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: Mumps

Effective: May 2022

Ontario

Mumps

☒ Communicable
☐ Virulent

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

Provincial Reporting Requirements

☒ Confirmed case
☒ Probable case

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;[7]
- The Case and Contact Management (CCM) software guides;[7]
- For certain vaccines, information to be entered into the applicable provincial inventory system; and
- Bulletins and directives issued by Public Health Ontario (PHO).

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

Laboratory confirmation of infection with clinically compatible signs and symptoms (see Clinical Evidence section) in the absence of recent history of immunization with

a mumps-containing vaccine*:

- Isolation of mumps virus from an appropriate clinical specimen (e.g. buccal swab, throat swab and urine specimen)

OR

- Detection of mumps virus ribonucleic acid (RNA) from an appropriate clinical specimen (refer to above)

OR

- Mumps immunoglobulin G (IgG) seroconversion by any standard serologic assay between acute and convalescent sera

OR

Detection of mumps immunoglobulin M (IgM) antibody in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known mumps activity

OR

Clinical illness (see Clinical Evidence section) in a person who has been epidemiologically linked to a laboratory-confirmed case.

Probable Case

Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting greater than two days, in the absence of appropriate laboratory tests (i.e., laboratory testing for mumps was not or could not be

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* Individuals with suspect mumps who have been immunized with a mumps-containing vaccine in the last 5-42 days require specimen collection for viral detection (e.g., nucleic acid amplification testing) and subsequent genotyping. If wild-type mumps virus is detected, the case would be classified as confirmed. Those with evidence of vaccine-derived mumps virus on genotyping should be classified as adverse events following immunization (AEFI).

performed), without other apparent cause, and without an epidemiological link to a laboratory confirmed case.

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 probable).

Clinical Information

Clinical Evidence

Clinical illness is characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary glands, lasting greater than two days, and without another apparent cause.

Infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or other salivary gland swelling, mastitis or pancreatitis.

Up to one third of infections do not cause clinically noticeable parotid swelling and may primarily manifest with respiratory tract symptoms.

Clinical Presentation

Fever, swelling and tenderness of one or more salivary glands are characteristic of mumps.[1] Parotitis (inflammation of the parotid gland) will develop in about 40% of those infected, 25% of which is unilateral.[3] In approximately 20% to 30% of mumps cases, infections are subclinical, but remain communicable.[1,4] Nonspecific or primarily respiratory symptoms that occur in about 50% of those who acquire infection can add to the difficulty in diagnosing mumps.[3,4] Orchitis (testicular inflammation) is a relatively common complication among post-pubertal males (20-30%), whereas oophoritis (ovarian inflammation) among females is relatively rare.[1,3] In general, permanent sequelae such as infertility and sensorineural hearing loss are rare, although mumps infection in adults is more likely to be severe and result in complications.[2,3]

Mumps was a major cause of viral meningitis prior to widespread use of mumps-containing vaccine. Mumps infection during the first trimester of pregnancy may increase the rate of spontaneous abortion, but mumps infection during pregnancy has not been associated with congenital malformations.[3]

Laboratory Evidence

Laboratory Confirmation

Any of the following are considered appropriate laboratory methods for meeting the confirmed case definition above:

- Positive mumps virus culture
- Positive Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) for mumps virus RNA
- Positive mumps IgM with clinical illness with an epidemiological link or recent travel to an area of known mumps activity
- Mumps IgG seroconversion between acute and convalescent sera

Approved/Validated Tests

- Standard culture for mumps virus
- RT-PCR for mumps virus RNA
- Commercial tests for anti-mumps IgM and IgG antibodies

Follow PHO Laboratory guidance regarding appropriate specimens for each testing methodology.

Indications and Limitations

- IgM serology for mumps is most useful in cases of primary infection and may be of limited use in an individual who has a history of mumps vaccination.
- IgM serology has the potential for false-positive findings. In the absence of recent travel/exposure history, IgM results must be confirmed using other confirmatory methods as listed.
- A buccal swab, throat swab and urine are the recommended clinical samples for RT-PCR testing. In order to increase the overall sensitivity of testing, all three specimens should be submitted, as not all sites are positive at the same time.
- Further strain characterization is conducted for epidemiologic, public health and control purposes – this will be performed routinely on all PCR-positive specimens.
- The Canadian Public Health Laboratory Network has endorsed the addition of mumps RT-PCR testing as a standard approach for mumps virus RNA detection.

Optimal recovery of mumps virus or detection of mumps RNA is achieved if specimens are obtained within three to five days after symptom onset. Virus may still be detectable in buccal and throat swabs collected up to nine days and urine up to 14 days after symptom onset. Submission of all three specimens will increase case detection, as not all sites are PCR-positive at the same time. PCR testing of cerebrospinal fluid (CSF) should be ordered if there is clinical suspicion of meningitis or encephalitis.

For serology, acute serum specimen IgM and IgG for mumps should be collected as soon as possible or within five days of symptom onset. If the initial IgM antibody is negative or indeterminate at onset of illness and mumps is considered likely, a convalescent serum specimen for mumps IgM and IgG should be repeated at least ten to 14 days after the initial (acute) sample.

Due to changes in the laboratory assays used for mumps serology, there is no longer a standardized definition of a 'significant rise' in IgG titre. This is a change from previous case definitions which included a significant rise in IgG titre (e.g., fourfold or greater) between acute and convalescent serum samples when tested in parallel using older assays.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories.

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.

All clinical cases should be managed as confirmed cases until laboratory evidence suggests otherwise.[4] Cases should be advised to stay home from school or post-secondary educational institutions, child care settings, workplaces, and other group settings for five days after onset of parotid swelling or symptom onset if parotitis is not present. Self-isolation of the case will prevent exposure of susceptible individuals to the virus.[4]

A health care worker (HCW) who has had an exposure to a person who has mumps, either in the health care setting or in the community, must report to Occupational Health and/or Infection Control at the facility where they work. Refer to the Mumps Surveillance Protocol for Ontario Hospitals for the definition of an exposure.[11]

Contact Management

Contacts are defined by the fulfillment of at least one of the following criteria during the infectious period (i.e., approximately seven days before to five days after onset of parotid swelling or symptom onset if parotitis is not present):[4]

- Household contacts of a case;
- Persons who share sleeping arrangements with the case, including shared rooms (e.g., dormitories);
- Direct contact with the oral/nasal secretions of a case (e.g., face-to-face contact, sharing cigarettes/drinking glasses/food/cosmetics like lip gloss, kissing on the mouth);
- Children and staff in child care and school facilities (as deemed necessary by the epidemiology of the outbreak); or
- A HCW who provided care within one metre of a case of mumps without Personal Protective Equipment (PPE). The recommended distance for droplet precautions in patients who have acute respiratory infections that cause coughing and sneezing is two metres because coughing and sneezing results in forceful projection of potentially infectious respiratory droplets. For mumps, one metre is adequate for interruption of transmission to HCWs and patients.[11]

Susceptible contacts include:[4]

- Those born in Canada in 1970 or later who have not received two doses of mumps- containing vaccine (at least 4 weeks apart) on or after their first birthday;
- Those without past history of laboratory confirmed mumps; and
- Those without documented immunity to mumps.

It should be noted, that while persons who have received two doses of mumps containing vaccine are not considered “susceptible contacts”, there may be secondary cases in this group as a result of waning immunity, especially if they have been vaccinated greater than ten to 12 years prior to exposure.[3,12-14]

Susceptible HCWs should follow the Mumps Surveillance Protocol for Ontario Hospitals.[11]

Post-exposure prophylaxis with mumps immune globulin (Ig) is ineffective.[2,4] Contacts should be advised of signs and symptoms of mumps infection that can occur within 25 days of exposure, to seek medical attention upon symptom onset if required, and to inform the local board of health.

Assessment of immunization status and immunization with a mumps-containing vaccine as appropriate for age and risk factors should be conducted for susceptible contacts.[4] Although mumps immunization after exposure to mumps may not prevent the disease, should the exposure not result in infection, the vaccine will confer protection against future exposures.[3]

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.

Outbreaks provide the opportunity to update the immunization status of contacts if required and to recommend immunization to all those who are not up to date in their mumps immunization. Based on local assessment and recommendations, an outbreak dose (for example a possible third dose) of mumps containing vaccine in an outbreak setting may be provided to individuals who are part of a group or population who are at increased risk of acquiring mumps. In the event that publicly funded vaccine doses are needed, the board of health should contact the ministry's immunization program at vaccine.program@ontario.ca as soon as possible.

Prevention and Control Measures

In the event that publicly funded vaccine doses are needed for case and contact management, the board of health should contact the Ministry of Health's (ministry) immunization program at vaccine.program@ontario.ca as soon as possible.

Personal Prevention Measures

Immunize as per the current Publicly Funded Immunization Schedules for Ontario.[8]

In Ontario, the Immunization of School Pupils Act (ISPA) is the legislation that governs the immunization of school pupils for the designated diseases that are included in the Act. All students without a valid exemption must have documented receipt of two doses of mumps containing vaccine according to the specified schedule.[9]

Mumps-containing vaccine is usually given as measles-mumps-rubella (MMR) or measles-mumps-rubella- varicella (MMRV) depending upon age. The first dose must be given on or after their first birthday, and the second dose is routinely given between 4 and 6 years of age.

In Ontario, the *Child Care and Early Years Act, 2014* (CCEYA) is the legislation that governs licensed child care settings. Pursuant to O. Reg. 137/15 under the CCEYA, children who are not in school and who are attending licensed child care settings must be immunized as recommended by the local medical officer of health prior to being admitted. Under the CCEYA parents can provide a medical reason as to why the child should not be immunized or object to immunization on religious/conscience grounds.[10]

Infection Prevention and Control Strategies

For hospitalized cases, droplet precautions, in addition to routine practices, are recommended until five days after onset of parotid swelling or symptom onset if parotitis is not present.[4]

Refer to PHO's website to search for the most up-to-date information on Infection Prevention and Control (IPAC).

Disease Characteristics

Aetiologic Agent - Mumps is caused by a RNA (ribonucleic acid) virus of the genus *Rubulavirus* in the *Paramyxoviridae* family.[1,2]

Modes of Transmission - Transmission is generally by droplet spread during face-to-face contact and direct contact with saliva or respiratory droplets from the nose or throat of an infected person. Mumps is spread through coughing, sneezing, sharing drinks, kissing, or from contact with any surface that has been contaminated with droplets containing the mumps virus.[3,4]

Incubation Period - The incubation period ranges from 12 to 25 days, commonly between 16 and 18 days.[1]

Period of Communicability - Mumps can be communicable from seven days before to five days after the onset of parotitis.[4] Recent evidence suggests that while mumps virus can be isolated from saliva and respiratory secretions for up to nine days after the onset of parotitis, there is a significant reduction in viral secretion by five days after symptom onset, thereby reducing the risk of transmission.[3,5]

Reservoir - Humans.[1]

Host Susceptibility and Resistance - After natural infection, immunity is generally lifelong.[1] Effectiveness of mumps vaccination after one dose is estimated to be between 62% and 91% and between 76% and 95% after two doses.[3] There is also evidence to suggest waning immunity after both one and two doses of vaccine.[3]

In Ontario, susceptibility of young adults to mumps infection identified in the cohort born between approximately 1970 and 1992 can be attributed to the receipt of only a single dose of mumps-containing vaccine, as well as reduced circulation of wild virus.[6]

Please refer to PHO's Reportable Disease Trends in Ontario reporting tool 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.

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Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.