

Standard for all Ontario Health Care Facilities/Settings for High-Risk Respiratory Procedures under Non- Outbreak Conditions

April 15, 2004

These standards have been established in order to prevent the transmission of respiratory and other pathogens to workers in health care facilities/settings during respiratory procedures that generate droplets and aerosols. Health care providers will need to review these standards against existing practices and make changes as required.

THIS STANDARD:

<p><u>REPLACES:</u></p>	<p>NON-OUTBREAK SECTIONS OF: Directive to All Ontario Acute Care Facilities for High-Risk Respiratory Procedures (includes Non-Outbreak and Outbreak Conditions), October 22, 2003</p>
<p><u>APPLIES TO:</u></p>	<ul style="list-style-type: none"> ➤ All Health Care Facilities/Settings with ventilated patients or that perform high-risk procedures ➤ In this document the term “High-risk procedures” refers to High-risk aerosol-generating procedures: <ul style="list-style-type: none"> any procedure with the potential to generate aerosolized droplets, including, <u>but not limited to</u> nebulized therapy, endotracheal intubation, sputum induction, bronchoscopy, bag-valve mask ventilation, non-invasive ventilation (CPAP, BiPAP), and ventilation using high frequency oscillation. ➤ Non-Outbreak situations only. During outbreak conditions, as declared by the local Medical Officer of Health, or for treatment of confirmed, probable or suspect SARS patients at any time, refer to <i>Directive to All Ontario Health Care Facilities/Settings for High-Risk Aerosol-Generating Procedures Under Outbreak Conditions, HR04-13, 2004.</i>
<p><u>IS CONSISTENT WITH:</u></p>	<p>The underlying principles inherent in these Directives are consistent with <i>Preventing Respiratory Illnesses: Protecting Patients and Staff. Infection Control and Surveillance Standards for Febrile Respiratory Illness in Non-Outbreak Conditions in Acute Care Hospitals.</i></p>

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1 GENERAL CONSIDERATIONS

1.1 Principles

Procedures that generate droplets and aerosols can expose staff to respiratory pathogens and should be conducted using infection control practices designed to reduce exposure to respiratory secretions.

Protection must be undertaken for all procedures that have the potential to generate droplets or aerosols, such as:

- nebulized therapies,
- aerosol humidification,
- non-invasive ventilation (CPAP, BiPAP),
- use of bag-valve mask to ventilate a patient,
- endotracheal intubation,
- airway suctioning,
- sputum induction,
- tube or needle thoracostomy,
- bronchoscopy or other upper airway endoscopy,
- tracheostomy, and
- open thoracotomy.

The sole exceptions to this are procedures performed routinely on stable afebrile patients without new or worsening cough or shortness of breath, such as those who require routine tracheostomy care at home, or chronic or home use of non-invasive positive pressure ventilators, such as CPAP for sleep disorders.

A summary of the personal protective equipment required when caring for different types of patients is provided in Appendix 2.

1.2 Equipment

All crash carts must have personal protective equipment available including fluid resistant surgical/procedure masks, N95 respirators or equivalent masks, eye protection, gloves, gowns, head covering and face shields, available for use during high-risk procedures

Each unit or crash cart must also have, in addition to resuscitation equipment:

- a manual resuscitation bag with hydrophobic submicron filter,
- in-line suction catheters¹, and
- non-rebreather mask that allows filtration of exhaled gases (ideally a low flow high oxygen concentration mask² with hydrophobic submicron filter).

During outbreak and non-outbreak conditions, health care facilities/settings are strongly recommended to maintain a group of highly trained healthcare workers to function as an

¹ Note: if the patient is a small child then suctioning may be performed in the normal fashion.

² This refers to a special mask which concentrates oxygen using low flows, e.g. Hi-Ox®

intubation team for high risk patients with confirmed, probable or suspect SARS or airborne pathogens. This should include expertise in the use and maintenance of Personal Protective Systems (PPS). Equipment must be stored in a readily-accessible place.

1.3 Personal Protection

For procedures on patients with Febrile Respiratory Illness (FRI – see Appendix 1, Glossary of Terms), personnel not essential to the procedure should remain outside of the room; if attendance is necessary for non-medical reasons (e.g., presence of family members on compassionate grounds), persons must use personal protection identical to that worn by healthcare workers performing the procedure and be instructed in its use.

Protective equipment must be removed in such a way as to not contaminate the health care worker or others.

The following process is recommended to remove personal protective equipment (the process is dependent on the level of precautions in use):

- Remove gloves and discard using a glove-to-glove/skin-to-skin technique.
- Use alcohol hand rinse or, if available, a hand sink to wash hands.
- Remove gown (discard in linen hamper in a manner that minimizes air disturbance).

Just prior to leaving or immediately after leaving the room:

- Use alcohol hand rinse (or rewash hands).
- Remove face shield/fluid shield and eye protection and discard or place in clear plastic bag and send for decontamination as appropriate.
- Remove hair cover and discard.
- Use alcohol hand rinse again (or rewash hands).
- Remove N95 respirator or equivalent mask and discard.
- Use alcohol hand rinse again (or rewash hands).

1.4 Personnel

Personal protective equipment must be properly used, fit and maintained in a manner consistent with the Regulation for Health Care and Residential Facilities (Reg. 67/93 s.10) under the *Occupational Health and Safety Act*. Staff who require N95 respirators or equivalent masks must be fit-tested to ensure maximum mask effectiveness. (See NIOSH website at www.cdc.gov/niosh -Publication No.99-143, and Canadian Standards Association Z94.4-02 Selection, Use, and Care of Respirators, October 2002). Measures and procedures for worker protection and training must be developed in consultation with the facility and/employer's Joint Health and Safety Committee/Health and Safety Representatives.

All staff working in SARS units or with SARS patients must follow the *Directive Regarding the Application of Respiratory and Contact Precautions (Enhanced) with Patients with Febrile Respiratory Illness and SARS Contact History; Persons Under Investigation; SARS Patients; and SARS Units, (Directive RCPE03-01), October 22, 2003.*

Note: Because some aspects of this document represent a change from practices used during outbreak conditions (e.g. use of surgical masks instead of N95 respirators), it may take time for staff to understand the basis for the change, become comfortable with the new precautions and adopt new practices.

Staff **should have the option** of continuing to use the N95 respirator (fit-tested), but they should be discouraged from using other levels of precautions—particularly those that, if misused, increase the risk of exposure to FRI.

2 PERFORMING HIGH-RISK PROCEDURES FOR ALL PATIENTS WITH OR WITHOUT FEBRILE RESPIRATORY ILLNESS (FRI)

This includes:

- **Patients with sudden cardio respiratory arrest or compromise that is not related to FRI**
- **NOTE: for patients with confirmed, probable or suspect SARS, refer to section 3 in Directive to All Ontario Health Care Facilities/Settings for High-Risk Aerosol-Generating Procedures Under Outbreak Conditions, HR04-13, 2004**

2.1 Principles

- High-risk procedures (see Appendix 2) for all patients (with or without known fever and respiratory symptoms) must be performed while wearing gloves, a fluid resistant surgical mask and eye protection because of the high risk of contact with respiratory secretions.
- Ideally, in patients **with FRI**, high risk procedures should be performed as outlined below:
 - in a private room, if possible with negative pressure; if not available, the procedure must be done if at all possible in a private room with the door closed; if performed in an area where patients cannot be isolated, such as a resuscitation area, curtains must be drawn and all non-essential persons must be at least 1 metre from the patient; an adjacent area should be used for decontamination.
 - by the most experienced available staff,
 - with minimum number of staff
- Patients who present with potential severe respiratory illness due to exposures/contacts (i.e. answer yes to questions i, ii and iii of the Febrile Respiratory Illness Screener, Appendix 3) should be managed using respiratory and contact precautions (enhanced) (see Appendix 1 – Glossary of Terms).

2.2 Personal Protection

Due to the nature of high-risk procedures, health care workers must wear at minimum, a fluid resistant surgical mask and eye protection because of the high risk of contact with respiratory secretions. Gowns are to be worn if contamination of uniform or clothing is anticipated. Careful hand hygiene must be practiced.

2.3 High-risk Procedures in patients with Febrile Respiratory Illness

2.3.1 Intubation, bronchoscopy and sputum induction

Personal Protection:

- Those on the intubation team and all staff in the room must use personal protection as outlined in section 2.2 above. For sputum induction procedures, an N95 respirator (fit tested) must be used (see Appendix 2).

Personnel:

- The procedure shall be performed by the most experienced staff members available. The number of persons in the room should be kept to a maximum of 4.

Procedure:

- The procedure must be done if at all possible in a private room (negative pressure essential for sputum induction, preferred for other procedures) with the door closed. If performed in an area where patients cannot be isolated, such as a resuscitation area, curtains must be drawn and all non-essential persons must be at least 1 metre from the patient. An adjacent area should be used for decontamination.
- If high concentrations of oxygen are required, a non-rebreather mask that allows filtration of exhaled gases (e.g., low flow high oxygen concentration mask³ with hydrophobic submicron filter) should be used.
- The intubation should be done in a manner which minimizes aerosolization of droplets. If the medical condition permits, consider sedation with or without paralysis.
- The ventilator and in-line suction device shall be in the patient room in advance of intubation, if at all possible, to reduce time needed for bag ventilation and disconnecting bag from the endotracheal tube suctioning.
- Minimize staff exposure by limiting staff re-entry to the room until the room has been cleaned. Ensure all equipment is properly cleaned inside the room after use and prior to transport out of the room.

Cleaning:

- Excess medications must be discarded at the end of the procedure.
- Immediate clean up of room and equipment must be done in such a way as to reduce the re-release of droplets. Staff performing the clean up must use personal protection as outlined in section 2.2 above.
- Staff performing the procedure must ensure that contaminated equipment and surfaces are discarded/disinfected and cleaned before leaving the room.
- Potentially contaminated surfaces in the room must be wiped with a hospital-approved disinfectant.

2.3.2 Mechanical Ventilation

Note: Infectious respiratory secretions from these patients may contaminate respiratory equipment and be expelled into the surrounding environment

Personal Protection:

- Personnel caring for patients with FRI on mechanical ventilators operating in a closed system may use routine practices. If the integrity of the closed system is breached (for example, for open suctioning through an endotracheal tube), staff in the room must use personal protection as outlined in section 2.2 above.

³ This refers to a special mask which concentrates oxygen using low flows, eg. Hi-Ox®

Ventilators:

- If possible, ventilators with built in hydrophobic submicron filters in the expiratory circuit should be used. If this is not possible, a disposable filter must be placed in the expiratory circuit of the ventilator. Filters must be changed when fluid build-up impedes ventilation.
- Disposal of filters is a high-risk exposure and staff must protect themselves using droplet precautions.
- Disposable filters and disposable ventilator circuits must be bagged, sealed, and then placed in a biohazardous bag for disposal.
- Heated wire circuits should be used on both the inspiratory and expiratory limbs of the ventilator circuit. In some cases, the use of heated dual wire circuits will not reduce the amount of condensation within the circuit (therefore necessitating more circuit disconnects). In this situation the use of a Heat Moisture Exchanger (HME) or HME/filter may be preferable.
- A water trap/filter combination should be placed at the end of the expiratory circuit in an effort to decrease the frequency of filter changes.

Manual Resuscitation Bags:

- A hydrophobic submicron filter must be placed between the endotracheal tube and the bag or on the expiratory exhaust component of the bag.
- Equipment used for manual ventilation must be fully cleaned or disposed of after use.
- Cleaning and disposal of bags and filters are high-risk exposures and staff must protect themselves using droplet precautions.
- Equipment must be bagged, sealed, and then placed in a biohazardous bag for cleaning or disposal.

3 RESOURCES

SARS Information

- Ontario: <http://www.health.gov.on.ca>
- Health Canada – www.sars.gc.ca
- U.S. Centers for Disease Control - www.cdc.gov/
- World Health Organization - www.who.int/csr/sars/en/

Infection Control

- Health Canada – Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care; Recommendations for Ambulatory Care – www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc/99vol25/25s4/index.html
- College of Physicians and Surgeons of Ontario – Infection Control in the Physician's Office – www.cpso.on.ca/publications/infect.htm.

Situation Reports

A list of areas with recent local transmission of SARS is available from:

- World Health Organization at www.who.int/csr/sarsareas

- Health Canada at www.sars.gc.ca
- Ontario Ministry of Health and Long-Term Care at:
www.health.gov.on.ca/english/providers/program/pubhealth/sars/sars_mn.html

4 LIST OF APPENDICES

Appendix 1: Glossary of Terms

Appendix 2: High Risk Respiratory Procedures Personal Protective Equipment

Appendix 3: Screening Questions

APPENDIX 1 - GLOSSARY OF TERMS

Aerosolization: The process of creating very small droplets (droplet nuclei) of moisture that may carry microorganisms. The aerosolized droplets can be light enough to remain suspended in the air for short periods of time and facilitate inhalation of the microorganisms.

Cluster: a grouping of cases of a disease (e.g., respiratory illness indicative of SARS) within a specific time frame and geographic location suggesting a possible association between the cases with respect to transmission.

Droplet Precautions: (see also Routine Practices) The use of surgical or procedure masks and eye protection or face shields for patients who have respiratory infections especially if associated with coughing, sneezing, felt to be transmissible principally by large respiratory droplets particularly when within 1 meter of such a patient. Also used where appropriate to protect the mucous membranes of the eyes, nose and mouth during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions (e.g., air way suctioning).

Febrile Respiratory Illness (FRI): temperature greater than 38⁰C and new or worsening cough or shortness of breath. During non-outbreak conditions this includes a fever of greater than 38⁰C **and** new or worsening cough or shortness of breath to increase the specificity of this designation. During outbreak conditions, to maximize the sensitivity to potential SARS infection, this includes a fever of greater than 38⁰C **or** new or worsening cough or shortness of breath. The context in which FRI is determined must take the outbreak vs. non-outbreak conditions into account.

Health Care Facility/Setting: a location where ill people are examined and assessed by health care workers and/or provided with direct health care services. Locations may range from private physician offices, ambulatory clinics or diagnostic facilities, hospitals, long-term care facilities, and peoples' homes.

High-Risk Aerosol-generating Procedure: any procedure with the potential to generate aerosolized droplets, including, but not limited to nebulized therapy, endotracheal intubation, bronchoscopy, bag-valve mask ventilation, non-invasive ventilation (CPAP, BiPAP), and ventilation using high frequency oscillation.

Non-Outbreak: Levels 0-3 of the Regional Response Levels Outbreak definition which describes seven levels of outbreak.

Reference: Regional SARS Response Levels and Paradigm appended to Infection Control Guidelines

Outbreak: For the purposes of SARS activity, an *outbreak* is defined as local transmission of SARS. This represents Level IV of the Regional Response Levels Outbreak definition which describes seven levels of outbreak. The local Medical Officer of Health is responsible for declaring a SARS outbreak. An outbreak may be setting-specific (e.g., a hospital with transmission) or health unit wide (e.g. transmission in more than one setting or significant community exposure). In declaring an outbreak the local Medical Officer of Health takes into

account global and neighbouring jurisdiction conditions and the potential impact of those conditions.

Reference: Regional SARS Response Levels and Paradigm appended to Infection Control Guidelines

Personal Protective Equipment (PPE): includes N95 respirator or equivalent mask, eye protection, gloves and gowns if contamination of clothing could be anticipated.

Personal Protective System (PPS): a full body suit or equivalent protective apparatus consisting of head, face and neck protection with or without enclosed body protection; or a powered air purifying respirator (PAPR).

Respiratory and Contact Precautions (RCP): infection control procedures for institutional and community-based settings with the intent of protecting the health care worker from SARS.

1. Common Elements for both institutional and community-based settings:

A. Personal protective equipment, (PPE):

- Staff to use an N95 respirator or equivalent mask, eye protection, gown, and gloves.
- Remove PPE after there is no further contact with the patient/client in the following order: Remove gloves, clean hands, remove gown, clean hands, remove eye protection and finally the N95 respirator or equivalent mask. Wash hands carefully after removing the final PPE. Avoid touching other objects or people until after removing PPE and washing hands.
- Disinfect non-disposable equipment (e.g.: stethoscope, testing items) and anything the client used or touched before it is used for others.
- When the patient leaves the examining room it should be cleaned with a hospital grade disinfectant.

B. Patient Management:

- Isolate the patient/client immediately from other patients/clients and staff.
- Whenever the patient/client is in a public setting (e.g., in the hallway, or waiting room), in the same room with others, and during transport, the patient/client must wear a surgical mask, unless medically contraindicated.
- Limit visitation to the symptomatic patient/client except for essential or compassionate reasons. Visitors should wear PPE.

2. For Institutional Settings:

Patient Accommodation for Hospitals: Patients are to be placed as follows (in order of decreasing preference):

1. Single room with negative pressure ventilation, with at least 6 air exchanges per hour or 12 air exchanges if the building is a new facility, as per Canadian Standards Association, Sept 2001 (highest preference)
2. Single room with HEPA filtration unit which achieves at least 9 air exchanges per hour

3. Single room, with no special air handling
4. Semi-private room, cohorted with patients with similar SARS risk factors and/or symptoms or diagnosis

3. For Community-Based Settings:

Includes physician's offices, community health practice settings, non-acute care facilities, and home and community care:

- Physician, or nurse/nurse practitioner, if present, to assess the patient
- If SARS is possible, or if hospitalization is required, arrange for the patient/client to be taken to an Emergency Department for evaluation (call ahead)
- Transportation for medical examination must be by private vehicle or medical transport with the patient/client wearing a surgical mask during transport.
- Contact the local public health unit, as appropriate

Respiratory and Contact Precautions (Enhanced) (RCP[E]): an enhanced form of infection control procedures, which require the following in addition to procedures under Respiratory and Contact Precautions:

A. Personal Protective Equipment: also includes a full face shield and hair covering

B. Patient accommodation in hospitals: patients assessed to be at risk for having SARS, based on the SARS Risk Management Algorithms, have priority for the highest level of accommodation

Respiratory Symptoms: new or worse cough (onset within 7 days) OR new or worse shortness of breath (worse than what is normal for the patient).

Routine Practices (See also "Droplet precautions"): The Health Canada term to describe the system of infection prevention recommended in Canada to prevent transmission of infections in health care settings. These practices describe prevention strategies to be used with all patients during all patient care, and include:

- Hand washing or cleansing with an alcohol-based sanitizer before and after any direct contact with a patient.
- The use of additional barrier precautions to prevent health care worker contact with a patient's blood and body fluids, non intact skin or mucous membranes.
 - Gloves are to be worn when there is a risk of body fluid contact with hands; gloves should be used as an additional measure, not as a substitute for hand washing.
 - Gowns are to be worn if contamination of uniform or clothing is anticipated.
 - The wearing of masks and eye protection or face shields where appropriate to protect the mucous membranes of the eyes, nose and mouth during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

The full description of routine practices to prevent transmission of nosocomial pathogens can be found on the Health Canada website:
(http://www.hc-sc.gc.ca/pphb-dgspsp/dpg_e.html#infection).

APPENDIX 2 - HIGH RISK RESPIRATORY PROCEDURES PERSONAL PROTECTIVE EQUIPMENT

	PPE (non outbreak)	Code Blue (non outbreak)	Comments
Patients without febrile respiratory illness (FRI)	surgical mask, eye protection, gloves	surgical mask, eye protection, gloves	Gowns to be worn if contamination of uniform or clothing is anticipated.
Patients with FRI	surgical mask, (N95 for sputum induction) eye protection, gloves	surgical mask, eye protection, gloves	Requires private room (negative pressure room essential for sputum induction, preferred otherwise), or, if in resuscitation area, no non protected people within one (1) metre.
Patients with potential SRI due to exposures /contacts (question iii in Febrile Respiratory Illness Screener)	Respiratory and Contact Precautions (enhanced)*	Respiratory and Contact Precautions (enhanced)*	Requires private room (negative pressure room preferred), or, if in resuscitation area, no non protected people within one (1) metre, and area set aside for donning and removing PPE.
Confirmed probable or suspect SARS patient(s) (non-outbreak)	Respiratory and Contact Precautions (enhanced) or Personal Protective System*	Protected Code Blue with PPS	Requires negative pressure room, or if in resuscitation area, no non protected people within two (2) metres, and area set aside for donning and removing PPS.

* refer to Glossary of Terms, Appendix 1

APPENDIX 3 – FEBRILE RESPIRATORY ILLNESS SCREENER

Screening Questions to be asked of Residents/Patients as Part of an Active Screening Process

i Do you have new/ worse cough or shortness of breath?

- if 'no', stop here (no further questions)
- if 'yes', continue with next question:

ii Are you feeling feverish, have you had shakes or chills in the last 24 hours?

In the long-term care sector, ask if there is an abnormal temperature

- if 'no', take temperature; if >38 C, continue with next questions, otherwise stop (no further questions)
- if yes, take temperature and continue with next questions:

Initiate droplet precaution if yes to i and ii.

iii Is any of the following true?

- Have you lived in, traveled to or visited a high risk area within the last 30 days?
- Have you had contact in the last 30 days with a sick person who has traveled to a high risk area?

Residents/Patients with FRI (fever and respiratory symptoms) and 'yes' to any of these exposures/conditions are potentially severe respiratory illness (SRI).

*Initiate droplet precautions and notify infection control if "yes" to i, ii and iii..
Infection control practitioner to notify public health.*

Additional questions to be asked of all admitted patients:

iv. Do you work for a health care agency or organization? If so, which one(s)

**v. Are/were you a resident of a long-term care institution? If so, which one(s)
(Not to be asked within a long-term care setting.)**

Initiate droplet precautions and notify infection control practitioner if "yes" to i, ii and either iv or v.