

## Severe Acute Respiratory Infection (SARI) and Emerging Respiratory Pathogens



Public Health Branch

This protocol provides recommendations for severe acute respiratory infection (SARI) before a specific pathogen has been identified (i.e. unknown respiratory pathogen). Refer to case definition below for details. This protocol is also intended to be used for any severe emerging respiratory pathogen if there is no disease specific protocol for the pathogen. For specific respiratory pathogens, refer to the Communicable Disease Control website

<http://www.gov.mb.ca/health/publichealth/cdc/protocol/index.html>

### Initial Management:

**When *patients* who report fever and severe respiratory illness (refer to definitions below) present to the hospital for medical attention, the following should occur:**

- The person doing the patient assessment should follow Routine Practices which includes respiratory hygiene/cough etiquette. Refer to the Manitoba Health, Seniors and Active Living document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.
- Implement Additional Precautions according to the Manitoba Health, Seniors and Active Living document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.
- If Additional Precautions are unable to be implemented, ensure the patient is separated by at least two metres from others. One metre may be sufficient for young children and others whose cough is not forceful enough to propel the droplets

as far as two metres.

## 1. Case Definition

### 1. Case Definition:

#### 1.1 SARI case (A):

**A person admitted to the hospital with the following:**

#### I. Respiratory symptoms, i. e.

- Fever<sup>1</sup> (over 38°C) AND new onset of (or exacerbation of chronic) cough or breathing difficulty

**AND**

#### II. Evidence of severe illness progression, i.e.

- Either radiographic evidence of infiltrates consistent with pneumonia, or a diagnosis of acute respiratory distress syndrome (ARDS) or severe ILI<sup>2</sup>

**AND**

#### III. Either admission to the ICU/other area of the hospital where critically ill patients are cared for OR mechanical ventilation

**AND**

#### IV. No alternate diagnosis within the first 72 hours of hospitalization, i.e.

- Results of preliminary clinical and/or laboratory investigations, within the first 72 hours of hospitalization, cannot ascertain a diagnosis that reasonably explains the illness.

**AND**

<sup>1</sup> As per the influenza-like illness (ILI) definition, fever may not be prominent in patients under 5 years or 65 years and older as well as in immunosuppressed individuals. Failure to take temperature should not rule out a history of self-reported fever. Clinical judgment should always prevail with regard to these groups (1).

<sup>2</sup> Severe ILI: In addition to the symptoms of ILI, severe ILI may include complications such as encephalitis, myocarditis or other severe and life-threatening complications (1).

## V. One or more of the following exposures/conditions:

- Residence, recent travel (within  $\leq 14$  days of illness onset) to a country where human cases of novel influenza virus or other emerging/re-emerging respiratory pathogens have recently been detected or are known to be circulating in animals<sup>3</sup>.
- Close contact<sup>4</sup> with an ill person who has been to an affected area/site within 14 days prior to onset of symptoms.
- Exposure to settings in which there have been mass die-offs or illness in domestic poultry or swine in the previous six weeks.
- Exposure involving direct health care, laboratory or animal exposure:
  - **Health care exposure** involving health care workers who work in an environment where patients with severe acute respiratory infections are being cared for, particularly patients requiring intensive care;
  - OR**
  - **Laboratory exposure** in a person who works directly with laboratory biological specimens or animals;
  - OR**
  - **Animal exposure:**
    - Poultry/swine farm worker
    - Poultry/swine processing plant worker
    - Poultry/swine culler (catching, bagging, transporting, or disposing of dead birds/swine)
    - Recent exposure to a live animal market
    - Dealer or trader of pet birds, pigs or other potentially affected animals
    - Chef working with live or recently killed domestic poultry, swine or other potentially affected animals
    - History of contact with camels or consumption of raw camel milk/urine
    - Veterinarian or veterinary technologist
    - Public health inspector/regulator (1).

<sup>3</sup> Refer to the World Health Organization Human Animal Interface for the most recent information [http://www.who.int/influenza/human\\_animal\\_interface/en/](http://www.who.int/influenza/human_animal_interface/en/).

<sup>4</sup> Close contact is defined as: Anyone who provided care for the patient, including a health care worker or family member, or who had other similarly close physical contact; anyone who stayed at the same place (e.g., lived with, visited) as a probable or confirmed case while the case was ill (1).

## 1.2 SARI Case (B):

### A deceased person with the following:

#### I. A history of respiratory symptoms, i.e.

- History of unexplained acute respiratory illness (including fever, and new onset of {or exacerbation of chronic} cough or breathing difficulty) resulting in death
- AND**

#### II. Autopsy performed with findings consistent with SARI, i.e.

- Autopsy findings consistent with the pathology of ARDS without an identifiable cause
- AND**

#### III. No alternate diagnosis that reasonably explains the illness

AND

IV. One or more of exposures/conditions, as listed above under SARI Case (A)-V(1).

## 2. Reporting and Other Requirements

### Health Care Professional:

- Infection Prevention and Control should be notified.
- A person meeting the SARI case definition must be reported by telephone immediately to the Public Health Surveillance Unit at 204-788-6736 during regular business hours (Monday to Friday 8:30 am to 4:30 pm). After regular business hours, the case should be reported to the Medical Officer of Health on call (204-788-8666). In addition, the Clinical Notification of Reportable Diseases and Conditions form [http://www.gov.mb.ca/health/publichealth/cdc/protocol/mhsu\\_0013.pdf](http://www.gov.mb.ca/health/publichealth/cdc/protocol/mhsu_0013.pdf) should be completed and faxed by secure fax (204-948-3044) to the Surveillance Unit.
- If the etiologic agent (when it is known) is a reportable disease (refer to Schedule B in the Reporting of Diseases and Conditions Regulation [http://web2.gov.mb.ca/laws/regs/current/\\_pdf-regs.php?reg=37/2009](http://web2.gov.mb.ca/laws/regs/current/_pdf-regs.php?reg=37/2009)), the reporting requirements found in the disease specific protocol should be followed (refer to the Communicable Disease Protocol Manual <http://www.gov.mb.ca/health/publichealth/cdc/protocol/index.html>).
- If an etiologic agent is identified in a person with severe respiratory illness that is not listed in Schedule B in the Reporting of Diseases and Conditions Regulation, but is believed to be an emerging respiratory pathogen, it should be reported by phone immediately to the

regional Medical Officer of Health (after hours call the MOH on call 204-788-8666). In addition to telephone reporting, the Clinical Notification of Reportable Diseases and Conditions form [http://www.gov.mb.ca/health/publichealth/cdc/protocol/mhsu\\_0013.pdf](http://www.gov.mb.ca/health/publichealth/cdc/protocol/mhsu_0013.pdf) should be completed and faxed by secure fax (204-948-3044) to the Surveillance Unit.

- Refer to the Communicable Disease Control website <http://www.gov.mb.ca/health/publichealth/cdc/index.html> for current information and reporting requirements on emerging and re-emerging respiratory pathogens.

### Laboratory:

- If the etiologic agent is a reportable disease under the Reporting of Diseases and Conditions Regulation [http://web2.gov.mb.ca/laws/regs/current/\\_pdf-regs.php?reg=37/2009](http://web2.gov.mb.ca/laws/regs/current/_pdf-regs.php?reg=37/2009) (refer to Schedule B), positive laboratory results must be reported to the Public Health Surveillance Unit as per the disease specific protocol (refer to the Communicable Disease Protocol Manual <http://www.gov.mb.ca/health/publichealth/cdc/protocol/index.html>).
- If the etiologic agent is not listed in Schedule B in the Reporting of Diseases and Conditions Regulation, but is believed to be an emerging respiratory pathogen, it should be reported by phone immediately to the regional Medical Officer of Health (after hours call the MOH on call 204-788-8666) as well as through the standard fax reporting.
- All specimens with suspected novel respiratory pathogens must be forwarded to the National Microbiology Laboratory (NML) for confirmatory testing.

## **Regional Public Health/First Nations Inuit Health Branch (FNIHB):**

- Once the case has been referred to Regional Public Health/FNIHB, the Emerging Respiratory Pathogens and Severe Acute Respiratory Infection (SARI) Case Report Form [http://www.gov.mb.ca/health/publichealth/surveillance/docs/mhsu\\_7274.pdf](http://www.gov.mb.ca/health/publichealth/surveillance/docs/mhsu_7274.pdf) should be completed and faxed by secure fax (204-948-3044) to the Surveillance Unit.

## **3. Clinical Presentation/Natural History**

SARI is defined primarily by clinical, radiological and/or histopathological evidence of pulmonary parenchymal disease (e.g., pneumonia, pneumonitis, or Acute Respiratory Distress Syndrome [ARDS]), typically associated with the need for hospitalization, intensive care unit management and/or other severity marker (such as death) (2). Atypical presentations may occur in the presence of immunosuppression or other comorbidity (2).

## **4. Etiology**

There are numerous pathogens that may cause SARI, including but not limited to novel influenza viruses and coronaviruses. Examples of other etiologies causing SARI that may not be identified within 72 hours of hospital admission include *Mycoplasma pneumoniae* and *Chlamydothila pneumoniae*.

## **5. Epidemiology**

### **5.1 Reservoir:**

The reservoir varies depending on the pathogen.

### **5.2 Transmission:**

Transmission route varies depending on the organism and could be airborne, droplet or through direct or indirect contact with humans or animals. There may be multiple modes of transmission for a single organism.

### **5.3 Occurrence:**

Occurrence of SARI is highly variable depending on the pathogen and mode of transmission. Pathogens with sustained human-to-human transmission will have higher case counts than those where only sporadic human-to-human transmission is observed. Visit the Global Alert and Response website: <http://www.who.int/csr/don/en/> for the latest updates on cases of circulating respiratory pathogens.

### **5.4 Incubation Period:**

The incubation period varies depending on the specific pathogen and the inoculum.

### **5.5 Risk Factors:**

Risk factors for SARI vary according to the causative agent. The risk will also vary according to the type and duration of exposure, as well as the inoculum. In general, people who have occupational or travel exposure are at greater risk of acquiring SARI. People who are elderly or immunocompromised will generally have more severe illness if they are infected.

### **5.6 Period of Communicability:**

Communicability varies with specific disease agent and is often not well defined. Not all causative organisms of SARI are capable of human-to-human transmission.

## **6. Laboratory Diagnosis**

In patients with no epidemiological risk factors for unusual or emerging pathogens, common pathogens should be ruled out first. Refer to the

*Protocol for Microbiological Investigations of Severe Acute Respiratory Infections (SARI)* at: <http://www.phac-aspc.gc.ca/eri-ire/proto-sari-iras-eng.php>.

Testing for novel respiratory pathogens (e.g., avian influenza A (H7N9) and Middle East Respiratory Syndrome - Coronavirus) in Canada should be initiated only after a risk assessment by the clinical or infectious diseases specialist in consultation with the medical officer of health and microbiologist (3). If a novel respiratory pathogen is suspected based on patient interview (e.g., recent travel to an area experiencing an outbreak of a novel respiratory pathogen), the Cadham Provincial Laboratory (CPL) physician on call (204-787-2071) should be consulted to provide advice on appropriate specimen collection and to prepare for the incoming specimen. When submitting samples for diagnostic testing, clearly write “suspected novel respiratory pathogen” and call CPL (204-945-6123) to alert them that the sample has been sent. Follow *Interim Guidance – Avian Influenza A (H7N9) Virus – Infection Prevention and Control Guidance for Acute Care Settings* <http://www.phac-aspc.gc.ca/eri-ire/h7n9/guidance-directives/h7n9-ig-dp-eng.php> when collecting respiratory specimens (4).

Limited evidence suggests that upper airway (nasopharyngeal [NP] or throat) swabs for diagnosis may not be as sensitive as lower respiratory specimens for SARI (4). If an NP swab tests negative for the suspected pathogen, consider retesting using lower respiratory specimens such as sputum, endotracheal aspirate, or bronchoalveolar lavage where relevant and clinically indicated (4).

Co-infection can occur. Identification of one causative agent (e.g., *Streptococcus pneumoniae*, *Haemophilus influenzae B*, *Legionella pneumophila* or respiratory viruses) should not exclude consideration of a novel respiratory pathogen when the index of suspicion is high (4).

Other laboratory investigations should be conducted according to local guidance for diagnosis and management of community-acquired pneumonia inclusive of other potentially more likely etiologies (3).

## 7. Key Investigations for Public Health Response

- Precautionary public health response (e.g., isolation of patient, contact tracing and monitoring) may need to begin before laboratory test results are available for the suspected pathogen where the index of suspicion is high (3).
- The patient and/or family members (if the patient is too ill to be interviewed or has died) should be interviewed within the first 24-48 hours of the investigation to collect basic demographic, clinical, and epidemiological information (3).

## 8. Control

### 8.1 Management of SARI Cases:

- Persons meeting the case definition for SARI are managed in the hospital. Refer to Canadian Critical Care Society’s *Guidance for Management of Severe Acute Respiratory Infection in the Intensive Care Unit* <http://www.canadiancriticalcare.org/website/Guidelines/CCCS%20SARI%20guidance%20January%202014.pdf>.
- For emerging respiratory pathogens, refer also to the Communicable Disease Control website <http://www.gov.mb.ca/health/publichealth/cdc/index.html> for current information on the management of specific diseases.
- **Infection Prevention and Control:** Contact and Droplet Precautions should be added to Routine Practices when providing care to patients with symptoms

of acute respiratory infection. Regional health authorities may choose more enhanced precautions depending on local protocols. Precautions for Aerosol Generating Medical Procedures (AGMPs) should be added if there is an emerging respiratory infection of unknown origin. Refer to the Manitoba Health, Seniors and Active Living document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* available at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf> .

## 8.2 Management of Close Contacts:

Management of close contacts will be dictated by the nature of the causative agent once it is known. Disease specific protocols should be referred to for reportable organisms once they are identified <http://www.gov.mb.ca/health/publichealth/cdc/protocol/index.html> .

For emerging respiratory pathogens, refer to the Communicable Disease Control website <http://www.gov.mb.ca/health/publichealth/cdc/index.html> for current information on contact management of specific diseases.

## 8.3 Preventive Measures

- Avoid travelling to areas where there are known ongoing outbreaks of SARI.
- Consult travel medicine clinics prior to travel to ensure appropriate immunizations are up to date for the travel destination.
- Avoid contact with wild or domestic animals and fowl especially if they are sick or dead (5). If there is contact with animals, regular hand washing is recommended before and after touching animals (5).
- Always practice good hand hygiene and respiratory hygiene/cough etiquette. Travellers should wash their hands often

with soap and water (5) or use hand sanitizers regularly.

- Follow good food safety and good food hygiene practices (5).
- Adhere to recommended infection prevention and control practices in health care facilities.

## References

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2. Public Health Agency of Canada. National Interim Case Definition: Avian Influenza A (H7N9) Virus 2013-09-23. <http://www.phac-aspc.gc.ca/eri-ire/h7n9/case-definition-cas-eng.php> .
3. Public Health Agency of Canada. National Surveillance Guidelines for Human Infection with Middle East Respiratory Syndrome Coronavirus (MERS-CoV) 2015-10-07. <http://www.phac-aspc.gc.ca/eri-ire/coronavirus/guidance-directives/mers-cov-srmo-eng.php>
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5. World Health Organization. Middle East respiratory syndrome coronavirus (MERS-CoV) – Bahrain. Disease Outbreak News April 25, 2016, <http://www.who.int/csr/don/25-april-2016-mers-bahrain/en/> .
6. World Health Organization. Human infection with avian influenza A (H7N9) virus – China Disease outbreak news 26 April 2016 <http://www.who.int/csr/don/26-april-2016-avian-ah7n9-china/en/>