Ministry of Health

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1: Case Definitions and Disease-Specific Information

Disease: Diseases caused by a novel coronavirus, including Coronavirus Disease 2019 (COVID-19), Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)

Effective: July 2022

Ontario

Diseases caused by a novel coronavirus, including Coronavirus Disease 2019 (COVID-19), Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)

☒ Communicable
☐ Virulent

Health Protection and Promotion Act (HPPA)
Ontario Regulation (O. Reg.) 135/18 (Designation of Diseases)

Provincial Reporting Requirements

☒ Confirmed case
☒ Presumptive confirmed case
☒ Probable case
☒ Laboratory-based case of reinfection (COVID-19 only)
☒ Time-based case of reinfection (COVID-19 only)

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- O. Reg. 569 (Reports) under the HPPA;[5]
- The Case and Contact Management (CCM) software guides (for COVID-19);
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.

Please note that novel coronavirus, MERS and SARS require immediate notification by phone to the Ministry of Health, 24/7 Health Care Provider Hotline at 1-866-212-2272. COVID-19 does not require notification but should be managed as per routine practices.

The reporting of these event will be notified to Public Health Agency of Canada (PHAC) as well as the World Health Organization through the International Health Regulations.[3,4]

Type of Surveillance

Case-by-case.

Case Definition

Should a novel coronavirus be identified, the ministry will issue a memo indicating it is now reportable and may issue a more focused case definition based on the epidemiological evidence available.

Novel Coronavirus

Confirmed Case

A person with laboratory confirmation of infection with a novel coronavirus.[a]

Presumptive Confirmed Case

A person in whom a laboratory test for the novel coronavirus is positive from the Public Health Ontario Laboratory and is awaiting confirmation by the National Microbiological Laboratory (NML).[a]

Probable Case

A person with:

- fever (over 38 degrees Celsius) **AND** new onset of (or exacerbation of chronic) cough or breathing difficulty **AND** evidence of severe illness progression *e.g.,* acute respiratory distress syndrome (ARDS) or severe influenza-like illness (may include complications such as encephalitis, myocarditis or other severe and life-threatening complications);

AND, any of the following:

- close contact[b] with a confirmed or probable case of novel coronavirus; **OR**
- a history of residence in or travel to a novel coronavirus affected area[c] within one full incubation period[d] before onset of illness; **OR**
- a close contact with a person with acute respiratory illness who has a direct epidemiological link to a novel coronavirus affected area within one full incubation period prior to their illness onset; **OR**
- direct contact with animals (if an animal source is identified)[e] in countries where the novel coronavirus is known to be circulating in animal populations or where human infections have occurred as a result of presumed zoonotic transmission;

AND

- in whom laboratory diagnosis of novel coronavirus is not available[f] or inconclusive[g] or negative (if specimen quality or timing is suspect).

Person under Investigation

- A person with acute respiratory illness;

AND, any of the following:

- close contact with a confirmed or probable case of novel coronavirus; **OR**
- a history of residence in or travel to a novel coronavirus affected area within one full incubation period before onset of illness; **OR**
- a close contact with a person with acute respiratory illness who has a direct epidemiological link to a novel coronavirus affected area within one full incubation period prior to their illness onset; **OR**
- direct contact with animals (if an animal source is identified) in countries where the novel coronavirus is known to be circulating in animal populations or where human infections have occurred as a result of presumed zoonotic transmission.

Coronavirus Disease (COVID-19)

Outbreak case definitions for COVID-19 high-risk settings can be found on page 10.

Confirmed Case

A person with confirmation of SARS-CoV-2 infection documented by:

- Detection of at least one specific gene target by a validated laboratory-based nucleic acid amplification testing (NAAT) assay (e.g., real-time PCR) performed at a community, hospital or reference laboratory (e.g., Public Health Ontario Laboratory or the National Microbiology Laboratory);[h,j]

OR

- A validated point-of-care (POC) NAAT that has been deemed acceptable by the Ontario Ministry of Health to provide a final result;[k]

OR

- Demonstrated seroconversion or diagnostic rise (at least 4-fold or greater from baseline) in viral specific antibody titre in serum, plasma, or whole blood using a validated laboratory-based serological assay for SARS-CoV-2.[j,n]

Probable Case

A person who:

- Has symptoms compatible with COVID-19;

AND

  - Had high-risk or close contact exposure;[12] **OR**
  - Was exposed to a known cluster or outbreak;

  AND

  - In whom a laboratory-based NAAT-assay (e.g., real-time Polymerase Chain Reaction[PCR]) for SARS-CoV-2 has not been completed;[m] **OR**
  - SARS-CoV-2 antibody is detected in a single serum, plasma, or whole blood sample using a validated laboratory-based serological assay for SARS-CoV-2 collected within 4 weeks of symptom onset;[j,n]

OR

- Has symptoms compatible with COVID-19;

AND

- In whom a laboratory-based NAAT assay (e.g., real-time PCR)for SARS-CoV-2 was inconclusive;[o,p]

OR

- Is asymptomatic;

  AND

  - Had high-risk or close contact exposure;[l] **OR**
  - Was exposed to a known cluster or outbreak;

  AND

- In whom a laboratory-based NAAT-based assay (e.g., real-time PCR) for SARS-CoV-2 is inconclusive.[o,p]

Laboratory-Based Case of Reinfection

A previous confirmed case of SARS-CoV-2[q] that has a subsequent confirmed SARS-CoV-2 infection where there is laboratory evidence supporting that these were separate infections caused by different viral lineages.[r]

Laboratory evidence includes:

- Genome sequencing or variant of concern (VOC) screen testing indicates two distinct SARS-CoV-2 infections, as described by identification of:
  - different genetic lineages; **OR**
  - the same lineage but contain sufficient single nucleotide/mutation variation to support two different infections;[s-u]

OR

- One of the infections was confirmed to be a variant of interest (VOI)/VOC or the isolate contains mutations associated with VOI/VOC based on genome sequencing or VOC PCR testing;[u]

AND

- The other infection occurred when the VOI/VOC was not circulating in Canada.[v]

Time-Based Case of Reinfection

A previous confirmed case of SARS-CoV-2:[q,w,x,y]

- That has a subsequent confirmed SARS-CoV-2 infection at least 90 days after the previous infection using episode date,[x,aa]

AND

- Does not meet the laboratory-based case of re-infection definition.

Severe Acute Respiratory Syndrome (SARS)

Confirmed Case

A person with:

- Laboratory evidence of SARS-associated coronavirus (SARS-CoV) infection;

AND

- Early presentation of clinically compatible signs and symptoms of SARS with or without radiographic evidence consistent with SARS;

OR

A deceased person with:

- A history of early presentation of clinically compatible signs and symptoms of SARS (i.e., fever **AND** cough **OR** difficulty breathing resulting in death);

AND

- Autopsy findings consistent with SARS, i.e.:
    - Evidence of pneumonia or Acute Respiratory Infection (ARI) without an alternate identifiable cause;

    AND

    - Laboratory evidence of SARS-CoV Infection.

Probable Case

In the absence of laboratory evidence, a person with:

- Early presentation of clinically compatible signs and symptoms of SARS with or without radiographic evidence consistent with SARS;

AND

- An epidemiologic link to a person or place linked to SARS, including:
    - Close contact[b] with a confirmed SARS case, within 10 days of onset of symptoms;

    OR

    - Close contact[b] with a symptomatic person who has laboratory evidence of SARS-CoV infection, within 10 days of onset of symptoms;

    OR

    - Residence, recent travel or visit to an "area with recent local transmission of SARS" within the 10 days prior to onset of symptoms;

    OR

    - Close contact[b] with a probable case who has been to an "area with recent local transmission of SARS" within the 10 days prior to onset of symptoms; this includes health care workers who were not wearing personal protective equipment;

    OR

Laboratory exposure to SARS-CoV where appropriate barriers and personal protective equipment were not in place;

OR

A deceased person with:

- A history of early presentation of clinically compatible signs and symptoms of SARS;

AND

- Autopsy findings consistent with SARS;

AND

- An epidemiologic link to a person or place linked to SARS.

Middle East Respiratory Syndrome (MERS)

Confirmed Case

A person with laboratory confirmation[ee] of infection with the MERS-CoV virus.

Presumptive Confirmed Case

A person with a positive laboratory result of infection for MERS-CoV virus from the PHOL that is awaiting confirmation by the NML.

Probable Case

A person with an acute respiratory illness of any degree of severity who had close contact within 14 days before onset of illness with a confirmed case or presumptive confirmed case and from whom laboratory diagnosis of MERS-CoV is unavailable[cc] or inconclusive.[dd]

Person Under Investigation

A person with:

- an acute respiratory illness, which may include history of fever and new onset of (or exacerbation of chronic) cough or breathing difficulty with or without indications of pulmonary parenchymal disease (e.g., pneumonia or acute respiratory distress syndrome [ARDS]) based on clinical or radiological evidence of consolidation;

AND, any of the following:

- The person has a travel history to or resided in Saudi Arabia within 14 days before onset of illness;

OR

- The person has a travel history or resided in one or more of the other affected countries[bb] **AND** had any of the following associated risk factors:
    - The person had contact with a health care facility (i.e., as a patient, worker or visitor) in one of more of the other affected countries[bb] within 14 days before onset of illness; **OR**
    - The person had contact with a camel or camel products (e.g., raw milk or meat, secretions or excretions, including urine) in one of more of the other affected countries[bb] within 14 days before onset of illness;

OR

- The person had close contact[b] within 14 days before onset of illness with a person with acute respiratory illness of any degree:
    - who had a travel history to or residence in Saudi Arabia; **OR**
    - who had contact with a health care facility (i.e., as a patient, worker or visitor) or camel or camel products (e.g., raw milk or meat, secretions or excretions, including urine) in one or more of the other affected countries;[bb]

OR

- The person has acute respiratory illness of any degree of severity and, within 14 days before onset of illness, had close contact[b] with a confirmed case, presumptive confirmed case, or probable case of MERS-CoV infection while the case was ill.

Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified, if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (i.e., confirmed and/or suspect).

COVID-19 Outbreak Case Definitions for Specific Settings

1. Acute Care

Declaring a confirmed outbreak:

- Two or more polymerase chain reaction (PCR) test **OR** rapid molecular test OR rapid antigen test results in patients and/or staff within a specified area (unit/floor/service) within a 10-day period where both cases have reasonably acquired their infection in the hospital.
    - Examples of reasonably having acquired infection in hospital include:
        - Specific high-risk exposure to COVID-19 positive patient/staff or other high-risk exposure in the hospital; **OR**
        - Admitted for 5 or more days before symptom onset or positive COVID-19 test result (based on the median incubation period of the virus).
- One positive PCR or rapid molecular test in a patient or staff who could reasonably have acquired their infection in hospital would **not** trigger the declaration of an outbreak. However, if the acute care setting confirms a single case which might be nosocomial, this should prompt a thorough investigation to obtain additional information and enhanced surveillance. Based on the case investigation, additional control measures may be warranted.
- In the context of **high community transmission** during the Omicron surge of COVID-19, staff cases should only be considered as having reasonably acquired their infection in hospital if there was a known specific high-risk exposure (i.e.: PPE breach) in the hospital.

- The above definition is for public health surveillance reporting purposes. Application of outbreak management measures, particularly for staff-only outbreaks where there is no evidence of transmission to/among patients, are at the discretion of the outbreak management team.

2. Long-term Care and Retirement Homes

Declaring a suspect/confirmed outbreak:

- A suspect outbreak in a home is defined as:
    - One positive molecular test **OR** rapid antigen test in a patient/client/resident.
- A confirmed outbreak in a home is defined as:
    - Two or more patients/clients/residents and/or staff/other visitors in a home (e.g., floor/unit) each with a positive molecular test **OR** rapid antigen test result **AND** with an epidemiological link*, within a 10-day period.*Epidemiological link defined as: reasonable evidence of transmission between patients/clients/residents/staff/other visitors **AND** there is a risk of transmission of COVID-19 to patients/clients/residents within the home.
- Note: the definitions above are for surveillance purposes only. PHUs have the discretion to declare a suspect, or a confirmed outbreak based on the results of their investigation, including when the above definitions are not completely met.
- For greater clarity, staff cases are those whose COVID-19 infection was deemed due to workplace exposure (i.e., acquisition in the home) by workplace health and safety, the PHU, or the IPAC team.
    - For the purposes of outbreak management, if a staff assessment is not possible to determine the source of acquisition and there is no evidence to support an epidemiological link to the home, the PHU has the discretion to presume staff COVID-19 infections were not acquired in the home during periods of high community transmission.
    - The home's workplace health and safety and/or IPAC team has a duty to report an employee case as per OHSA requirements.

- All positive PCR, rapid molecular, or RAT results in patients/clients/residents, staff, or visitors associated with a suspect or confirmed outbreak in the home must be reported to the PHU and Outbreak Management Team.
- During a suspect or confirmed outbreak, homes should continue to conduct enhanced symptom assessment (minimum twice daily) of all patients/clients/residents to facilitate early identification and management of ill patients/clients/residents.

Declaring a COVID-19 outbreak may not be necessary in certain scenarios such as:

- When a patient/client/resident has tested positive during their self-isolation period following their admission or transfer and has been under Droplet and Contact Precautions for the entirety of this period; and
- When the source of COVID-19 acquisition for staff cases are deemed to have reasonable occurred outside the workplace and there is no evidence of transmission or an epidemiological link to patient/client/resident cases in the home.

For greater clarity,

- Declaration of an outbreak (suspected or confirmed) is not required to implement enhanced measures at the discretion of the Outbreak Management Team or as directed by the local public health unit (e.g., enhanced disease surveillance, infection prevention and control measures).
- At this time RATs are not primarily intended for diagnostic purposes; however, they may be used to facilitate case, contact, and outbreak management. The results of a RAT may be used to declare a suspect or confirmed outbreak while awaiting PCR or rapid molecular diagnostic test results.
- Negative RAT results should not be used independently to rule out COVID-19 in an outbreak situation due to its limited sensitivity and the increased pre-test probability of COVID-19.
- If a RAT is used for a staff or patients/clients/resident with symptoms or high-risk exposure (e.g., to expedite outbreak management) PCR or rapid molecular diagnostic (e.g., ID NOW) testing should also be performed in parallel:
    - Staff and/or patients/clients/residents are to be managed as a case if a positive RAT or an epidemiological link until PCR (i.e., negative PCR) or rapid molecular diagnostic test results are received.

3. Congregate Living Settings

Declaring an Outbreak: The following definitions are for surveillance purposes only. PHUs have the discretion to declare a suspect, or a confirmed outbreak based on the results of their investigation, including when the definitions below are not completely met:

- A suspect outbreak in a CLS is defined as one positive molecular test **OR** rapid molecular **OR** rapid antigen test in a client.
- A confirmed outbreak in a CLS is defined as two or more clients and/or staff (or other visitors) in a CLS each with a positive molecular test **OR** rapid molecular test **OR** rapid antigen test **AND** with an epidemiological link*, within a 10-day period. *Epidemiological link defined as: reasonable evidence of transmission between clients/staff/other visitors **AND** there is a risk of transmission of COVID-19 to other clients within the CLS.
- Note: the definitions above are for surveillance purposes only. PHUs have the discretion to declare a suspect or confirmed outbreak based on the results of their investigation, including when the above definitions are not completely met.
- For greater clarity, staff cases are those whose COVID-19 infection was deemed due to a workplace exposure by the PHU:
    - For the purposes of outbreak management, if an assessment is not possible to determine the source of acquisition and there is no evidence to support an epidemiological link to the CLS, the PHU has the discretion to presume staff COVID-19 infections were not acquired in the CLS during periods of high community transmission.
    - The CLS's workplace health and safety and/or IPAC team has a duty to report an employee case as per OHSA requirements.
- Declaring an outbreak may not be necessary in certain scenarios such as:
    - When the source of COVID-19 acquisition for staff cases are deemed to have reasonably occurred outside the workplace, and there is no evidence of transmission or an epidemiological link to client cases.

4. International Agricultural Workers

An outbreak in an agri-food living setting is defined as:

- One confirmed case (i.e., by PCR or rapid molecular or antigen test) among a resident of an employer-provided living setting associated within an agri-food setting;

OR

- Two confirmed cases (i.e., by PCR or rapid molecular or antigen test) in workers or any other person working on or visiting an agri-food setting (e.g., an employer) with an epidemiological link, within a 14-day period, where at least one case could have reasonably acquired their infection in the agri-food setting.*

  *Examples of reasonably having acquired infection in an agri-food setting include:

  - No obvious source of infection outside of the farm or employer-provided living setting,

  OR

  - Known exposure in the agri-food setting or employer provided living setting.

Clinical Information

Clinical Evidence

Clinically compatible signs and symptoms may vary by novel coronavirus. In general, coronavirus respiratory infections are characterized by the following:

- Fever (>38 degrees Celsius);
- Cough or breathing difficulty; and
- Severe illness progression (e.g., severe influenza-like illness)

Clinical Presentation

Clinically compatible signs and symptoms may vary by novel coronavirus. Common signs include fever, and respiratory symptoms such as cough, shortness of breath, and breathing difficulties. In more severe cases, infection can cause pneumonia, acute respiratory distress syndrome (ARDS), severe influenza-like illness, kidney failure and even death.[3]

Laboratory Evidence

These criteria apply to an unspecified novel coronavirus. For Laboratory Evidence for SARS, MERS-CoV and COVID-19, use the virus specific Laboratory Evidence in the case definition.

Laboratory Confirmation

Laboratory tests and testing recommendations will change accordingly as new assays are developed and validated. Laboratory confirmation of infection with a newly emerged novel coronavirus would initially consist of positive real-time PCR on at least two specific genomic targets or a single positive target with sequencing AND confirmed by NML by nucleic acid testing.

Novel human coronaviruses are genetically distinct from the common human coronaviruses (229E, NL63, OC43, HKU1), which cause seasonal acute respiratory illness, and are detected in widely used multiplex respiratory virus PCR (MRVP) assays. MRVP assays would not cross-react with novel coronaviruses.

Approved/Validated Tests

Novel Coronavirus

For information on testing guidelines for novel coronavirus, contact or refer to Public Health Ontario Laboratory Services.

COVID-19

Review PHOL's Test Information Sheet for Coronavirus Disease 2019 (COVID-19) for more information on laboratory testing.

SARS

Laboratory Confirmation:

- Detection of SARS-CoV ribonucleic acid (RNA) in appropriate samples (with confirmation by NML or a designated laboratory) or isolation in cell culture from a clinical specimen.

OR

- Serologic detection of SARS-CoV in a convalescent sample taken > 28 days after onset of illness

OR

- Seroconversion between acute and convalescent blood samples collected at least 4 weeks apart.

- Clinical specimens include clotted blood or serum for serology, nasopharyngeal swab (NPS) or Nasopharyngeal aspirate (NPA), bronchoalveolar lavage (BAL)/bronchial washings and stools for viral RNA detection.

MERS

Review PHOL's Test Information Sheet for MERS-CoV for more information on laboratory testing.

Indications and Limitations

For information on indications and limitations for novel coronavirus testing, contact or refer to Public Health Ontario Laboratory Services.

For further information about human diagnostic testing, contact or refer to Public Health Ontario Laboratory Services.

Case Management

In addition to the requirements set out in the Requirement #2 of the "Management of Infectious Diseases – Sporadic Cases" and "Investigation and Management of Infectious Diseases Outbreaks" sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection. Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

Refer to the guidance document for further information regarding coronavirus-specific case management activities for:

- COVID-19: Management of Cases and Contacts of COVID-19 in Ontario
- MERS: Public Health Management of Cases and Contacts of MERS Coronavirus in Ontario.

Period of isolation will vary by type of coronavirus. Cases should wear a face mask if required to travel for medical attention.

Contact Management

Refer to the guidance document for further information regarding coronavirus-specific contact management activities for:

- COVID-19: Management of Cases and Contacts of COVID-19 in Ontario
- MERS: Public Health Management of Cases and Contacts of MERS Coronavirus in Ontario.

A close contact is defined as:*

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* This close contact definition assumes that the case self-isolated while symptomatic. If the case did not isolate while symptomatic - or if the case visited a health care setting while symptomatic - PHUs should consider additional environments where exposures may have occurred to identify contacts for follow-up and monitoring (e.g., workplace, places of worship, recreation centres, conveyance/vehicles, health care setting waiting area or room, and other health care setting exposures).

- Anyone who provided care (e.g., bathing, toileting, dressing or feeding) for the probable, presumptive confirmed or confirmed case while the person was symptomatic, including a health care worker, family member, or individual who had other similarly close physical contact; **OR**
- Anyone who stayed at the same place (e.g., lived with, visited) while the case was ill.

Management of symptomatic contacts:

- Immediate clinical investigation (including laboratory investigation) at a site where appropriate infection prevention and control precautions can be ensured. Symptomatic contacts would be a probable case.
- Monitor results of clinical investigation including laboratory results, which may result in a change of case status (i.e., change to "probable" or "confirmed" case or exclusion of the case based on determination of an alternative diagnosis that can fully explain the illness).

Outbreak Management

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.

Prevention and Control Measures

Personal Prevention Measures

Measures:

- Since there is no vaccine against novel coronaviruses the most effective measure is to prevent transmission from infected persons to susceptible persons;
- All individuals presenting to a health care facility with symptoms of an acute respiratory infection should be provided with a surgical face mask and receive information about the importance of respiratory etiquette and hand hygiene; and

- Ensure early recognition and prevention of transmission of novel coronaviruses and other respiratory viruses at the initial encounter with a health care facility.
- For COVID-19 specific personal prevention measures:
    - COVID-19 Guidance for the Health Sector; and
    - COVID-19 Vaccine-Relevant Information and Planning Resources

Infection Prevention and Control Strategies

Strategies focus on the use of routine infection prevention and control practices in healthcare settings and among health care workers:

- All health care workers should be educated in regard to Routine Practices related to infection prevention and control; and
- All health care workers should wear appropriate Personal Protective Equipment (PPE), based on their point of care risk assessment, when assessing patients with suspect acute respiratory infections.

Educate health care staff about the importance of strict adherence to, and proper use of, routine infection prevention and control measures especially hand hygiene as well as isolation procedures and use of appropriate PPE.

For COVID-19 specific guidance on PPE, see COVID-19 Guidance: Personal Protective Equipment (PPE) for Health Care Workers and Health Care Entities.

Encourage and maintain respiratory hygiene and cough etiquette in order to reduce transmission of all forms of respiratory pathogens. Persons with signs and symptoms of respiratory infection should:

- Cover their nose and mouth when coughing and sneezing;
- Use tissues to contain respiratory secretions;
- Dispose of tissue in the nearest waste receptacle after use; and
- Perform hand hygiene after contact with respiratory secretions and contaminated objects and materials.

Refer to PHO for the most up-to-date information on Infection Prevention and Control.

Disease Characteristics

Aetiologic Agent - Coronaviruses are large, enveloped ribonucleic acid (RNA) viruses named after their corona- or crown-like surface projections observed on electron microscopy.[1] A novel coronavirus is a new strain that has not been previously identified in humans. Coronaviruses are zoonotic, as they transmit between animals and people. There are at least seven known coronaviruses that infect humans.

Coronaviruses are a large family of viruses, some causing illness in people and others that circulate among animals, including camels, cats and bats. Rarely, animal coronaviruses can evolve and infect people and then spread between people such as has been seen with MERS (Middle East Respiratory Syndrome) and SARS (Severe Acute Respiratory Syndrome).[1] Past MERS and SARS outbreaks have been complex, requiring comprehensive public health responses.[2]

Modes of Transmission - Coronaviruses are a large family of viruses that are transmitted primarily through droplets, aerosols, and direct contact. SARS-CoV-2 is known to be transmitted primarily at short range through respiratory particles that range in size from large droplets to smaller droplets (aerosols), however, other transmission routes are possible. Some cause illness in people; numerous other coronaviruses circulate among animals, including camels, cats, and bats. Rarely, animal coronaviruses can evolve and infect people and then spread between people such as has been seen with Middle Eastern Respiratory Syndrome (MERS-CoV).[1]

Incubation Period –The SARS coronavirus demonstrated an incubation period ranging from 2-19 days (median 4-5 days), the incubation period for the MERS coronavirus is approximately 5 days (range of 2-14 days) and COVID-19 incubation period is estimated to range from 2-14 days with a median of 5-6 days, with some variation in the median incubation periods with different COVID-19 variants.

Allowing for variability and recall error, exposure history based on the prior 14 days is recommended at this time for novel coronaviruses with an unknown incubation period.[4]

Period of Communicability - Not completely understood and varies by type of coronavirus.

Reservoir - Coronaviruses are considered zoonotic. Several known coronaviruses are circulating in animals that have not yet infected humans.

Host Susceptibility and Resistance - Unknown, but susceptibility is assumed to be universal.

Please refer to Public Health Ontario's (PHO) Reportable Disease Trends in Ontario reporting tool and other reports for the most up-to-date information on infectious disease trends in Ontario.

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.[3,4]

Comments

Allowing for variability and recall error, exposure history based on the prior 14 days is recommended at this time for novel coronaviruses with an unknown incubation period.

References

1. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Coronaviruses, Including SARS and MERS. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. Red Book: 2018 Report of the Committee on Infectious Diseases. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018. Available from: https://publications.aap.org/aapbooks/book/546/Red-Book-2018-Report-of-the-Committee-on?autologincheck=redirected
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3. World Health Organization: Q & A on coronaviruses (2020) [Internet]. Available from: https://www.who.int/news-room/q-a-detail/q-a-coronaviruses
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5. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2019). Available from: https://www.ontario.ca/laws/regulation/900569

Case Definition Sources

Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Coronaviruses, Including SARS and MERS. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. Red Book: 2018 Report of the Committee on Infectious Diseases. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018.

Case Definition Footnotes

a. "Laboratory confirmation" will depend on the testing available for the novel coronavirus. For most novel coronaviruses, laboratory confirmation will require NML confirmation of testing conducted at the Public Health Ontario Laboratory. In the situation where confirmation of laboratory testing by the NML is no longer required, a Presumptive Confirmed case will be the same as a Confirmed case. Laboratory confirmation of infection with a newly emerged novel coronavirus would initially consist of positive real-time PCR on at least two specific genomic targets or a single positive target with sequencing **AND** confirmed by NML by nucleic acid testing.

b. Close contacts are defined as:[†]

   - Anyone who provided care (e.g., bathing, toileting, dressing or feeding) for the probable, presumptive confirmed or confirmed case while the person was symptomatic, including a health care worker, family member, or individual who had other similarly close physical contact.

   OR

   - Anyone who stayed at the same place (e.g., lived with, visited) while the case was ill.

c. Epidemiological information on 'novel coronavirus affected area' will be subject to change as new information evolves with each novel coronavirus. The Ministry of Health will provide additional information on current guidance for 'novel coronavirus affected area' definitions, as well as any additional exposures within the novel coronavirus affected area that would increase the risk of acquisition.

[†] This close contact definition assumes that the case self-isolated while symptomatic. If the case did not isolate while symptomatic - or if the case visited a health care setting while symptomatic - PHUs should consider additional environments where exposures may have occurred to identify contacts for follow-up and monitoring (e.g., workplace, places of worship, recreation centres, conveyance/vehicles, health care setting waiting area or room, and other health care setting exposures).

d. Where the incubation period of the novel coronavirus is unknown, assume incubation period of 14 days based on the Middle East Respiratory Syndrome Coronavirus incubation period.

e. Animal source to be updated if identified.

f. A laboratory test is not available if there is no possibility of acquiring samples for testing.

g. Inconclusive is defined as a positive test on a single real-time PCR target or a positive test with an assay that has limited performance data available.

h. Laboratory tests continue to evolve, and laboratory testing recommendations will change accordingly as new assays are developed and validated.

i. Some hospital and community laboratories have implemented and validated COVID-19 NAAT testing inhouse and report final positive results, which is sufficient for case confirmation. Other hospital and community laboratories will report positives as preliminary positive during the early phases of implementation and will require confirmatory testing at another licenced laboratory with a validated SARS-CoV-2 NAAT assay, which can be a community, hospital or reference laboratory (e.g., Public Health Ontario's laboratory or the National Microbiology Laboratory).

j. In cases where individuals received a Health Canada approved COVID-19 vaccine, detection of the nucleocapsid antibody can be used to determine exposure to SARS-CoV-2 through natural infection. Spike antibody can be generated through natural exposure and/or COVID-19 vaccination, but cannot differentiate between the two. Seroconversion of the spike and/or nucleocapsid antibody in an individual who has received no doses of vaccine suggests natural exposure to SARS-CoV-2.

k. All positive results issued from molecular point-of-care assays are reportable to public health units. Final results can be issued from certain Ministry of Health approved POC assays that have been evaluated, and do not require further testing for confirmation (see Ministry guidance on cases and contacts of COVID-19). Additional testing may be recommended to guide case and public health management.

l. A close contact is defined as defined as an individual who has an exposure to a confirmed positive COVID-19 case or an individual with a positive rapid antigen test result. This includes household, community and healthcare exposures as outlined in Ministry guidance on cases and contacts of COVID-19.

m. Any case classified as probable based on a high risk exposure (i.e., close contact) or exposure to a known cluster or outbreak, which subsequently tests negative/not detected for SARS-CoV-2 by NAAT should no longer be classified as a probable case. Exceptions may be made for negatives on a compromised sample or if NAAT testing is delayed (e.g., >10 days following symptom onset), whereby such persons remain as probable cases.

n. COVID-19 antibody (serology) testing should not be used as an acute screening or diagnostic tool or used to determine a patient's immune status, vaccination status, or infectivity. It may be considered as an adjunct to SARS-CoV-2 NAAT in individuals with compatible symptoms who present late and therefore may test negative, and in the diagnosis of multisystem inflammatory syndrome in children (MIS-C) and multisystem inflammatory syndrome in adults (MIS-A). Only results from a laboratory in Ontario that is licensed to conduct serology testing AND where testing is done for clinical purposes will be reported to the Medical Officer of Health and used for case classification. SARS-CoV-2 IgM and serology POC tests are not widely available and are not recommended for use at this time due to a lack of adequate performance data.

o. Inconclusive is defined as an

   i. indeterminate result on a single or multiple NAAT gene target(s)

   OR

   ii. ii. a positive test with an assay that has limited performance data available.

   An indeterminate result on a real-time PCR assay is defined as a late amplification signal in a real-time PCR reaction at a predetermined high cycle threshold (Ct) value range (note: Ct values of an indeterminate range vary by assay and not all assays have an indeterminate range). This may be due to low viral target quantity in the clinical specimen approaching the limit of detection of the assay, or alternatively in rare cases may represent nonspecific reactivity (false signal) in the specimen. When clinically relevant, repeat testing is recommended.

p. For clearance definitions refer to the COVID-19 Integrated Testing & Case, Contact and Outbreak Management Interim Guidance: Omicron Surge

q. A viral lineage is a group of viruses defined by a founding variant and its descendants.

r. Where there is no suspected contamination in the primary or secondary infection specimen (i.e., did not contain two virus subpopulations by genome sequencing or VOC PCR testing).

s. When reinfection confirmation is based on detection of mutation(s) associated with a VOC using VOC PCR screen testing in one of the infection episodes and not in the other episode, both specimens MUST have been screened for the same mutation(s) to ensure there has been a change in mutation status from one episode to the next.

t. VOC PCR results are consistent with VOC detection based on current epidemiology as indicated in the lab report (e.g., S gene target failure [SGTF] on the TaqPath™ assay for the Omicron VOC BA.1 sublineage, N501Y-negative/E484K-negative for the Delta VOC, etc.).

u. Refer to the national genomic surveillance dataset on the Public Health Agency of Canada Re-infection case definition for dates of first detection of a particular VOC in Canada. This dataset is updated on a monthly basis.

v. Persistent positive results due to prolonged viral shedding are very rare after 90 days. Public health or clinical judgement should be used when assessing if a subsequent confirmed SARS-CoV-2 infection occurring 90 days or more after the previous infection is a persistent positive result rather than a reinfection. For more information on management of Previously Cleared Cases with New Positive Results, refer to Ministry guidance on cases and contacts of COVID-19.

w. If case is symptomatic, then episode date uses symptom onset date. If symptom onset date is unavailable or the case is asymptomatic, then the earliest of the following dates could be used as proxy for classification: laboratory specimen collection date, laboratory testing date or reported date.

x. The Medical Officer of Health or relevant public health authority may be consulted when considering the management of potential reinfection cases that do not meet the time-based case of reinfection criteria (e.g., new symptoms within 90 days of the previous confirmed infection, low Ct value). For example, if there is high suspicion of reinfection within 90 days of the previous confirmed infection using episode date consider requesting genome sequencing or VOC PCR (if not already done) and follow laboratory-based case of reinfection criteria.

y. VOC PCR screen testing and/or genome sequencing is not routinely required if the case meets the time-based case of reinfection definition.

z. Seroconversion or a diagnostic rise in antibody titre can be established using paired acute and convalescent sera taken 2-4 weeks apart.

aa. Saudi Arabia is experiencing continuing local transmission of MERS-CoV. Other affected countries in the Middle East with limited transmission among adults include Jordan, Oman, Qatar, the United Arab Emirates and Yemen. However, for these other countries, cases have almost been exclusively limited to adults who had contact with a case of MERS-CoV, a health care facility (such as a patient, worker or visitor) or camels/ camel products (e.g., raw milk or meat, secretions or excretions, including urine). The risk of MERS-CoV infection for individuals from these other affected countries without exposure to a case of MERS CoV, a health care facility or camels/ camel products is extremely low. As this list of affected countries is subject to change, health care workers and health sector employers should review this footnote regularly for the latest information.

bb. A laboratory diagnosis of MERS-CoV is unavailable if there is no possibility of acquiring samples for testing.

cc. Inconclusive is defined as a positive test on a single target, a positive test with an assay that has limited performance data available, or a negative test on an inadequate specimen.

dd. In Canada, laboratory confirmation of infection with MERS-CoV is done by the NML. After the PHOL had identified a presumptive confirmed case, the sample will be sent to the NML for confirmation.

Document History

Revision Date	Document Section	Description of Revisions
January 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
January 2022	Epidemiology: Occurrence section	Removed.
January 2022	ICD Codes	Removed.
January 2022	Case definition	COVID-19 case definition added.
January 2022	Clinical information	Removed “novel” from section.
January 2022	Laboratory evidence	Addition of PHOL’s Test Information Sheet for Coranvirus Disease 2019 (COVID-19) for information on laboratory testing.
January 2022	Contact management	Addition of guidance document link for COVID-19 case and contact management.
February 2022	Footnotes	Entire section updated.
April 2022	COVID-19 sections	Updated to reflect current practices and included outbreak case definitions.
July 2022	Case Management (pg. 19)	Removed reference to former SARS appendices.