



SARS Infection Control and Exposure Management

Soju Chang, MD, MPH

Division of Healthcare Quality Promotion
National Center for Infectious Diseases
Centers for Disease Control and Prevention

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Infection Control and Hospital Epidemiology



- Source
 - Patient, healthcare personnel, visitors
- Host
 - Age, underlying diseases, corticosteroids, irradiation, etc
- Transmission
 - Contact
 - Droplet
 - Airborne
 - Common vehicle
 - Vectorborne

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Infection Control and Hospital Epidemiology



- Contact
 - Direct: body surface-to-body surface contact
 - Indirect: contact with a contaminated intermediate object, usually inanimate
- Droplet
 - Generated from the source person during coughing, sneezing, and talking, and during the performance of certain procedures such as suctioning and bronchoscopy

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Infection Control and Hospital Epidemiology



- Airborne
 - Dissemination of airborne droplet nuclei or dust particles
- Common vehicle
 - Contaminated items such as food, water, medications, and devices
- Vectorborne
 - Mosquitoes, flies, rats, etc.

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Isolation Precautions in Hospitals



- Administrative controls
 - Education
 - Adherence to precautions
- Standard precautions
- Contact precautions
- Droplet precautions
- Airborne precautions

Source: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>

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SARS Epidemiology



- Worldwide*
 - 7,053 cumulative cases
 - 506 deaths
- Taiwan*
 - 846 reported Cases
 - 131 probable Cases
 - 229 suspected Cases
 - 19 deaths

*As of May 8, 2003

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SARS Epidemiology



- Causative agent
 - Coronavirus
 - Highly infectious
- Incubation period
 - Median: 7 days
 - Range: 4 – 13 days
- Communicable period
 - Unknown
 - 67% of SARS patients with RT-PCR positive (stool) on day 21 after onset of symptoms*
- Organism survival in environment
 - Duration unknown

*JSM Peris et al, Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study. Available at <http://image.thelancet.com/extras/03art4432web.pdf>.

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SARS Epidemiology



- Modes of Transmission
 - Evidence of person to person transmission
 - Close contact with respiratory droplets
 - Possibly airborne transmission (inhalation of aerosols)
 - Aerosolized medication treatments, diagnostic sputum induction, bronchoscopy, airway suctioning, and endotracheal intubation
 - Contaminated hands, clothes, equipment may also be important

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USA SARS Case Classification



- Probable case
 - Clinical criteria for severe respiratory illness of unknown etiology with onset since February 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined
- Suspect case
 - Clinical criteria for moderate respiratory illness of unknown etiology with onset since February 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined

*As of April 30, 2003

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Impact of Information on Healthcare Personnel



- Fear of becoming infected
- Fear of spreading infection
 - ◆ Family/community
 - ◆ Other patients
 - ◆ Co-workers
- Uncertainty of how to protect self and others
- Strict and appropriate infection control precautions can protect all

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SARS Infection Control Goals



- Detect new cases
- Implement appropriate isolation measures
- Protect patients and healthcare personnel
- Protect family and community members

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Components of SARS Isolation



- Facility Characteristics
- Administrative Controls
- Organization of Isolation Area
- Protective Attire
- Hand Hygiene
- Cleaning and Disinfection
- Waste and Linen Handling
- Other Issues

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Facility Characteristics



- Removed from main hospital traffic
- Good ventilation
 - ◆ Air movement: corridor to room to outdoors
- Sinks and running water
- Adequate bathroom facilities
- Capacity to handle waste and laundry
- Sufficient rooms for expected patients

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Administrative Controls



- Limit and control points of entry to infected wards
 - ◆ One entrance
 - ◆ “Guard” to control entrance
 - ◆ Log of personnel and visitors

- Limit access to infected area
 - ◆ Minimize visitors
 - ◆ Limit patient travel/transport outside unit

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Administrative Controls



- Assignment of responsibility
 - ◆ Determining patient placement
 - ◆ Overseeing implementation and enforcement of infection control measures
 - ◆ Enforcing access restrictions
 - ◆ Supply acquisition and distribution
 - ◆ Surveillance for transmission

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Surveillance



- Maintain list of all staff who worked with SARS patients or on the SARS ward
 - ◆ Systematically monitor for SARS-like illness
- Screen for symptoms of SARS-like illness among staff reporting for duty
- Create a list of and contact information for persons visiting or caring for SARS patients

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Organization of Isolation Area



- Sign designating isolation area
 - ◆ Instructions for using protective attire
- Separation of clean and dirty supplies
- Designated area for clean protective attire
 - ◆ Accessible to personnel
 - ◆ Sufficient inventory to meet daily needs
- Designated area for containment of waste and soiled linen
 - ◆ Color-coded bags and containers for contaminated waste and laundry

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Protective Attire



- N-95 Masks
 - ◆ If not available, a surgical mask should be worn
- Goggles (protective glasses)/face shields
- Disposable or Reusable Gowns
- Disposable Gloves
- Head and/or shoe covers not required but may be used according to local preference

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Early Detection of New SARS Cases



- Think of SARS in patients with
 - ◆ Fever and/or respiratory symptoms
 - ◆ Exposure history
- Triage area
 - ◆ Signs and surgical masks at entrance
 - ◆ Masks for patients with respiratory symptoms
 - ◆ Segregate from other patients
 - ◆ Hand hygiene
 - ◆ If admission considered, notify infection control personnel immediately

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Interim SARS Infection Control for Outpatient Setting



- Education
- Surgical masks for patients with respiratory symptoms
- Separate the patient from others in reception area
- Wear N-95 respirators and eye protection or face shield while taking care of patients, hand hygiene, use of gown and gloves for contact with patients and their environment

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Interim SARS Infection Control for Inpatient Setting



- Education
- Standard and contact precautions (e.g., hand hygiene, use of gown and gloves for contact with the patient or their environment, use eye protection or face shield for exposure to splashes or sprays of blood, body fluids, secretions, and excretions)

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Interim SARS Infection Control for Inpatient Setting



- Airborne precautions (e.g., an isolation room with negative pressure and use of a N-95 filtering disposable respirator for persons entering room)
- Patient placement
 - ◆ Admit to a private room
 - ◆ May cohort patients

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Patient and Family Member Education



- Teach patients “source control”
 - ◆ Cover mouth when coughing
 - ◆ Expectorate into tissue, dispose in waste container
 - ◆ Wear mask when leaving unit
 - ★ Continuous use of mask may affect air exchange
- Teach visiting family members in use of mask, gown and hand hygiene

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Hand Hygiene



- Hand washing with soap and water; if hands are not visibly soiled, alcohol-based handrubs may be used as an alternative to hand washing
- Perform hand hygiene
 - ◆ Between tasks and procedures on same patient
 - ◆ Between patients
 - ◆ After contacting secretions, blood, body fluids, excretions and contaminated items
 - ◆ After removing gloves
 - ◆ Before leaving the isolation area or unit

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N-95 Masks for Respiratory Protection



- N95 offers higher filtration than surgical mask
- Fit mask securely over BOTH nose and mouth
- Use for single shift unless excess moisture necessitates replacement
 - ◆ Label with name
- Dispose with medical waste

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Proper Use of N-95 Masks



- Avoid touching front of mask
- Wear only one mask – no need for additional protection
- No need to wear mask outside of ward housing infected or suspect patients

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Goggles and Face Shields



- Assign to each worker at beginning of shift
- Wear when anticipate spray or splatter of respiratory secretions
 - ◆ e.g., suctioning, intubation, coughing, sneezing
- Returned to dirty area at end of shift
 - ★ To be cleaned and disinfected

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Gowns



- Gowns should be worn for direct patient contact
 - ◆ Intended for one patient contact
 - ◆ If necessary, may be reused during one shift
- Designate one or more gowns for each patient per day
 - ◆ Discard immediately if visibly contaminated
 - ◆ Hang gown with outside facing in when not in use
 - ◆ Discard at end of shift



Gloves



- Wear disposable gloves for contact with patients and their environment
- Dispose gloves after use
- Wash hands or perform hand hygiene after glove removal

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Disinfecting the Hospital Environment and Equipment



- All reusable patient items (eg, basins and bedpan) should be
 - ◆ Cleaned and disinfected before use on another patient
 - ◆ Take to dirty utility room for reprocessing
 - ◆ Personnel should at a minimum wear gloves when handling contaminated equipment

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Disinfecting the Hospital Environment and Equipment



- ◆ Immediate area around patients should be considered heavily contaminated
- ◆ Bedside table, bed stand, and accessible areas of bed and floors should be cleaned with a disinfectant daily
- ◆ Disinfect other surfaces if visibly soiled
- ◆ No need to perform disinfectant fogging

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Protecting the Hospital Environment



- Contain and dispose of infectious materials in waste containers
 - ◆ Put waste containers near entrance/exit to patient room
- Dedicate patient equipment when possible
- Clean and disinfect patient care equipment

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Disinfecting the Hospital Environment and Equipment



- Standard procedures and agents for cleaning and disinfection of environmental surfaces and patient care equipment should be used
- Use 1:100 Bleach solution to clean contaminated areas and inanimate objects

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Waste



- Clinical waste: all items from treatment areas
 - ◆ Soiled surgical dressings
 - ◆ Swabs
 - ◆ Face masks
 - ◆ Gowns
 - ◆ Other contaminated waste
- Collect waste in designated color-coded plastic bags for incineration

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Laundry



- Laundry and Linens
 - ◆ Placed in color-coded bags for transport
 - ◆ Do not sort laundry
 - ◆ As per standard procedures
 - ★ Staff placing linens and laundry in machine should wear protective attire
 - ◆ Standard detergents
 - ★ Bleach may be added if desired and compatible

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Other Issues



- Patient visits to other departments
 - ◆ Unit should have portable x-ray machine
 - ◆ When necessary, visit with no delay—call ahead
 - ◆ Patients
 - ★ Surgical mask and isolation gown for transport
 - ◆ Accompanying staff
 - ★ Gloves
 - ★ Gown
 - ★ N-95 mask

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Other Issues



- Transport –Ambulance
 - ◆ No dedicated ambulance needed
 - ◆ Mask patient
 - ◆ Transporters wear protective attire
 - ★ N-95 mask, disposable gown, goggles or face shield, gloves
- Disinfect ambulance after transport
 - ◆ Standard disinfectant or 1:100 dilution of bleach and water
 - ◆ After 30 minute contact time, rinse with clean water

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