PROVINCE OF BRITISH COLUMBIA

SARS Science Committee

Guidelines for the Acute Management of the patient with SARS in the Hospital Setting

May 7, 2003

Introduction:

The following document outlines the procedures for managing the patient admitted with probable or suspect SARS (as defined by Health Canada case definitions) and is intended for all acute care areas. These guidelines were initially developed by the Vancouver regional infection control interest group in conjunction with infection control representation from Fraser Valley Region, Children and Women's Hospital, British Columbia Chapter, Canadian Association of Medical Microbiologists (BCCAMM) and British Columbia Centres for Disease Control. Respiratory therapy, employee and occupational health were also represented. The document has since been revised by the Provincial SARS Science Committee. Recommendations are based on what is currently known on the transmissibility of the SARS agent, Health Canada guidelines and guidelines from other provinces and countries.

Transmission of the SARS agent: current knowledge

The primary route of disease acquisition has been close person-to-person contact via infectious droplets. Droplet transmission occurs when particles greater than 5 um in diameter are propelled short distances (less than one meter) through the air and are deposited on mucous membranes of individuals or on the immediate environment with subsequent accidental autoinoculation. Aerosol generation (smaller particles that remain suspended in air) under certain setting (e.g. use of humidified high flow oxygen and nebulization therapy) has also been implicated in disease acquisition. In addition, initial studies from Hong Kong reveal that the purported agent (a new type of coronavirus) may survive as long as 24 hours outside the body. Further studies are underway to address this crucial question.

Transmission of the SARS agent appears to have occurred in health care workers after close contact with symptomatic individuals prior to implementation of appropriate infection control precautions. In a few cases, however, the circumstances leading to disease acquisition have yet to be defined. Case-control studies are currently being conducted to clarify the circumstances under which disease is transmitted. Pending results of these studies, personal protective equipment appropriate for standard, contact and airborne precautions in addition to eye protection have been recommended for health care workers to prevent transmission. The following guidelines represent reasonable precautions to protect staff, visitors, and patients until the epidemiology of illness transmission is better characterized. It must be emphasized that these guidelines will be revised as new information becomes available and that communication of any document revisions to front-line staff is essential.

Air Supply:

1. The following three preferences for patient accommodation are ranked in descending order of preference;

a. Rooms should be negative pressure in relation to surrounding areas with a minimum of 6-9 air exchanges per hour. The air should be discharged outside of the building and away from intake ducts, or through a high efficiency filter if recirculated.

b. single patient rooms with bathroom and handwashing facilities in the room

c. cohort placement in an area with an independent air supply and exhaust system, and the door must be kept closed.

The patient's door must be kept closed at all times whether the patient is in the room or not.

2. HVAC personnel should be available 24/7 to adjust air supply and pressure as necessary. Negative pressure for each room or unit should be checked and documented prior to admission and then once weekly. Regular single patient rooms (i.e. non-negative pressure rooms) should be checked to ensure that they are neutral and not positive in relation to the corridor and that the air exchange is a minimum of 6-9 per hour. A simple smoke test is considered a sufficient check of the air flow relative to the corridor.

Assessment and Triage:

1. Each institution should have their own algorithms for screening, admitting and managing a suspect or probable SARS patient in the relevant clinical areas. Not all clinical areas will require the same level of personal protective equipment and an assessment of risk should be performed when evaluating the level of preventive measures required (See Appendix A).
2. Assessment of the patient presenting with SARS-like symptoms does not require a negative pressure room and patients may be assessed in their local Emergency Department. Ambulances should be directed to take patients to the nearest available Emergency for assessment rather than to any one particular institution.
3. The individual first meeting the patient must initially wear an N95 mask and protective eyewear until the reasons for admission are known and/or screening questions for risk factors for SARS have been completed. [If no risk factors for SARS are found, the mask and face shield may be removed]. A fluid resistant gown and gloves are optional and should be worn consistent with Standard or Routine Precautions. Hands must be washed or cleaned with alcohol hand rub before and after each patient contact. As noted in 1), certain clinical areas (e.g. outpatient departments) will not require personal protective equipment to be worn initially, however, barriers should be available for staff to use if warranted.
4. The Triage assessment area (e.g. booth) must be wiped down with a virucidal disinfectant (please check the label) after each respiratory case. The complete triage area must be cleaned by Building Services a minimum of twice daily and preferably twice per shift.

5. It is preferred, but not required, that Admitting staff be separated from patients by a plexiglass screen.

Patient Rooms:

1. Single rooms must be used for patient care.

2. All unnecessary items are to be removed from the room. This includes upholstered furniture, extra beds, tables and chairs.

3. Rooms should be stocked with supplies adequate to meet patient and nursing needs but should not be overstocked.

4. Sharing of equipment must be kept to a minimum. If equipment must be shared (e.g. pulse oximeters, dopplers) disinfection protocols must be written and approved by infection control.

5. Dedicated patient care equipment must be stored in the patient room and wiped down after each use with an appropriate virucidal disinfectant.

Staff Working with patients with SARS:

1. Staffing (RN, RT, housekeepers, etc..) should be adequate to meet the definite increase in work load that occurs with these patients.

2. Staff caring for patients with *probable* SARS should be told to monitor for symptoms on a daily basis before coming to work. This must include a daily temperature before coming to work. Staff who develop any symptoms should be instructed to stay at home and contact Employee Health. Upon arriving at work, staff should also have their temperature taken at the beginning of each shift and should be queried regarding symptoms. (see attached sheet). Monitoring should continue until ten days after their last contact with the patient.

3. To minimize the effect of fatigue on compliance with precautions, consideration should be given to shorter shifts and off unit breaks, etc…

4. Immunocompromised health care staff should be referred to Employee Health for assessment.

Visitors:

1. Visitors will be limited to one at a time and should be family members only. Immunocompromised individuals and children (or anyone who would have difficulty complying with precautions) are restricted from visiting. Exceptions can be made for compassionate reasons.

2. Visitors are to be educated on infection control techniques similar to staff.

3. Visitors are to sign in on the patient contact list and provide phone numbers.

4. Visitors will be told to self-monitor for fever greater than 38^0C and cough on a daily basis until ten days after their last contact with the patient. Visitors should be aware that they are to stay at home and notify their local Public Health if any symptoms develop.

5. Visitors on home isolation or quarantine are restricted from visiting.

Personal Protective Equipment:

The level of personal protective equipment (PPE) necessary to care for a patient with SARS is a matter of continued debate both locally and globally. Some of the recommendations noted below address concerns about accidental autoinoculation or decreasing bioburden (e.g. protective eyewear, hair covers and double gloving). Others sought to address health care workers' concerns re soilage or were instituted as one means of controlling traffic flow (e.g. scrub suits). It should be reemphasized that paramount to curtailing this infection is meticulous attention to hand hygiene and careful thought when removing potentially contaminated barriers. The following categories apply to the acutely ill patient with SARS. It should be noted that the level of personal protective equipment required will change as the patient's clinical condition improves. In these situations, an individual risk assessment should be performed and the appropriate barriers used as outlined in Appendix A.

1. *ICU Patients: All staff entering the room* (staff providing patient care, staff not providing direct care and visitors) of an ICU patient with SARS should wear a clean surgical scrub suit that will be laundered by the hospital (to be removed prior to leaving the ward after each shift). Upon entry to the room, the health care worker should be attired in fluid resistant gown, hair cover, double gloves, N95 or equivalent mask and protective eyewear. Booties are an optional item – it is recognized that there are some situations where soilage is a concern (e.g. diarrhea or vomitus), however, the low risk of contamination and the higher risk of injuries from falls preclude recommending their routine use.

   Non-ICU Patients: Staff providing direct care should wear a surgical scrub suit, N95 or equivalent mask, disposable hair cover, fluid resistant gown, double gloves and protective eyewear when entering the room. Visitors and health care staff not providing direct patient care (i.e. phlebotomy, x-ray technologists) must wear a fluid resistant gown, N95 or equivalent mask, protective eyewear , double gloves and hair cover.

   Note that eyeglasses are not a substitute for protective eyewear.

2. Upon entry into the patient room, two pairs of gloves are to be worn. The outer pair of gloves is to be removed after providing direct patient care and before touching other areas in the room.

3. The procedure for removing protective equipment on exit from the room may vary depending upon room configuration and the clinical circumstances. One general method suggested is as follows

   In the room:

   - Remove the outer pair of gloves (if still wearing)
   - Remove booties (if wearing) and place in garbage
   - Remove the inner pair of gloves
   - Remove gown and place in laundry hamper
   - Wash hands or use alcohol hand rub

- Exit the room.

Outside the room:

- Use alcohol hand rub or wash hands.
- Remove protective eyewear and discard if disposable. [if not disposable, clean with a virucidal disinfectant and wash hands or use alcohol hand rub prior to the next step]
- Remove mask by the straps, remove hair cover and discard both
- Wash hands or use alcohol handrub again

4. Masks must be used as consistent with Health Canada recommendations;
   - Filter particles one micron in size or larger
   - Have a 95% filter efficiency
   - Provide a tight facial seal (less than 10% leak).

Consistent with the application of droplet and contact precautions, masks should be discarded after each clinical encounter with a suspect or probable case. A risk assessment may be done as the patient's clinical status improves to determine when an N95 mask is no longer required and a surgical mask may be used (Appendix A).

Patient Care Activities:

1. Health care staff entering the room must be kept at an absolute minimum. This includes students, medical care teams and other personnel not essential to that patient's care. Repeated physical exams by various medical staff are discouraged unless clinically warranted (e.g. one physician should examine the patient while the rest of the medical team remains outside the room).

2. Tympanic temperature probes or disposable thermometers should be used where possible.

3. Bed linens should be changed in a manner that minimizes dust generation (i.e. gently roll sheets and place in linen hamper).

4. Minimize air turbulence when emptying linen and garbage bags.

5. Change patient wash basins, urinals, and bedpans after each use (these items should be bagged for processing in SSD where appropriate.)

6. Bedpans must NOT be cleaned using hoses or hoppers in patient rooms. If a bedpan decontaminator is used the bedpan must be bagged for transport and then processed immediately. If a bedpan decontaminator is not available, bedpans should be emptied in the toilet or hopper (in the patient's room or anteroom) and then for bagged for transportation to the Sterile Supply Division for decontamination.

7. No special handling of food trays is required. Food trays and menus should be delivered by the nursing staff. Trays may be picked up and processed by dietary staff using disposable gloves as consistent with routine practices.

Patient Transport within the Facility:

1. Patients should be confined to their rooms and movement outside of the room should be avoided. All procedures should be performed in the patient's room whenever possible.

2. Patients should be out of their rooms for essential procedures only. If this is necessary, the diagnostic area *must* be notified as to the patient's status *in advance*, advised on the proper protective gear, and the procedure booked as the last case of the day whenever possible. The transport route should avoid well-populated areas if possible and a dedicated patient elevator (i.e. with no other patients or visitors on it) should be used. Patients must be transported directly to the procedure room and not wait in common areas.

3. Patients must wear a mask (surgical preferred, N95 optional) while outside their rooms for transport or, if oxygen by mask is required, a Star Wars Mask with viral filters attached to the tubing reservoirs must be worn. Ventilated patients must have a viral filter on the exhalation tubing and an in-line suctioning system must be used (see Vancouver Hospital Respiratory Equipment and Procedures Infection Control guide for further details).

4. If unable to keep a mask on an infant, an incubator can be used for transportation.

Specimen Collection:

1. Nasopharyngeal swabs should be performed with the patient wearing a mask over their mouth during the procedure (the exception to this may be children where nasopharyngeal washings must be performed by experienced personnel).

2. Specimen containers must be wiped down with a virucidal agent prior to placement in a biohazard bag or container and transport.

3. Specimens for special microbiological diagnostic tests will only be processed after approval by the Medical Microbiologists.

Aerosol generating procedures:

1. Aerosol-generating procedures on patients with suspect or probable SARS should be avoided.

2. All aerosol generating procedures (e.g. bronchoscopy) must be performed using airborne and contact precautions including an isolation room with negative pressure relative to the surrounding area and use of N95 mask, protective eyewear, hair cover, fluid resistant gown and double gloves.

3. For further details on respiratory management, please refer to the Vancouver Hospital Respiratory Equipment and Procedures guide.

Cleaning Patient rooms:

1. Disposable cloths moistened with a virucidal agent are to be used and all touchable surfaces cleaned daily. This includes but is not limited to doors and door knobs, holders for alcohol hand rub, call bells, telephones, pulls for lights, handles of window blinds, chairs, bed rails, overbed tables, television controls, etc…

2. Bathrooms should also include all touched surfaces including mirrors, sink, handles, toilet paper holders, flush handles, toilets, light switches, etc…

3. Cleaning involves a new cloth cleaning solution, mop head and bucket for each room

    - Cleaning equipment and supplies are preferably stored within each room

    - A virucidal disinfectant solution should be changed between cleaning the room and cleaning the bathroom

    - Surfaces should be cleaned thoroughly with a moist disposable cloth and then recleaned with a second cloth using fresh disinfectant solution. Surfaces are then left to dry.

4. Upon discharge, a double cleaning of the room as described above is required for all surfaces. All equipment in the room that cannot be cleaned must be discarded. Drapes and curtains must be removed and laundered. Supplies will not be reused for other patients and will be either sent home with the patient or discarded. If a ventilator has been used, it must be disassembled in the room, all tubing and filters discarded, and the unit wiped down with disinfectant prior to removing from the room. (A complete guide to respiratory equipment and its cleaning is in a separate document).

Suggested reading/important links

http://www.sars.gc.ca

http://www.cdc.gov/ncidod/sars

http://www.bccdc/org

http://www.who.int/csr/sars/en

Appendix A: Proposed Hazard and Risk Priorities List
Severe Acute Respiratory Syndrome with clinical or radiological pneumonia
2003-05-06

The following table provides a guide to measure risk assessment and appropriate protective barriers when having contact with patients with "probable" SARS. It differs from the Health Canada *Infection Control Guidelines for Health Care Workers in Health Care Facilities and Other Institutional Settings* (Revised 2003-05-01) in that it integrates a probable decreasing level of risk of transmission as the patient slowly improves, presents with fewer aerosolizing behaviors, and requires fewer aerosolizing therapies.

Hospitalized patients with "suspect" SARS (patients with fever, respiratory symptoms, but without evidence of pneumonia) should be treated the same during the period of isolation.

Level	Hazard	N95 Required[4]	N95 NOT Required **(Surgical Mask Acc**	Gown	Gloves	Goggles, Safety Glasses, or Face Shield	Hand washing
High	Acute illness with potential aerosol formation by clinical behavior[1],	Yes	No	Yes	Yes	Yes	Yes
Medium	Stable or improving illness: afebrile for 10 days[5], with cough[6], or requiring nasal oxygen	No	Yes	Only if Direct Contact	Only if Direct Contact	Only if Direct Contact	Yes
Low	Stable improved illness; afebrile, and no cough	No Respirator or Mask		Standard Precautions apply	Standard Precautions apply	Not Required	Yes

1:	Coughing, sneezing, shouting, forceful vomiting, severe diarrhea
2:	Includes, but not limited to intubation, bronchoscopy, percussive therapy, cough induction
3:	Humidified oxygen, or nebulized pharmacotherapy
4:	If an N95 respirator is required, it must be fit tested
5:	A patient may be febrile due to a secondary infection and no longer be infectious for SARS.
6:	Respiratory protection (surgical mask) is standard practice in caring for any patient, whether known to be infectious or not, in the presence of aerosolizing procedure/behaviour

The table is provided for discussion for the BC SARS Science Committee and the BC SARS WCB-OHSAH Committee

- ➢ Clinical experience supports a reasonable hypothesis of reduced transmission risk for infectious diseases with increasing resolution of illness.
- ➢ Increased potential for aerosol formation with certain procedures and behaviors
- ➢ In the absence of large amounts of aerosol formation, transmission of infection is equal among workers wearing either surgical mask and N95 respirator (Seto, et al; 2003. The Lancet, 361: 1519-1520)
- ➢ The single most important infection control procedure to effectively reduce transmission of disease is handwashing either with soap and running water or with alcohol based antiseptic handwash or gel.