Emerging Infectious Respiratory Diseases
Middle East Respiratory Syndrome Coronavirus & Avian Influenza A(H7N9) Virus

Presentation by:

Ministry of Health and Long-Term Care
Ministry of Labour
Public Health Ontario

June 4, 2013
Outline

- Emerging Infectious Respiratory Diseases
  - Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
  - Avian Influenza A(H7N9) Virus

- Health Worker Occupational Health and Safety

- Screening and Case Definitions

- Routine Practices and Additional Precautions
Purpose of Webinar

• While we must always be vigilant, it is especially important today that health workers carefully watch for and be prepared for patients with emerging infectious respiratory diseases.
  ➢ Share what is known
  ➢ Review occupational health & safety and infection prevention & control requirements and recommendations
  ➢ Review the application of the precautionary principle in these scenarios.
MERS-CoV: Background

• In September, 2012, the World Health Organization (WHO) reported the first human case of a novel coronavirus infection
  • A male patient in the United Kingdom with recent travel to Qatar and the Kingdom of Saudi Arabia
  • Retroactive testing identified cases in Jordan dating back to April 2012

• The Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS) are in the same family of viruses (i.e., coronavirus)
  • Coronaviruses are common and are typically associated with mild upper respiratory illness
  • Although rare, some types of coronaviruses produce more severe illnesses and death
MERS-CoV: Current Status

- As of June 3, there have been 53 confirmed cases, including 30 deaths identified in nine countries (Kingdom of Saudi Arabia, Qatar, Jordan, United Arab Emirates, Tunisia, Germany, United Kingdom, France, Italy)
  - All of the cases have had a direct or indirect connection to the Middle East

- At this time, the WHO is not recommending any travel restrictions or special screening at points of entry

- The WHO continues to encourage urgent reporting of cases and related information to support international efforts to identify key clinical characteristics and implications for public health
MERS-CoV: Risk Assessment

• MERS-CoV is thought to be of animal origin and to be sporadically transmitted to humans through an as yet unknown route.

• In several cases, infections have occurred in a cluster:
  • Human-to-human transmission has only been observed in health care facilities and close family contacts. Sustained human-to-human transmission has not been observed.

• The Public Health Agency of Canada public health risk assessment (May 29) identified risk to Canada as low
MERS-CoV: Ministry of Health and Long-Term Care Actions

- Issued Important Health Notices on September 27 and December 17, 2012

- Issued a statement from the Chief Medical Officer of Health on May 10, 2013

- Created a website to maintain risk information, recommendations, frequently asked questions and links to additional information
  - [www.ontario.ca/novelcoronavirus](http://www.ontario.ca/novelcoronavirus)

- Developed an advanced plan with triggers to escalate ministry actions if needed

- Continues to work with partners to monitor the situation
On April 1, 2013, the WHO announced the identification of human disease in China caused by the avian influenza A(H7N9) virus, including several deaths.

Influenza A H7 viruses are a group of influenza viruses that normally circulate among birds.

Although some H7 viruses (H7N2, H7N3 and H7N7) have occasionally been found to infect humans, these recent reports from China are the first reports of human infection with an H7N9 virus.
H7N9: Current Status

- As of June 3, there have been 132 confirmed cases, including 37 deaths
  - To date, all cases have been located in China and Taiwan

- At this time, the WHO is not recommending any travel restrictions or special screening at points of entry

- The WHO continues to encourage urgent reporting of cases and related information
H7N9: Risk Assessment

• There is no evidence of sustained human-to-human transmission. Family clusters suggest that limited human-to-human transmission may occur where there is close contact between cases and other people.

• Much remains unknown about this virus, including the animal reservoir(s) in which it is circulating, the main exposures and routes of transmission, and the scope of the spread of this virus among people and animals.

• Human infection appears to be related to exposure to live poultry or contaminated environments:
  - The virus in humans is genetically similar to that found in animals and the environment (live bird markets).
  - Most human cases report a history of exposure to animals, mostly chickens.
  - The virus has been detected in poultry in live bird markets.
  - The number of human cases appears to have decreased after closure of live animal markets.

• The Public Health Agency of Canada public health risk assessment (May 29) identified risk to Canada as low.
H7N9: Ministry of Health and Long-Term Care Actions

• Issued a statement from the Chief Medical Officer of Health and a Health Bulletin in April, 2013

• Created a website to maintain risk information, recommendations, frequently asked questions and links to additional information
  • (www.ontario.ca/avianinfluenza)

• Developed an advanced plan with triggers to escalate ministry actions if needed

• Continues to work with partners to monitor the situation
• Health Worker Occupational Health and Safety
  (Dr. Leon Genesove; Ministry of Labour)

• Screening and Case Definitions
  (Dr. Brian Schwartz; Public Health Ontario)

• Routine Practices and Additional Precautions as applicable to Emerging Respiratory Pathogens
  (Dr. Maureen Cividino; Public Health Ontario)
Health Worker Occupational Health and Safety
Employer Obligations

- Employers are required to provide all workers with training, instruction and supervision to protect their health and safety.
  - For employers in workplaces covered by O. Reg 67/93 – the Health Care and Residential Facilities (HCRF) regulations, the education and training programs must be developed in consultation with the Joint Health and Safety Committee (JHSC) or Health and Safety Representative (HSR).
Employer Obligations (continued)

• Employers in consultation with the JHSC or HSR must establish written measures and procedures for the control of infections in accordance with sections 8 and 9 of the HCRF regulations.
Employer Obligations (continued)

• Employers are required by the OHSA to ensure that workers are provided with personal protective equipment to protect them from workplace hazards.
  - Employers must ensure personal protective equipment that is to be provided, worn or used is properly used and maintained, is a proper fit, is inspected for damage or deterioration and be stored in a convenient, clean and sanitary location when not in use.
Employer Obligations (continued)

- Employers covered by the HCRF regulations are required to, in consultation with the JHSC (or HSR), if any, develop, establish and put into effect written measures and procedures regarding the use, wearing and care of personal protective equipment and its limitations.
  
  Personal protective equipment may include, but is not limited to, masks or respirators, eye protection, gowns and gloves.
Emerging Infectious Respiratory Diseases: Screening and Case Definitions

Brian Schwartz MD, MScCH, CCFP(EM)
Public Health Ontario

June 4, 2013
2003-2013: is there any difference?

<table>
<thead>
<tr>
<th>What do we know?</th>
<th>SARS</th>
<th>Novel Coronavirus</th>
<th>H7N9</th>
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<tbody>
<tr>
<td>Clinical spectrum of illness</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
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<tr>
<td>Clinical course</td>
<td>No</td>
<td>Limited</td>
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<tr>
<td>Disease transmission</td>
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<td>Diagnostic test</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Treatment</td>
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<tr>
<td>Duration of infectivity</td>
<td>No</td>
<td>No</td>
<td>No</td>
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Screening

1. Acute respiratory infection (ARI), AND
2. Travel history
MERS-CoV – Case Definitions

Confirmed
A person with laboratory confirmation of infection with the novel coronavirus.

Probable
A person with an acute respiratory infection with clinical, radiological, or histopathological evidence of pulmonary parenchymal disease (e.g. pneumonia or Acute Respiratory Distress Syndrome, (ARDS)); AND
no possibility of laboratory confirmation for novel coronavirus either because the patient or samples are not available for testing; AND
close contact with a laboratory-confirmed case.
MERS-CoV

Person under Investigation

A person with an **acute respiratory infection**, which may include history of fever and cough and indications of pulmonary parenchymal disease (e.g. pneumonia or the acute respiratory distress syndrome [ARDS]), based on clinical or radiological evidence of consolidation. AND any of the following:

- History of **travel to, or residence in the Arabian Peninsula** or neighbouring countries within 14 days before onset of illness.
- **Close contact** within 14 days before onset of illness with a person with acute respiratory illness of any degree who had a history of travel to, or residence in the Arabian Peninsula or neighbouring countries within 14 days before the contact’s onset of illness.
- The disease occurs as part of a **cluster** that occurs within a 14-day period, without regard to place of residence or history of travel, unless another aetiology has been identified.
- The disease occurs in a **health care worker** who has been working in an environment where patients with severe acute respiratory infections are being cared for, particularly patients requiring intensive care, without regard to place of residence or history of travel, unless another aetiology has been identified.
- Develops an unexpectedly severe clinical course despite appropriate treatment, without regard to place of residence or history of travel, even if another aetiology has been identified, if that alternate aetiology does not fully explain the presentation or clinical course of the patient.

A person with an acute respiratory illness of any degree of severity who, within 14 days before onset of illness, had **close contact with a confirmed or probable case** of novel coronavirus infection, while the case was ill.
Avian Influenza A(H7N9) Virus – Case Definitions

**Confirmed**
A patient with appropriate exposure criteria and novel influenza A(H7N9) virus infection that is confirmed by a laboratory.

**Probable**
A patient with appropriate exposure criteria† and acute respiratory illness or other symptoms compatible with influenza, regardless of illness severity, for whom laboratory diagnostic testing is positive for influenza A but un-subtypeable (i.e., negative for H1pdm09, negative for seasonal H1 and negative for seasonal H3 by real-time reverse transcriptase polymerase chain reaction (RT-PCR)).
Avian Influenza A(H7N9) Virus

Person under Investigation

A patient with acute respiratory infection or other symptoms compatible with influenza, regardless of illness severity, meeting any of the exposure criteria† and for whom laboratory confirmation is not known or pending, or for whom test results do not provide a sufficient level of detail to confirm avian influenza A(H7N9) virus infection.

†Exposure Criteria: A patient who has recently arrived (within 14 days of illness onset) from a country where transmission of avian influenza A(H7N9) virus has been confirmed or where avian influenza A(H7N9) viruses are known to be circulating in animals, or

A patient who has had recent close contact (within 14 days of illness onset) with a confirmed or probable case with avian influenza A(H7N9) virus.

Close contact includes:

• anyone who provided care for the patient, including a health 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 symptomatic
Travel (as of May 22)

MERS-CoV

• Countries considered to be in the Arabian Peninsula and neighbouring countries include: Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian territories, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen

www.ontario.ca/novelcoronavirus

Avian Influenza A(H7N9) Virus

• To date, China is the only country where transmission has been confirmed. Testing is not recommended for patients who have traveled to countries with imported cases from China, where infection likely occurred in China

www.ontario.ca/novelcoronavirus
Patient Screening

1. Acute respiratory infection (ARI), AND
2. Travel history

• Lead to specific actions in infection prevention and control (IPAC), laboratory testing and patient management
• IPAC measures will be discussed next
Routine Practices and Additional Precautions as applicable to Emerging Infectious Respiratory Diseases: Middle East Respiratory Syndrome (MERS-CoV) and Avian Influenza A (H7N9) Virus

Presented by Public Health Ontario
June 4, 2013
• **Patient safety and health care worker safety are closely linked**

• **Each organization must foster a culture of patient safety and health care worker safety to achieve success**
Key Concepts: Practice Routine Practices Routinely

• The focus of what I am going to say is
  • Do the usual great job you do every day
  • Pay attention—as you always should, and know that each of us needs to be reminded of best practices in IPAC
  • When there is a change in practice take care and time to incorporate it into your usual routine
  • When there is a change in practice take care and time to incorporate it into your usual routine (said twice intentionally for reinforcement);
  • Main change in recommendation is change of surgical/procedure mask to N95 respirator, and care for patient in airborne infection isolation room
Objectives

• Review of Routine Practices and Additional Precautions
• Emphasize Hand Hygiene with alcohol-based hand rub (ABHR)
• Review Personal Protective Equipment (PPE)
• Main difference is guidance from Ministry of Health and Long-Term Care (MOHLTC) regarding use of airborne precautions
Principles of Routine Practices

• Based on premise that all patients are potentially infectious...and the same safe standards of practice should be used routinely to prevent exposure to blood, body fluids, mucous membranes or contaminated environment

• Infection control measures used to prevent and control transmission of microorganisms from patient to patient, patient to health worker, health worker to patient and health worker to health worker

• Perform a risk assessment before every encounter with the patient or their environment. Note this will be a dynamic risk assessment as the patient’s condition changes
Principles of Additional Precautions

• Additional Precautions (AP) are used in addition to Routine Practices for patients known or suspected to be infected or colonized with certain microorganisms to interrupt transmission

• AP include the use of barriers, PPE and control of the environment

• In some instances specialized engineering controls may be required (e.g. airborne infection isolation room for a patient with tuberculosis)
Hierarchy of Controls: as They Apply to Patients with Acute Respiratory Infection

• **Engineering**
  • Where possible screen in separate room or area
  • Maintain spatial separation of 2 metres between patients
  • Decision by MOHLTC for patients to be in airborne precautions means patients will be cared for in airborne infection isolation room (negative pressure, single room, door closed)

• **Administrative**
  • Passive and Active Screening protocols for acute respiratory infection (ARI) both at entrance to health care setting and ongoing surveillance once admitted
  • Healthy work place policy—health workers with symptoms of ARI stay home
  • IPAC policies including Routine Practices and Additional Precautions (hand hygiene)
  • Cough etiquette

• **PPE**
  • Droplet/Contact Precautions + use of N95 respirator (as per MOHLTC)
Airborne Transmission as a Theoretical Possibility

- There is no evidence as yet of airborne transmission of either MERS-CoV or avian influenza H7N9 virus.
- World Health Organization (WHO) and Public Health Agency of Canada (PHAC) recommend use of airborne precautions for aerosol generating medical procedures.
- Ontario Ministry of Health and Long Term Care recommend use of airborne precautions for all patient care based on the precautionary principle.
- This includes the use of N95 respirators for all care of persons under investigation (PUI), probable and confirmed cases of MERS-CoV and H7N9.
Recommended Precautions for PUI, Probable and Confirmed MERS-CoV or H7N9 Patients

• Droplet

• Contact +

• Airborne, including N95 respirator fit-tested and seal-checked

• **Patient placement:** in airborne infection isolation room (AIIR)
  • Negative pressure; door closed

• **Patient Transport:** transfer as is medically indicated; surgical mask on patient (if tolerated); health worker to wear N95 respirator
Droplet Transmission

• Respiratory droplets are coughed, sneezed, or spit during conversation.
• Droplets travel up to 2 metres (6 feet) before they drop onto surfaces, including the mucous membranes of others' nose, mouth, or eyes.

Image source: CDC/ Brian Judd
Contact Transmission

- Most common mode of transmission of infectious agents in all settings

**Direct contact**
Organisms move from person to person directly by contact with intact skin, usually on hands.

**Indirect Contact**
Organisms move from a person to an object (healthcare equipment) or environmental surface and then to another person.
Personal Protective Equipment (PPE)

• PPE includes one or more of the following: gloves, gowns, masks, respirators and eye protection

• Clean PPE is applied immediately before providing care, removed and disposed of immediately after, and hands cleaned
Gloves

Wear when it is anticipated that hands will be in contact with:

- Mucous Membranes
- Non-Intact Skin
- Tissue, Blood, Body Fluids, Secretions, Excretions
- Healthcare Equipment and Environmental Surfaces that may be contaminated with any of the above.

- Proper hand hygiene is required **before** wearing gloves and **after removal**
- Gloves are disposable
- Gloves should be worn on top of the sleeve of the gown
- Gloves should be of good quality and appropriate for the task.
Gowns

- Wear when anticipated that the patient’s environment will be contaminated
- Wear when any risk of splash or spray or contact with non-intact skin
- Tie gown at back of neck
- Ensure sleeve length is adequate
- Remove with care to avoid contaminating self and dispose after each use
- Always clean your hands after removal and disposal of a gown
Facial and Eye Protection

• It is important to protect the mucous membranes of the health worker

• A proper fit-tested seal-checked N95 respirator will protect the nose and mouth

• Eye protection is often forgotten but very important

• Eye protection can be goggles, glasses with proper side coverage or face shield
  • Important to be comfortable; to fit; to ensure no splash or spray will contact eye
  • Can be disposable or reusable; ensure proper cleaning procedure that will not contaminate the worker
Face Protection: N95 Respirator

- N95 respirator must be fit-tested at least every two years as part of a respiratory protection program
- Must be seal-checked with each use
- Must be disposed of after each use
- Take great care not to self-contaminate while removing

Image source: M. Ashcroft
Donning and Doffing PPE (Putting On & Taking Off)

The order for taking off (doffing) PPE is most crucial to avoid contaminating yourself.

Remember: hand hygiene before moving soiled hands to your face!
Your 4 Moments for Hand Hygiene

1. BEFORE INITIAL PATIENT / PATIENT ENVIRONMENT CONTACT
2. BEFORE ASEQTIC PROCEDURE
3. AFTER BODY FLUID EXPOSURE RISK
4. AFTER PATIENT / PATIENT ENVIRONMENT CONTACT
Hand Hygiene Includes:

• Perform hand hygiene as per the Just Clean Your Hands (JCYH) 4 moments of hand hygiene

• ABHR at point of care is preferred

• Should be 70% concentration of alcohol with emollients

• Hand washing with soap and water if hands visibly soiled

Image source: M. Ashcroft
Cleaning of Equipment and Environment

• Equipment must be cleaned and disinfected between patients
• Wherever possible, dedicate equipment to each patient
• Usual environmental services (housekeeping) protocols in place with appropriate PPE

Images source: Microsoft Office Clipart
Dishes Linen and Waste

- Usual practices for dish use; no special handling required
- Usual practices for safe handling of soiled linen and waste
- No special bagging or handling is required
- Bags should not be overfilled, but tied up securely
- Sharps should be disposed of in appropriate containers, ideally point of use
- Remember Needle Safety Regulation and ensuring use of safety-engineered medical devices
Summary

- Follow usual Routine Practices
- Use Additional Precautions for Droplet/Contact + N95/airborne
- Remember proper sequence for donning and doffing PPE
- Accommodation of confirmed or suspected patient in airborne infection isolation room
- Surgical mask on patient if being transported
- Normal cleaning practices for equipment, environment
- Normal safe handling practices for dishes, linens, sharps
Summary

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  • Avian Influenza A(H7N9) Virus

• Health Worker Occupational Health and Safety

• Screening and Case Definitions

• Routine Practices and Additional Precautions
This presentation

• These audiences have previously received a version of this presentation
  ➢ Ontario Hospital Association