedure should be performed in a private room, away from other patients. If possible, steps should be taken to increase air exchanges, create a negative pressure relative to the adjacent room or hallway, and avoid recirculation of the room air. If recirculation of air from such rooms is unavoidable, the air should be passed 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. Doors should be kept closed except when entering or leaving the room, and entry and exit should be minimized during the procedure.

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Use of filters on ventilation exhaust valves.

- Some hospitals caring for SARS patients have used bacterial/viral filters on exhalation valves of mechanical ventilators to prevent contaminated aerosols from entering the environment. Although the effectiveness of this measure in reducing the risk of SARS transmission is unknown, the use of such filters may be prudent during HFOV of patients with SARS.

Wear personal protective equipment appropriate for standard, contact and airborne precautions with consideration for additional personal protection based on the potential for higher level of contact with respiratory secretions

The optimal combination of personal protective equipment (PPE) for preventing transmission of SARS during aerosol-generating procedures has not been determined. PPE must cover the arms and torso, and fully protect the eyes, nose and mouth; additional PPE to protect all exposed areas of skin should be considered. The following personal protective equipment is recommended for those present during aerosol-generating procedures on patients with SARS:

- Single isolation gown to protect the body and exposed areas of the arms. A disposable full-body isolation suit may be considered in this setting as it provides greater protection for the neck area; some suits also have an attached hood to cover the hair. Another alternative for providing full head, neck, face and respiratory protection is a disposable surgical hood with an attached face shield in combination with a disposable respirator. It is unknown whether covering exposed areas of skin or hair of the head and neck will further reduce the risk of transmission.

- A single pair of disposable gloves that provide a snug fit over the wrist.

- Eye protection consisting of goggles should be worn to protect the eyes from respiratory splash or spray. Goggles should fit snugly around the eyes.

- A face shield may be worn over goggles to protect exposed areas of the face but should not be used as a primary form of eye protection for these procedures.

- Respiratory protection for aerosol-generating procedures must ensure that HCWs are protected from exposure to aerosolized infectious droplets through breaches in respirator seal integrity. Healthcare facilities should consider the following options:

    - Disposable particulate respirators (e.g. N-95, N-99, or N-100) are sufficient for routine respiratory protection for airborne precautions and are the minimum level of respiratory protection for HCWs who are performing aerosol-generating procedures. To ensure adequate protection, HCWs must be fit-tested to the respirator model that they will wear (see TB Respiratory Protection Program In Health Care Facilities: Administrator's Guide - www.cdc.gov/niosh/99-143.html), and also know how to check their facepiece seal. A fit-check should be performed each time the respirator is put on, prior to entering the patient room. If disposable respirators cannot be fit-tested to the individual, a higher level of respiratory protection should be used.

    - Healthcare facilities in some SARS affected areas have used higher levels of respiratory protection for persons present during aerosol-generating procedures on SARS patients. Higher levels of respiratory protection include:

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- Powered air purifying respirator (PAPRs) designed with loose-fitting facepieces that form a partial seal with the face;
- PAPRs with hoods that completely cover the head and neck and may also cover portions of the shoulder and torso;
- PAPRs with tight-fitting facepieces (both half and full facepiece);
- Full facepiece elastomeric negative pressure (i.e. non-powered) respirators with N, R, or P100 filters.

At this time there is inadequate information to determine whether these higher levels of respiratory protection will further reduce transmission. Factors that should be considered in choosing respirators in this setting include availability, impact on mobility, comfort, (link to TB Respiratory Protection Program In Health Care Facilities: Administrator's Guide - www.cdc.gov/niosh/99-143.html), the potential for exposure to higher levels of aerosolized respiratory secretions, and the potential for reusable respirators to serve as fomites for transmission.

All HCWs offered respiratory protection must be included in a respiratory protection program that meets the minimum requirements of the OSHA Respiratory Protection Standard (29CFR1910.134) if within the United States, or other applicable requirements for workplaces outside the U.S.

Safe work practices

- HCWs must be careful to contain the area of contamination. Aerosol-generating procedures may produce high concentrations of virus in the air and on environmental surfaces. HCWs should avoid touching their face and personal protective equipment on their face with contaminated gloves. They also should avoid contaminating surfaces around the patient and room.
- HCWs should use care when removing personal protective equipment to avoid contaminating skin, clothing, and mucous membranes. Standard procedures for removal of personal protective equipment that minimize the potential for self-contamination should be developed based on the equipment used, and healthcare workers should be trained in these procedures.
- Hand hygiene should be performed following the removal of PPE and leaving the patient's room.

Decontaminating, cleaning, and disinfecting personal protective equipment and environmental surfaces

- A disinfectant should be available for decontaminating reusable personal protective equipment. Clean gloves should be worn when wiping surfaces of equipment to render them safe for handling. Manufacturer's guidelines for cleaning and disinfection of reusable protective equipment should be followed.
- Horizontal surfaces in the environment around the patient should be cleaned and disinfected as soon as possible following an aerosol-generating procedure. (www.cdc.gov/ncidod/sars/cleaningpatientenviro.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)

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