

Health

Public Health and Primary Health Care
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January 25, 2012

Dear Colleague:

RE: Mumps

- Over the past month a small cluster of mumps has been observed in the Winnipeg area, primarily among partially immunized and unimmunized populations.
- Suspected clinical cases of mumps should be tested by buccal swab for viral culture/PCR in addition to serology. The Manitoba Health Communicable Disease protocol outlines the appropriate sampling methods for laboratory diagnosis as well as the recommended public health management of cases and contacts: <http://www.gov.mb.ca/health/publichealth/cdc/protocol/mumps.pdf>
- Healthcare providers are encouraged to review immunization histories and update vaccinations as required.

Please share this communication with all colleagues in your department, facility or clinic. For questions, please contact a local public health office or Manitoba Health at 788-8666 or check the CDC web page at <http://www.gov.mb.ca/health/publichealth/cdc/index.html>

Sincerely,



Dr. Richard Rusk
Medical Officer of Health
Communicable Disease Control

Additional Information for Physicians regarding Mumps

For more information on mumps, please visit:

- Manitoba Health <http://www.gov.mb.ca/health/publichealth/cdc/index.html>
- The MMR Vaccine fact sheet: <http://www.gov.mb.ca/health/publichealth/cdc/fs/mmr.pdf>
- Public Health Agency of Canada: <http://www.phac-aspc.gc.ca/mumps-oreillons/index.html>

Clinical information:

- **Incubation period:** 14 to 25 days, commonly 18 days.
- **Period of communicability:** 12th - 29th days after exposure. Maximum infectiousness occurs 2 days before symptoms until 4 days after. Asymptomatic transmission can also occur.
- Mumps symptoms include fever, parotid gland pain and enlargement, which is usually bilateral.
- Other infectious causes of unilateral parotitis can include mononucleosis, influenza and bacterial infections.
- Cervical lymphadenopathy is not usually a presenting feature of mumps.
- Orchitis, pancreatitis, meningitis, encephalitis and deafness can be complications of mumps and rarely may result in long term sequelae such as deafness and sterility.

Information regarding Laboratory Testing:

- Submit a swab taken from the area by the parotid duct which has been placed in viral transport medium. Viral swabs from the parotid duct are best collected within 5 days of disease onset; results of PCR are usually available within 2-5 days. Culture can take 10 days.
- Send 5-10 cc of acute and convalescent serum specimens (approx 10 days apart) for mumps antibodies, specifically requesting both IgM and IgG testing.
- Physicians are required to document on the requisition all clinical signs and symptoms and any epidemiological link to a known mumps case.
- All swabs for mumps detection, by culture or PCR, need to be received at the **Cadham Provincial Laboratory** within 24-48 hours of collections to preserve the optimal integrity of the specimens.
- **All three types of specimen should be submitted** however depending on the number of samples being received by the laboratory, and the timing of the sample prioritisation of testing may occur, and not all specimens may be processed.

Prevention of Secondary Transmission:

- A) Give the patient a surgical mask to wear and keep at least 1 metre away from other patients
- As always, have all staff wash hands before and after each patient contact;
 - Staff with face to face contact (<1 metre) with the patient should wear a mask especially if their immune status is not known. Unprotected exposures may result in health care workers being furloughed and thus can be disruptive to service provision;
 - Wear gloves and gown if likely to be exposed to respiratory secretions
- B) People with mumps should avoid close contact with others for **five (5)** days after the onset of parotid swelling, particularly those who have not had mumps or the mumps vaccine, or those who may have a weak immune system such as people receiving cancer treatment.

MMR Vaccine:

- One dose at age 1 and at age 4 – 6 years given at the time of their other preschool boosters.
- For adults born on or after 1970, one dose of MMR is recommended if the person has no evidence of being immunized against mumps on or after their first birthday, no laboratory evidence of immunity; and no history of laboratory-confirmed mumps disease.
- Adults such as health care workers, military recruits, and university students born on or after 1970 are recommended a second dose of the MMR vaccine.
- The vaccine status of close contacts who are born before 1970 (i.e., household and intimate contacts/exchange of saliva) should be assessed and updated so that they receive two doses of MMR. While the use of post-exposure vaccination has not been shown to be effective in preventing mumps, it will help protect against future exposures.
- Other targeted strategies may be considered by Public Health in the event of an outbreak.

Mumps



Communicable Disease Control Branch

1. Case Definition

1.1 Confirmed Case

Consistent clinical illness^a with laboratory confirmation of infection in the absence of recent immunization^b with mumps-containing vaccine.

- Isolation of mumps virus from an appropriate clinical specimen
- or
- Detection of mumps virus RNA
- or
- Seroconversion or a significant rise in mumps IgG titre between acute and convalescent sera by any standard serologic assay
- or
- Positive serologic test for mumps IgM antibody^c 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^a in a person with an epidemiological link to a laboratory-confirmed case (1).

1.2 Probable Case

Clinical illness^a in the absence of appropriate laboratory test results (i.e., no laboratory tests have been performed) and in the absence of an epidemiologic link to a laboratory-confirmed case in a person who has recently been to an area of known mumps activity (1).

Note: Surveillance for mumps focuses on evident disease rather than infection. Therefore, surveillance definitions do not take into account asymptomatic or subclinical infections that may be detectable by laboratory methods.

2. Reporting Requirements

Laboratory:

- All positive laboratory results should be faxed (204-948-3044 secure fax) to Manitoba Health, Public Health Surveillance Unit.
- Operators of Manitoba clinical laboratories are required to submit to Cadham Provincial Laboratory (CPL) the residual serum, plasma or respiratory specimens or respiratory viral isolate sub-cultures from individuals who tested positive for mumps virus within seven days of report.

Health Care Professional:

- The *Communicable Disease Control Investigation Form* (available at: www.gov.mb.ca/health/publichealth/cdc/protocol/form2.pdf) should be faxed (204-948-3044 secure fax) to Manitoba Health, Public Health Surveillance Unit when a health professional becomes aware that a person meets or has recently met the probable or confirmed case definition for mumps.

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- a Characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting > 2 days, and without other apparent cause. A laboratory-confirmed case may not exhibit clinical illness, as up to 30% of cases are asymptomatic (1).
 - b The most frequent reaction to Measles-Mumps-Rubella (MMR) immunization is malaise and fever (with or without rash) occurring 7-12 days after immunization. Parotitis has occasionally occurred after immunization. However, this should be determined for each case as these reactions and timeframes can vary (1) (refer to current *Canadian Immunization Guide*).
 - c IgM serology may be a false positive. If the clinical presentation is inconsistent with a diagnosis of mumps or in the absence of recent travel/exposure history, IgM results must be confirmed by another listed confirmatory method (1).

3. Clinical Presentation

Prodromal symptoms are usually non-specific and may include low-grade fever, anorexia, malaise and headache (2). The most prominent manifestations of this disease are swelling and tenderness of the salivary glands; one or both parotid glands are affected in most cases (2). Generalized nonspecific symptoms or primarily respiratory symptoms occur in about half of infected persons (3). Symptoms usually resolve three to 10 days after onset of illness (2). Subclinical infection is common (3).

Central nervous system (CNS) involvement (i. e., aseptic meningitis) is the most common extrasalivary gland manifestation of mumps (2, 4). Orchitis is a common complication in men after puberty, but seldom results in sterility (5). Other rare complications include arthritis, thyroiditis, mastitis, glomerulonephritis, myocarditis, endocardial fibroelastosis, thrombocytopenia, cerebellar ataxia, transverse myelitis, ascending polyradiculitis, pancreatitis, oophoritis and deafness (5).

In the absence of immunization, mumps usually occurs in childhood (5). Infection tends to be more severe in adults (5). There is no firm evidence that mumps during pregnancy causes congenital abnormalities (2, 5). Mumps infection during the first trimester of pregnancy is associated with an increased rate of spontaneous abortion (5).

4. Etiology

Mumps virus is a member of the Paramyxoviridae family (2), genus Rubulavirus (6). Multiple genotypes (strains) of the mumps virus exist (7), but there is only one serotype (2).

5. Epidemiology

5.1 Reservoir and Source

Humans are the only known natural host (2). A carrier state is not known to exist in humans (2).

5.2 Transmission

By droplet spread and by direct contact with the saliva of an infected person (e.g., from coughing,

sneezing, sharing drinks or kissing) (6, 7). Immunized individuals do not transmit mumps vaccine virus (5). Importation from countries with low vaccine coverage rates presents an ongoing risk to under-vaccinated individuals and communities (8).

5.3 Occurrence

General: Endemic worldwide (2). In temperate climates, winter and spring are peak seasons (6). The incidence of mumps remains high in countries without childhood mumps vaccination, particularly in children aged five to nine years (6).

Canada: From 2000-2006, an average of 79 cases were reported annually, ranging from 28 in 2003, to 202 cases in 2002 (9). The age distribution of mumps in Canada has changed following the introduction of universal childhood immunization—the proportion of cases aged 20 years and older increased from 14% in 1988-1990, to 64% in 2003-2005 (9). Conversely, the proportion of cases aged 1-9 years fell from 49% to 17% during the same period (9).

Manitoba: Three cases were reported in 2006, eight cases in 2007 and two cases in 2008. In 2007, cases occurred over a wide age distribution, from under one year of age to 40-49 years. In 2009, an outbreak occurred in a correctional facility, resulting in five cases.

5.4 Incubation Period

The average incubation period for mumps is 16-18 days with a range of 12-25 days (5, 6).

5.5 Host Susceptibility and Resistance

Mumps is uncommon in infants younger than one year of age due to transplacental maternal antibody (2). Mumps infection confers lifelong immunity (2). The duration of vaccine-induced immunity is unknown (9). Mumps outbreaks have been reported in highly vaccinated populations (3, 10-13). It is not known whether primary vaccine failure or waning immunity is the reason for mumps in vaccinated individuals (9). Individuals are presumed to be immune to mumps if they have documented evidence of vaccination (2 doses of mumps-containing vaccine at least 28 days apart)

on or after their first birthday, laboratory evidence of immunity, documented history of laboratory-confirmed mumps infection, or if they were born before 1970^d (3, 9). Individuals born between 1970 and 1990 (to a lesser extent through 1994) should be considered susceptible in the absence of evidence of immunity as they are too young to have acquired natural immunity and too old to have been included in the routine two-dose measles-mumps-rubella (MMR) immunization programs (7).

In 1996 a second dose of MMR vaccine for protection against measles was introduced in Manitoba, given at school entry to children born during or after 1991. A school-based catch-up program for children born during 1985 to 1990 was also introduced in Manitoba in 1996 using the measles-rubella (MR) vaccine (mumps vaccine was not included).

5.6 Period of Communicability

Virus is isolated in saliva from seven days before the onset of parotitis to nine days afterwards and in urine from six days before onset of parotitis to 15 days after. Maximum infectiousness occurs from two days before onset of illness to four days afterwards. Persons with inapparent illness can transmit infection (6). **For this document, the period of communicability is considered to be from seven days before to five days after onset of parotitis (5-7, 14).**

6. Laboratory Diagnosis

Information which must be provided on the laboratory requisition by the health care provider:

- Brief clinical history (signs and symptoms)
- Date of onset of symptoms
- Date of collection of specimen
- Type of specimen
- Any epidemiological link to a known mumps case

Testing for mumps-specific IgM-class antibody has sub-optimal sensitivity for the diagnosis of acute

cases in partially immunized populations (7). Of the tests which are currently available for viral detection, reverse transcriptase polymerase chain reaction (RT-PCR) is preferred (7). Both swab for viral detection and serology specimen should be submitted; however, depending on the number and timing of samples received by the laboratory, prioritization of testing may occur. Therefore, not all specimens may be processed.

Viral Detection:

Cadham Provincial Laboratory (CPL) virology section (204-945-6123, after hours 204-945-6655) should be consulted prior to sending specimens for virus detection. All specimens for mumps virus detection by culture or mumps virus RNA (RT-PCR) should be transported with a cold pack (to maintain a temperature of approximately 4°C) to CPL as soon as possible (within 24-48 hours of collection to preserve optimal specimen integrity).

A swab^e should be taken from the buccal mucosa in the area by the parotid duct (second upper molar area, i.e., space between the cheek and back teeth adjacent to the swollen gland) and placed in viral transport medium. For unilateral parotitis, the swab should be collected from the affected side. Optimal time for collection is within five days of symptom onset. Results for detection of mumps virus RNA (RT-PCR) are usually available within three to five days. Virus isolation by culture may take up to 10 days.

Serology:

Acute and convalescent serum specimens (5-10 cc each) for detection of mumps antibodies should be sent approximately 10 days apart. Both mumps IgM and mumps IgG testing should be specifically requested.

d The age at which natural immunity to mumps can be assumed to have been acquired is not known with certainty. Some individuals born before 1970 may still be susceptible to mumps (7).

e Acceptable swabs include either flocced or non-flocced Dacron, nylon or rayon tipped swabs. Calcium alginate swabs are not acceptable, nor are swabs with wooden or aluminum shafts.

7. Key Information for Public Health Response

- Immunization history including date(s) and type of vaccine if known.
- Recent exposure/travel history of cases (e.g., 12-25 days before onset of parotitis).
- Identification and appropriate follow-up of susceptible contacts.

8. Control

8.1 Management of Cases

Reported cases are referred by Manitoba Health to the Regional Health Authority (RHA) of patient residence or First Nations Inuit Health (if applicable) for follow-up. Probable cases should be managed as confirmed cases until laboratory evidence becomes available (7).

- Droplet Precautions in addition to Routine Practices should be followed when individuals with probable mumps present to a health care setting. Refer to *Infection Control Guidelines: Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care. Canada Communicable Disease Report CCDR, 1999; 25S4: 1-142.*
- All cases should be offered supportive care and be encouraged to practice good hand hygiene, avoid sharing drinking glasses or utensils, and cover coughs and sneezes with a tissue or forearm (7).
- All cases should be advised to stay home (self-isolate) from school, post-secondary educational institutions, child care facilities, workplaces and other group settings for five days after symptom onset (7). Cases should be advised to present to health care facilities only for urgent medical issues during this time.

- Cases who are health care workers (HCWs) should be advised to immediately notify Occupational Health and/or Infection Prevention and Control for the facility/regional program in which they work and in consultation with them determine fitness to return to work (7). A health care worker (HCW) includes individuals who have the potential to acquire infection from or transmit infection to others (e.g., patients, staff members, visitors) during the course of their work and includes nurses, physicians, other hospital workers, students, volunteers, home-care workers, emergency responders, and support staff (7).

Public Health Measures:

- **Exclusion of Cases:** It is recommended that cases be excluded from school, workplace, community settings and health care facilities (except for urgent medical issues) until five days after onset of parotitis (6, 7, 14-16). Care givers should be advised to keep excluded children away from other children and susceptible adults during the exclusion period (7).
- **Hospitalized Patients:** Cases in health care facilities should be managed with Droplet Precautions in addition to Routine Practices until five days after symptom onset (7).

8.2 Management of Contacts

The Regional Health Authority of case residence or First Nations Inuit Health (FNIH) (if applicable) will contact reported cases to establish a list of exposed persons and identify susceptible contacts.

Definitions:

Contact: An individual meeting one or more of the following criteria within the period of communicability of the mumps virus (i.e., approximately seven days before to five days after onset of parotitis):

- living in the same household as a case;
- sharing sleeping arrangements with a case, including shared rooms (e.g., dormitories);
- having direct contact with the oral/nasal secretions of a case (e.g., face-to-face contact, sharing cigarettes/drinking glasses/food/cosmetics such as lip gloss, kissing on the mouth);
- children and staff in child care and school facilities (if applicable based on the epidemiology of the outbreak);
- in the health care setting (includes acute care and long-term care facilities, as well as home care): if unprotected face-to-face interaction within one metre of an infectious mumps case occurred (7).

Susceptible Contact: For HCWs, refer to “Contacts who are Health Care Workers (HCWs)” below. A contact (defined above) born during or after 1970^f and not meeting any of the following criteria:

- Documented evidence of vaccination with two doses of mumps-containing vaccine administered at least 28 days apart on or after their first birthday;
- Laboratory evidence of immunity^g;
- Documented history of laboratory confirmed mumps infection (9).

8.21 *Recommendations for Susceptible Contacts*

- Susceptible contacts should be offered immunization with measles-mumps-rubella (MMR) vaccine unless contraindicated (7). Although mumps immunization after exposure to mumps may not prevent the disease, it does not confer greater risk than administering the vaccine at other times (3). Should the exposure not result in an infection, the vaccine should confer protection against future exposures (3). A second post-exposure dose of MMR vaccine given at

least 28 days after the first post-exposure dose is indicated only for susceptible contacts who received no doses of mumps-containing vaccine prior to the exposure (i.e., no pre-exposure doses). Susceptible contacts who received one dose of mumps-containing vaccine prior to the exposure (i.e., pre-exposure dose) do not require a second post-exposure dose of MMR vaccine. Routine post-immunization serology is not indicated (3). Passive immunization with immunoglobulin (Ig) is not effective in preventing mumps (7).

- Susceptible contacts should be educated about the early signs and symptoms of mumps and advised to present to a health care provider should symptoms occur (7). It is recommended that symptomatic contacts call first before presenting to a health care facility or provider to reduce the possibility of transmission (7).
- Quarantine of mumps-susceptible contacts is not recommended (7).
- All susceptible contacts should be encouraged to practice good hand hygiene, avoid sharing drinking glasses or utensils, and cover coughs and sneezes with a tissue or forearm.
- Susceptible contacts that are in a health care facility should be managed using Droplet Precautions in addition to Routine Practices from day 10 after first exposure until day 26 after last exposure inclusive to cover the incubation period and prevent potential transmission of disease (7).

f The age at which natural immunity to mumps can be assumed to have been acquired is not known with certainty. Some individuals born before 1970 may still be susceptible to mumps (7).

g Routine pre-employment laboratory screening for mumps immunity is not recommended.

8.22 Recommendations for Contacts who are Health Care Workers (HCWs)

Refer to contact definition above. The recommendations below apply to all exposed HCWs^h, regardless of the HCW's birth date (i.e., if born before, during or after 1970) (7).

Advise HCWs to immediately notify Occupational Health and/or Infection Prevention and Control for the facility/regional program in which they work who will:

- Provide information about mumps disease and its symptoms;
- Assess immunity to mumps if not previously assessed and provide immunization when necessary unless contraindicated (e.g., pregnant, immunocompromised):
 - If prior documented two doses of mumps-containing vaccine, can return to work immediately;
 - If documented laboratory-confirmed mumps infection, can return to work immediately;
 - If documented one dose of mumps-containing vaccine, provide a dose of MMR vaccine and return to work immediately; or
 - If undocumented immunization history and no previous laboratory-confirmed mumps infection:
 - Draw blood for mumps IgG serology;
 - Provide a dose of MMR vaccine (after blood specimen taken);
 - Begin HCW exclusion from day 10 after first exposure until serology results are received;
 - When serology results are received:
 - If mumps IgG positive, consider immune and allow

return to work but consider a second MMR vaccine dose for adequate measles protection.

- If mumps IgG negative, then consider susceptible, provide a second dose of MMR vaccine 28 days after the first and continue to exclude from work until day 26 after last exposure inclusive to prevent potential transmission of disease.

8.3 Management of Outbreaks

Definition of Outbreak: Confirmed cases in excess of what is expected in the jurisdiction over a given period of time (7).

Refer to sections 8.1 and 8.2 above for management of cases and contacts.

Additional Recommendations:

- Public notification should occur: the level of notification will be at the discretion of regional Public Health and/or the Office of Disaster Management.
- Mumps-containing vaccine should be given to susceptible at-risk populations during outbreaks, unless contraindicated. At-risk populations will need to be defined by the specifics of the outbreak. No more than two doses of MMR vaccine are currently recommended (9).
- Parents/guardians of students who continue to be exempted from mumps immunization because of medical, religious or other reasons should be advised about the signs, symptoms and potential complications of mumps infection and the need for exclusion of children who develop symptoms.

^h As the recommendations in this protocol reflect recent updated Public Health Agency of Canada guidelines, implementation in regions/health care facilities will occur over time.

Refer also to the Public Health Agency of Canada document *Guidelines for the Prevention and Control of Mumps Outbreaks in Canada*.

8.4 Preventive Measures

- Prompt identification and management of cases and contacts as described above in sections 8.1 and 8.2.
- Routine Practices in health care settings.
- In non-health care settings:
 - Cleaning frequently touched environmental surfaces with a household cleaner on a regularly scheduled basis
 - Practicing cough etiquette and hand hygiene on a regular basis
 - Cleaning reusable items contaminated with respiratory secretions
- Immunization:

Note: Not all recommended vaccines and immune globulins are provided by Manitoba Health (e.g., second MMR dose for adults who are students at post-secondary institutions). Refer to eligibility criteria for high risk individuals available at:

www.manitoba.ca/health/publichealth/cdc/vaccineeligibility.html

- Children: Routine two-dose immunization of all children, unless contraindicated (3). Infants should receive a first dose combined with measles and rubella vaccines (MMR) on or shortly after their first birthday; the second dose should be given at least 28 days after the first dose and after 15 months of age, but before school entry (3).
- Adults (non-HCWs): Recommendations for HCWs are covered in the section below.
 - Immunization of non-immune adults (i.e., born during or after 1970), unless contraindicated (9).

- A second dose of MMR should be offered only to adults born during or after 1970 who are at greater risk of exposure specifically (9);
 - Military recruits
 - Students at post-secondary institutions
- One dose of MMR vaccine could be considered among high-risk adults (e.g., military personnel) born before 1970 who do not have laboratory evidence of immunity or a history of laboratory-confirmed mumps disease (9).

Please refer to the supplemental statements from the National Advisory Committee on Immunization (NACI) for more information. Refer to the current *Canadian Immunization Guide* as well as the manufacturer's package insert instructions for clinical use information on mumps-containing vaccine.

For Health Care Workers (HCWs):

Note 1: Mumps outbreak management recommendations below reflect recent updated Public Health Agency of Canada guidelines (7).

- Pre-placement of HCWs: Occupational Health or equivalent should document HCW immune status at the pre-placement examination and provide MMR vaccine if not immune. An HCW is considered immune to mumps if there is:
 - Documented evidence of vaccination with two doses of mumps-containing vaccine administered at least 28 days apart on or after their first birthday.
 - Laboratory evidence of immunityⁱ.
 - Documented history of laboratory confirmed mumps infection.

ⁱ Routine pre-employment laboratory screening for mumps immunity is not recommended.

- Existing HCWs: Occupational Health or equivalent should provide MMR vaccine to all HCWs who are not immune to mumps and who do not have a valid contraindication to measles, mumps and rubella (MMR) vaccine.

9. Additional Resources

- Manitoba Immunization Schedules – available at:
www.manitoba.ca/health/publichealth/cdc/schedule.html
- Canadian Immunization Guide*

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