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Unless otherwise stated the content of this guideline has been adapted from BCCDC Communicable Disease Mumps Guideline June 2014

1.0 AUTHORITY

Yukon Public Health and Safety Act (2009). Available at http://www.hss.gov.yk.ca/ifo_professionals.php

2.0 GOAL

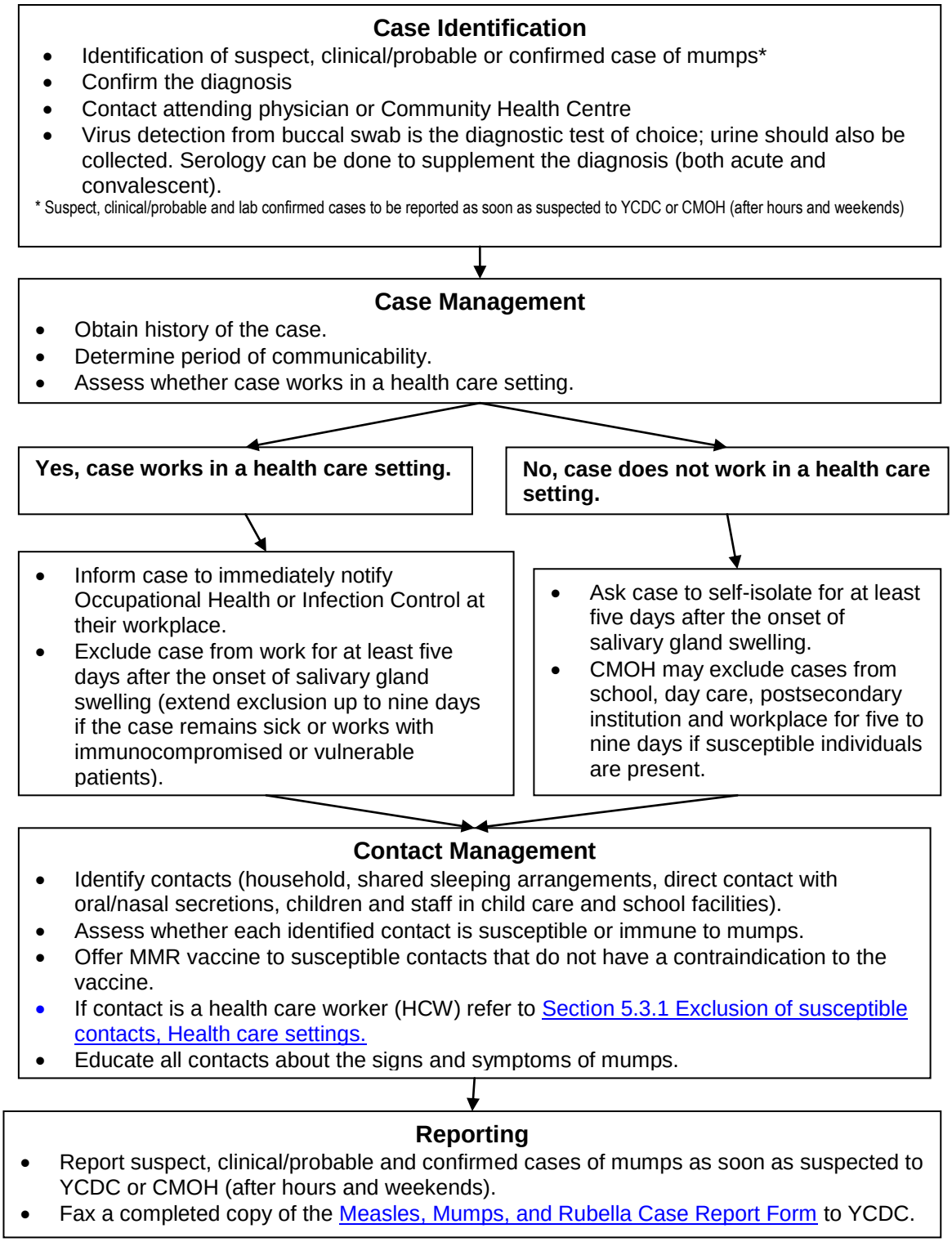
Mumps goals for Canada were established at a consensus conference in 1994. Yukon has adopted the national goal to maintain an active prevention program for mumps to minimize serious sequelae from the disease.

This will be accomplished by:

- Delivery of on-time immunization to children at 12 months and 4-6 years of age
- Immunization of previously unimmunized children and adults at opportune health encounters
- Case management and contact follow-up
- Reporting of probable, suspect/clinical and confirmed cases of mumps.

3.0 MUMPS FLOW CHART

The flow chart below describes actions to be taken by public health when notified of a case of mumps



4.0 CASE MANAGEMENT

4.1 Confirm the Diagnosis

Investigate all clinically identified and laboratory reported cases of mumps as soon as possible. Inform YCDC or CMOH as soon as possible of all suspect, clinical/probable and confirmed cases of mumps.

MUMPS CASE DEFINITION

Surveillance	Definition	Reportable to YCDC
Confirmed case	Mumps-compatible illness[1] and laboratory confirmation of infection in the absence of recent immunization with mumps-containing vaccine (i.e., within the previous 28 days): • isolation of mumps virus from an appropriate clinical specimen **OR** • detection of mumps virus RNA **OR** • Seroconversion or a significant rise (e.g., fourfold or greater) in mumps IgG titre by any standard serologic assay between acute and convalescent sera **OR** • Detection of mumps IgM antibody[2] 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** • Mumps-compatible illness[1] in a person with an epidemiologic link to a laboratory-confirmed case	Yes
Clinical/ Probable case	Mumps-compatible illness[1] in the absence of laboratory confirmation of infection and not epidemiologically linked to a laboratory-confirmed case.	Yes
Suspect case	Illness consistent with mumps[3] but without parotitis or orchitis, in a person who is a contact of a confirmed or clinical mumps case.	Yes

1. Mumps-compatible illness is characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, or orchitis, lasting $\geq$ 2 days, and without other evident cause.
2. IgM serology has the potential for false positive and false negative findings. 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 the other listed confirmatory methods. In a mumps case that had been previously immunized, the IgM class antibody response may not be detectable.
3. Illness consistent with mumps may include myalgia, anorexia, malaise, headache, low-grade fever, or non-specific respiratory symptoms.

4.2 Laboratory Testing

Probable and suspect cases of mumps should be tested ***by both virus detection*** (by RT-PCR testing and/or isolation in cell culture) ***and serology***. Specimens should be sent to the Whitehorse General Hospital Laboratory – notify the laboratory if priority testing is required. The WGH Laboratory will then forward the specimens to BCCDC laboratory for processing.

4.2.1 Virus Identification

The reverse transcriptase polymerase chain reaction (RT-PCR) assay is the test of choice for the definitive diagnosis of an acute mumps infection, but its sensitivity can be influenced by the following:

- timing of the specimen collection in relation to onset of illness; and
- specimen integrity (rapid specimen processing).

If client presents at ≤ five days after symptom onset, collect oral specimen. Buccal swab or saliva from the buccal cavity collected within the first three to five days of parotitis or symptom onset is the preferred specimen.

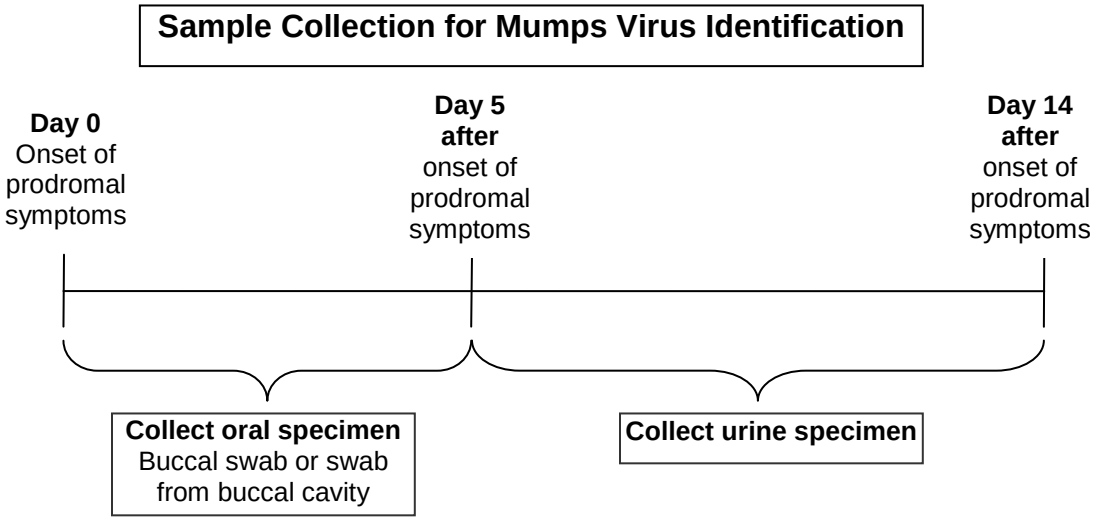
If client presents at > five days after symptom onset, collect urine specimen.

Oral specimen: These specimens are optimal for mumps virus detection and isolation purposes; in particular, buccal swabs or swabs of the area around Stensen's duct. If possible the parotid gland should be milked (stroke anteriorly to the ear lobe forward and down) and the specimen collected at the exit of the parotid duct (also known as Stensen's duct) which opens into the vestibule of the mouth opposite the upper second molar. Use a synthetic swab or a plain Dacron swab for collection of the specimen. Synthetic swabs are preferred over cotton swabs which may contain substances that are inhibitory to enzymes used in RT-PCR. Place swabs in standard viral transport media (VTM).

- Collect oral specimen within five days of onset of symptoms.
- In those who have not been previously immunized, the virus can be isolated from the saliva for up to five days after onset of symptoms, and from the urine for up to two weeks. In previously vaccinated individuals, the virus may only be detected by RT-PCR within the first three days of presentation as it is cleared much more quickly than among those not immunized.

Urine specimen: Mumps has been detected in urine by isolation in cell culture up to 14 days after the onset of prodromal symptoms. Limited data suggest that the virus may be detected in urine samples later (> four days post-onset) than oral specimens. Mumps outbreak experiences suggest that urine is not as sensitive as oral specimens. Nevertheless, in outbreaks of mumps, seven per cent of cases have been detected solely through testing the urine by RT-PCR.

Note: Keep samples refrigerated (~4°C) and send as soon as possible to the Whitehorse General Hospital Lab.



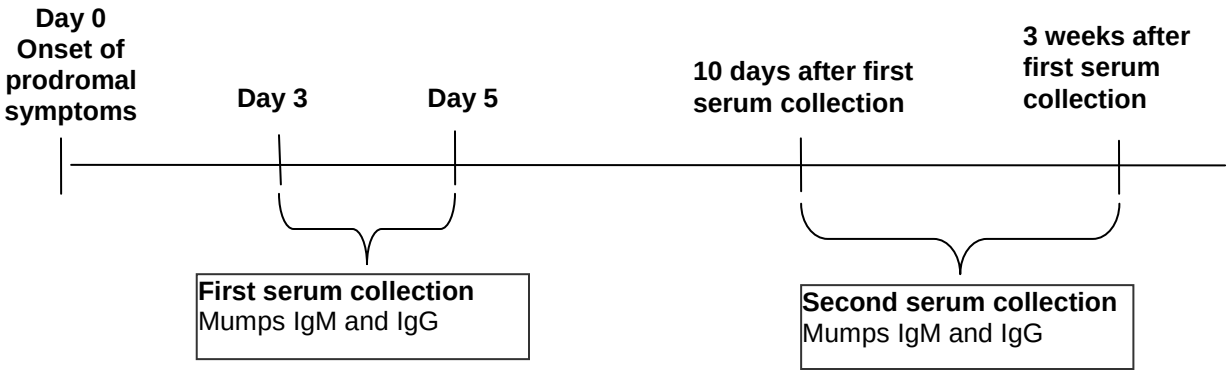
4.2.2 Serology

Collect both acute and convalescent serum specimens. The first **(acute)** serum sample should be collected as soon as possible upon suspicion of mumps and within five days after symptom onset. If mumps IgM class antibody is not detectable in a mumps-compatible case, the blood may have been drawn too early. Collect another sample for retesting. The second **(convalescent)** serum should ideally be collected at least 10 days and up to three weeks after the first sample.

- In ***unvaccinated*** persons, the best time to collect serum is between three and five days from the onset of prodromal symptoms but specimens may be collected at the time of presentation. In unvaccinated cases, IgM antibody is present by day five post onset of prodromal symptoms and peaks after about one week. If IgM class antibody is not detectable and the specimen was collected early in the illness, a second acute specimen should be obtained. IgM class antibody can be detected for at least six weeks.
- Serology may be difficult to interpret in previously immunized people or those recently immunized against mumps. In previously ***vaccinated*** persons, the IgM antibody response to mumps infection is highly variable and may be absent. The existing IgG antibody will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG antibody may already be quite elevated and may obscure the four-fold rise typically observed between acute and convalescent serum specimens in previously unvaccinated individuals.

For persons with probable mumps, and where laboratory confirmation is not available, discuss further course of action with the Chief Medical Officer of Health.

Serum Collection for Mumps



4.3 Interpretation of Test Results

For interpretation of serial acute/convalescent IgG results, an increase of approximately 25 per cent or more from the acute to convalescent value is deemed significant and indicative of a recent infection. This magnitude of increase is consistent with a four-fold or greater rise in IgG titres.

Mumps Testing Results

Test Result	Interpretation
Positive PCR (oral swab or urine), regardless of serology result	Acute mumps infection.
Reactive IgM antibody	Possible acute mumps infection. **Note**: without additional confirmatory testing (i.e., IgG seroconversion or virus identification), this may be a false positive IgM result. Such cases should be reported as clinical/probable unless epidemiologically-linked to a laboratory-confirmed case or outbreak related. An isolated IgM positive result in a person with negative IgG on both acute and convalescent testing is likely a false positive IgM, especially if sporadic and without contact with mumps.
Non-reactive or equivocal IgM antibody	Not acute mumps infection (unless blood was drawn too early) in an unvaccinated person, but does not rule out mumps in a previously vaccinated person. Viral identification is required for confirmation in previously vaccinated people with this serological result.
Reactive IgG antibody	Immunity to mumps. However, unlike for measles and rubella, there is no reliable serological correlate of protection for mumps IgG. The presence of mumps-specific IgG, as determined using an enzyme immunoassay (EIA), does not necessarily predict the presence of neutralizing antibodies and, thus, immunity. Mumps immunity testing by IgG is not considered as 'proof of immunity' in pre-exposure assessment and **should not** be conducted in this context.
Non-reactive or equivocal IgG antibody	Not immune to mumps.

4.4 Case History

In order to properly interpret laboratory results, consider both clinical and epidemiologic information along with the laboratory information. Prior vaccination history, travel history and timing of sample collection relative to disease onset are all factors that must be considered in the interpretation of lab results for the purpose of confirming mumps cases.

Determine **period of communicability**. Maximum infectiousness occurs between two days before to five days following the onset of parotid swelling. However, virus has been isolated from saliva from seven days before through nine days after onset of swelling and may be detected in urine for up to 14 days after onset of swelling. Unapparent infections can be communicable.

A Measles, Mumps, and Rubella Case Report Form is available to assist with data collection and recording.

See Section 10.0 Measles, Mumps, and Rubella Case Report Form.

4.5 Case Treatment

There is no specific treatment for mumps. All confirmed and clinical cases of mumps should be offered supportive care. Encourage cases to practise good hand hygiene, avoid sharing drinking glasses or utensils, and cover coughs and sneezes with a tissue or forearm.

Cases in health care facilities should be managed with droplet precautions (in addition to routine practices) until at least five days after symptom onset and up to nine days if symptomatic.

4.6 Exclusion of Cases

Clinical and suspect cases should be managed as confirmed cases until laboratory evidence suggests otherwise.

4.6.1 Exclusion of health care workers

Health care workers (HCWs) include and are not limited to nurses, physicians, physiotherapists, lab technicians, HCW students, volunteers, home care workers, emergency responders, and support staff in acute care, long-term care home care and community settings.

Advise the case to immediately notify Occupational Health and/or Infection Control and Manager for the facility in which they work.

If the case is a HCW, the CMOH will exclude them from work for at least five days after the onset of salivary gland swelling. This exclusion may be extended up to nine days if the HCW remains symptomatic or if they work with vulnerable patients (e.g., immunocompromised). Those working with immunocompromised or other vulnerable patients may be reassigned to another area after day five, at the discretion of Occupational Health.

4.6.2 Exclusion from workplace, school, or child care

Exclude cases from school, day care, post-secondary institution and the workplace for at least five days and up to nine days (if symptomatic) after the onset of salivary gland swelling if there are susceptible individuals present in that setting. The period of maximum communicability is from two days before to five days after onset of parotid swelling.

When the case is in a school setting, YCDC will notify the appropriate school administrator.

4.7 Airline Travel of a Case

If the case traveled by air during the infectious period, inform the CMOH. Contact tracing through a passenger manifest is not necessary. Inform YCDC so that other provincial/territorial jurisdictions may be notified to assist in mumps investigations should the exposure result in a recognized case of mumps.

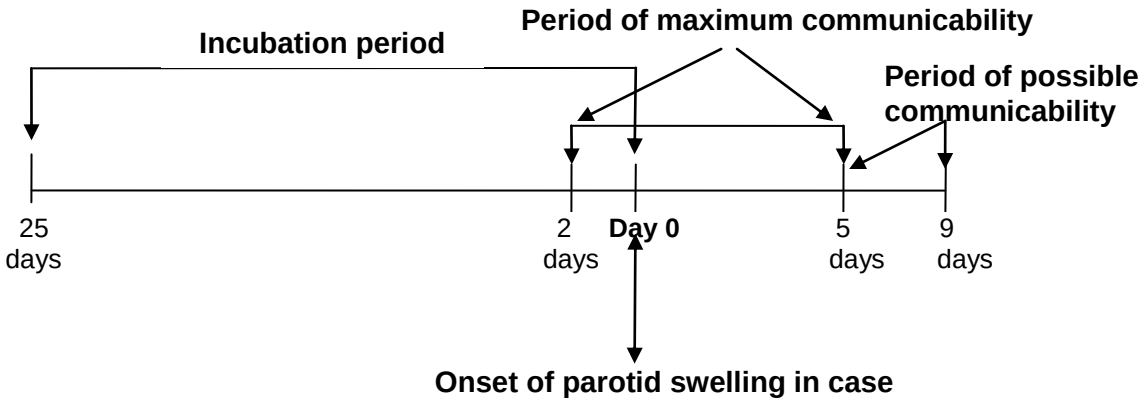
5.0 CONTACT MANAGEMENT

5.1 Contact Identification

Identify contacts. Contacts include those who have had the following types of contact with the case during the period of maximum communicability (i.e., during the two days prior to the onset of salivary gland swelling to five days after onset of salivary gland swelling):

- household contact
- persons who share sleeping arrangements with the case, including shared rooms (e.g., dormitories)
- direct contact with the oral/nasal secretions of an infectious case (e.g., close contact within a distance of two metres; 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)

The Measles, Mumps, and Rubella Case Report Form (Section 10.0) may be used for data collection.



Incubation period – usually 16 to 18 days to onset; ranges from 12 to 25 days after exposure.

Mode of transmission – Infection is spread through airborne transmission and direct contact with saliva or respiratory droplets from the nose or throat, spread through coughing, sneezing, sharing drinks, or kissing, or from contact with any surface that has been contaminated with the mumps virus.

Assess whether each identified contact is susceptible or immune to mumps. Those not immune are considered susceptible.

The following contacts are considered **immune** to mumps (i.e., **not susceptible**):

- have had a clinical diagnosis of acute mumps **and** laboratory confirmation of same; **or**
- born on or after January 1, 1970 with documented evidence of two doses of mumps-containing vaccine on or after the first birthday and given at least four weeks apart; **or**
- non-health care workers born before January 1,1970*
- health care workers:
    - born before January 1, 1957*
    - Born on or after January 1, 1957- Dec 31, 1969 ** with documented evidence of one dose of mumps-containing vaccine on or after the first birthday

*These persons are generally assumed to have acquired immunity to measles or mumps from natural infection. There may be susceptible individuals in this age group, however, and those without a history of measles or mumps vaccine or disease may be considered susceptible and offered MMR vaccine per the rountine schedule.

** On a case-by-case basis, individuals in this age group with a clear historic clinical diagnosis of mumps, in the absence of laboratory confirmation, may be assessed to be immune.

Given there is no known serologic threshold that correlates with immunity to mumps, mumps serology is not to be used for assessment of immunity. The only exception is post-exposure serology when no other information is available and a health care worker may need to be excluded.

Determine whether any of the identified contacts are health care workers (HCWs). If a contact is a susceptible HCW, advise that individual to notify Occupational Health and/or Infection Control and manager for the facility in which the HCW works.

Investigate the possibility of additional suspect cases among the contacts.

5.2 Immunoprophylaxis of Susceptible Contacts

Offer MMR vaccine to susceptible contacts that do not have a contraindication to the vaccine. Although mumps immunization after exposure to mumps may not prevent the disease, it is not harmful. Should the exposure not result in an infection, the vaccine will confer protection against future exposures. There is no evidence that the risk of vaccine-associated adverse events increases if vaccine is administered to persons incubating mumps disease.

Testing for antibody to mumps virus to identify susceptible individuals prior to immunizing should not be done because a serological correlate of protection has not been established. The presence of pre-existing anti-mumps antibody is not a contraindication to mumps immunization.

On rare occasions, mumps vaccine can cause parotitis which may be clinically indistinguishable from mumps infection. Parotitis associated with mumps vaccine most commonly occurs within 10 to 14 days of immunization. Virus isolation and typing will distinguish wild from vaccine strain virus.

The serologic response to vaccine is indistinguishable from wild type infection because IgM can be elevated by vaccine or infection. In contacts that have received mumps vaccine post-exposure and develop symptoms of mumps, specimens must be collected for virus identification to confirm the diagnosis of mumps as serology will not be helpful.

Immune globulin is not recommended for mumps for post exposure prophylaxis.

5.3 Exclusion of Susceptible Contacts

5.3.1 Health care settings

Susceptible HCWs who are contacts of a mumps case should be excluded from the health care setting from the 10th day after the first exposure until the 26th day (inclusive) after the last exposure to the case of mumps, **regardless** of receipt of post-exposure mumps vaccine. These time intervals reflect the incubation period and the potential period of communicability before the possible onset of symptoms.

5.3.2 School, child care, and post-secondary educational settings

Exclusion of susceptible contacts to a mumps case is **not** indicated.

5.4 Contact Education

Advise susceptible contacts:

- about the signs and symptoms of mumps, how it is transmitted, and to isolate themselves at home immediately if any symptoms of mumps develop until an assessment has been done to confirm a diagnosis of mumps;
- to observe for signs and symptoms of mumps beginning 10 to 25 days after the first contact with a case;
- to rapidly report any symptoms compatible with mumps to their doctor/health care provider. Advise them to call ahead before going to any health care facility, including laboratories, to inform the staff of mumps symptoms so that they can be isolated on arrival to avoid exposing any susceptible persons.
- to inform their local public health unit should they develop mumps.

6.0 REPORTING

Notify the YCDC or CMOH (after hours and weekends) as soon as possible about cases of mumps that meet the suspect, clinical/probable or confirmed case definitions.

Fax the completed Measles, Mumps and Rubella Case Report Form to YCDC at (867) 667-8349.

See Section 10.0 Measles, Mumps, and Rubella Case Report Form.

7.0 OUTBREAK MANAGEMENT

A mumps outbreak is defined as confirmed cases in excess of what is expected in the jurisdiction over a given period of time.

The public health response to increased mumps activity includes managing cases, identifying and managing contacts, identifying social networks when individual follow-up is not feasible, and maintaining/enhancing surveillance for further cases and disease outcomes. Generally, a mumps outbreak is managed by the following methods:

- defining the at-risk populations and transmission settings;
- preventing further transmission through isolation of cases and contact education/awareness;
- protecting susceptible populations with immunization (where no contraindication to MMR vaccine exists); and
- good risk communication.

7.1 Intensify Surveillance

Conduct enhanced surveillance for additional cases of mumps including through notification of health care providers about the occurrence of mumps in the area and diagnostic testing.

Collect the case information required for reporting of cases. Plot an epidemic curve. Collect enough specimens to confirm the existence of an outbreak, and continue to collect sufficient specimens from each generation of cases to establish that mumps is the cause of illness, especially if non-specific symptoms predominate. Describe the outbreak in terms of person (including age and immunization history), place and time. Mapping cases by place of residence or work over time can be useful in delineating the population at risk and appropriate choice of denominator for rate calculations.

7.2 Immunization During an Outbreak

The Vaccination Program will be notified of the outbreak to coordinate services and vaccine supply if expanded immunization clinics are being planned.

Outbreaks limited to family or closely related groups in which the cases can be epidemiologically linked can be managed with a limited offering of vaccine.

Outbreaks that are community based with multiple generations of cases occurring in a geographic area and without epidemiologic links require broader messaging and offering of immunization.

There is no threshold of numbers of cases or rates above which expansion of control measures should be done (e.g., broader offering of vaccine). Control measures will be advised by the CMOH. These measures will need to be considered on a situation-specific basis. The characteristics of cases of mumps and the settings in which transmission is occurring should guide the focus of vaccination activity. Anyone who is not up to date on their immunization and resides within the outbreak area should be recommended the vaccine as this is an opportunity to update their immunization status.

Immunization is not known to prevent mumps in those already exposed, but will protect against future exposures if given sufficiently in advance of that exposure (i.e., minimum 14 days) and will eventually interrupt the outbreak if it results in sufficient herd immunity.

Provide immunization clinics in locations readily accessible by the affected community including in high schools, on campuses and in “outreach” settings (e.g., churches, large workplaces with several cases of mumps).

7.3 Communication During an Outbreak

The CMOH and YCDC will notify Yukon health care providers at the start of the outbreak. This is to ensure diagnosis and reporting of cases but also to ensure health care worker immunization and infection control policies are fully implemented.

During an outbreak, YCDC in conjunction with the CMOH, notify local health care workers, hospitals, and school/post-secondary institutions about the outbreak and mumps immunization recommendations. Inform the public through use of local media, news releases and radio and newspaper news conferences. Additional promotion using flyers and posters may be done in targeted (e.g., affected) settings such as colleges/universities.

7.3.1 Contact notification

Contact notification will occur if resources permit. This may be undertaken by YCDC or Community Health Centre staff in collaboration with YCDC. Resources may not be sufficient to do this with a large number of cases. An alternative is contact notification by the case. Contacts should be informed by the case about their potential exposure and asked to do the following:

- review their immunization history or contact their local health centre for evidence of MMR vaccine receipt and get immunized if needed. Refer them to the Yukon's MMR Vaccine information: http://www.hss.gov.yk.ca/pdf/immunization_mmr_en.pdf
- watch for signs and symptoms of mumps. Refer them to the Mumps HealthLink BC File #14c available at http://www.healthlinkbc.ca/healthfiles/hfile14c.stm;
- contact local health care provider should symptoms occur; and
- isolate themselves if symptomatic until a clinical assessment has been done to confirm mumps diagnosis.

Depending on the epidemiology of the outbreak, alternative follow-up mechanisms (e.g., letter, Internet, public service announcement, press release, toll-free telephone number) should be considered to reach contacts and provide information to other at-risk groups.

7.3.2 Guidelines for mass gatherings

Gatherings at which mumps can be transmitted include events of all sizes, in both private and public settings. Gatherings may include social or religious functions, sports activities, shopping events, concerts, conferences, meetings as well as public transit. During an outbreak, events need not be cancelled.

Jurisdictions may consider postponing gatherings that pose a high-risk for transmission or involve unimmunized populations. In the context of a mumps outbreak, public health and event organizers should advise participants:

- of the potential for exposure and of measures to take to reduce risk of spreading the disease (e.g., check that immunization is up-to-date, hand hygiene, avoid sharing food/drink/utensils, cough or sneeze into crook of elbow, stay home if ill);
- about mumps symptoms and prevention; and
- that if they become ill, they should call ahead before visiting their health-care provider.

Refer individuals to HealthLink BC for more information:

- Phone HealthLine 8-1-1
- Website: http://www.healthlinkbc.ca/kbaltindex.asp

7.4 Analyze the Outbreak

Review the effectiveness of the local control measures and revise local protocols as necessary. Following an outbreak, an epidemiological analysis of events provides a useful local reference.

7.5 Health Care Workers

The following are recommended for management of health care workers in settings where mumps cases are being assessed in the context of a **community-based outbreak**:

- Identify areas of the facility (e.g., parts of the hospital) where exposures are likely to occur, such as the emergency room and laboratory areas;
- Review immunization records of HCW employed in these areas;
- Update immunization status as per the institutions policy; and
- Provide information on mumps disease and its symptoms.

Advise health-care workers to immediately notify Occupational Health and/or Infection Control for their facility should they develop symptoms of mumps.

8.0 CLINICAL DESCRIPTION

Mumps is an acute infectious disease caused by the mumps virus. It is characterized by swelling of one or more of the salivary glands, most commonly the parotid glands (parotitis), which may be unilateral but is more commonly bilateral. Sometimes the sublingual or submaxillary glands are involved.

Parotitis may be preceded by a non-specific prodrome lasting three to five days with fever, headache, malaise, myalgia, and anorexia. About 20 to 30 per cent of those infected develop acute parotitis. Non-specific or primarily respiratory symptoms occur in about half of those who acquire infection and in children

under five years old mumps can present as a primarily lower respiratory infection. Fever lasts one to six days but enlargement of the parotids may persist 10 days or longer.

While mumps virus is the major etiologic agent of parotitis, this condition can also be caused by other viruses such as Coxsackie, influenza A, parainfluenza and Epstein Barr virus, as well as bacteria such as streptococci and staphylococci.

Up to 30 per cent of mumps infections are sub-clinical. Although complications are relatively frequent, permanent sequelae are rare. Before the widespread use of mumps vaccine, mumps was a major cause of viral meningitis. Mumps meningoencephalitis can, rarely, result in permanent neurologic sequelae, including paralysis, cranial nerve palsies and hydrocephalus. Transient but occasionally permanent deafness may occur at an estimated rate of 0.5 to 5.0 per 100,000 reported mumps cases. Orchitis occurs in 20 per cent to 30 per cent of post-pubertal male cases, mastitis in up to 31 per cent and oophoritis in five per cent of post-pubertal female cases. Involvement of the reproductive organs is commonly unilateral; therefore, sterility as a result of mumps is rare. Neither wild type infection nor vaccination provides a lifelong guarantee of immunity.

Mumps infection during the first trimester of pregnancy may increase the rate of spontaneous abortion, but mumps infection in pregnancy has not been associated with congenital malformations.

9.0 EPIDEMIOLOGY OF MUMPS IN CANADA

Prior to 2007

The number of reported mumps cases has decreased from an average of 34,000 cases reported per year in the early 1950s to fewer than 400 cases per year in the early 1990s. During the period 2000–2006, an average of 79 cases was reported annually, ranging from 28 in 2003 to 202 in 2002. From 1996 to 2006, Canada had five outbreaks, with the number of cases ranging from 13 to 193. These outbreaks primarily involved pre-school or school-aged children, adolescents and young adults.

Over time, the age distribution of mumps cases in Canada has changed. The proportion of reported cases aged 20 years and older increased from 14 per cent in 1988–1990 to 64 per cent in 2003–2005. Conversely, the proportion of cases aged one to nine decreased from 49 per cent to 17 per cent during the same period.

On the basis of the community epidemiology of mumps, most people born before 1970 in Canada are immune to mumps, as they were likely exposed to the wild mumps virus that was circulating during their childhood. In the majority of jurisdictions, most people born between 1990 and 1994 (depending on the province/territory of residence) have been offered two doses of mumps-containing vaccine following the introduction of a second dose of MMR vaccine for measles control in 1996 and 1997, either during a mass campaign or as part of the routine schedule. This left a possibly susceptible cohort of people born between 1970 through 1990 (to a lesser extent through 1994) who were offered only one dose of mumps-containing vaccine and who are not assumed to have natural immunity.

It is important to note that the age at which natural immunity to mumps can be assumed to have been acquired is not known with certainty and that some individuals born before 1970 may still be susceptible to mumps.

After 2007

As of March 5, 2008, 1,284 confirmed cases of mumps had been reported in Canada with symptom onset in 2007. The vast majority of cases (1,159: 90 per cent) were from Nova Scotia, New Brunswick and Alberta. The majority (58 per cent) of cases occurred in persons aged 20–29, many of whom were college or university students. Both sexes were equally affected.

The particular susceptibility among those who are college/university-aged is multifactorial. They are too young for natural immunity and too old for inclusion in routine two-dose MMR immunization programs. Mumps has a fairly long infectious period and a long incubation period (14 to 25 days), and 20 to 30 per cent of infectious cases show no signs or symptoms. In addition, the very social and mobile lifestyles of this age group appear to be facilitating disease transmission and interfering with control measures. Young people in this age group tend not to adhere to isolation requests and they generally do not participate when immunization is offered. Furthermore, post-secondary students often share living/sleeping arrangements, many are involved in competitive sports, and many frequent bars/pubs/nightclubs, as well as travel during school holidays and breaks. Additional cases in this demographic group, and possibly other jurisdictions, would not be unexpected.

Immunization history was known for less than half of the mumps cases (586: 46 per cent) reported in 2007. Of these, 45 (eight per cent) had received two or more doses, 430 (73 per cent) had received one dose, and 111 (19 per cent) had received no doses of mumps containing vaccine *(*Canadian Communicable Disease Report, 2010*).*

Since 2010, a notable outbreak of mumps in Canada occurred in 2011 in BC with 132 confirmed cases among BC residents. This outbreak started in January in the ski resort of Whistler and spread to the Lower Mainland, peaking in the first week of July. The outbreak was consistent with prior Canadian outbreaks with the median age of 27 years. Immunization history was known for the majority of cases (82.5 per cent). Of these, 7 (five per cent) had received two or more doses, 68 (52 per cent) had/ likely had received one dose of mumps vaccine (including 46 cases with a verbal history of receipt of childhood vaccines), and 26 (20 per cent) had received no dose of mumps immunization (BC Centre of Disease Control, 2012).

From 1989 to 2013 Yukon has seen low numbers (< 15 cases) of sporadic cases of mumps.

9.1 Mumps Immunization in Yukon

In 1974, a combined live attenuated measles, mumps- and rubella-containing vaccine was introduced for children 12 months of age and older. In 1996, a second dose of MMR vaccine was introduced at age 18 months as part of the routine schedule and in the same year a second dose of measles vaccine was provided through a mass vaccination campaign in schools. In 2012 the

second dose of MMR was moved to school entry and is given at 4-6 years of age (Yukon Immunization Program Manual, 2012).

In 2014, 18 years after implementation of a measles 2-dose policy, most children and adolescents aged up to about 20 years old who have lived their lives in Canada will have received two doses of mumps vaccine given as MMR vaccine, and those up to about 45 years of age will have been offered one dose of MMR vaccine. Those older than about 45 are likely to have naturally acquired immunity as mumps continued to circulate prior to and during the first several years of immunization programs in Canada.

10.0 MEASLES, MUMPS, AND RUBELLA CASE REPORT FORM

Complete and fax the "Measles, Mumps and Rubella Case Report Form" to YCDC (867) 667-8349.

10.1 Instructions for Completing the Report Form

A. PERSON REPORTING

Record name and phone number of person completing the form.

B. CASE INFORMATION

Complete identifying information about the case. Include name of the case's regular physician. If the case doesn't have a physician but did see a health care provider regarding the current illness, record that health care provider's name. Record whether the case is a health care worker or attends child care, school or university.

C. CLINICAL AND LABORATORY INFORMATION

Laboratory tests: refer to individual disease guidelines for information regarding appropriate lab testing to confirm the case.

Symptoms/ Signs/ Complications: check all experienced in the course of this illness.

D. CASE HISTORY

MMR Immunization History: Ascertain immunization history of every case.

Incubation period: The incubation period is the time interval from contact with an infectious person until first symptoms appear. By using the average incubation period time intervals, it is possible to determine the period of time when the case was exposed to an infectious person who was their source of infection. Determine the likely exposure period by referring back from date of

symptom onset in case. Calculate the likely dates of the exposure period by counting back from the date of onset using the range (min and max) of specified incubation periods.
Determining the likely exposure period is important in assessing where the case was infected and whether there may be other unidentified cases developing from the same exposure.

Prodrome: The prodrome is an early non-specific sign or symptom that indicates the start of the illness before disease-specific symptoms (such as cough, coryza or conjunctivitis for measles) occur. Infectiousness can begin prior to onset of prodromal illness (e.g., for measles the period of communicability usually starts one to two days before the onset of prodromal symptoms).

Period of communicability: The period of communicability is the time interval when the case can transmit the infection to others. Determining the case's period of communicability is essential to contact management. Determine the dates during which the case was communicable by referring back to dates of prodrome or illness onset, and reviewing the specified period of communicability before/after onset of symptoms.

E. CONTACT MANAGEMENT

The contact tracing worksheet is intended to facilitate follow up of contacts. Its completion is optional.

Refer to the guidelines for each disease (i.e., measles, mumps and rubella) for the definition of a "contact" before conducting contact tracing and follow up.

Submit the completed MMR Case Report Form by fax to YCDC (867) 667-8349.

10.2 Measles, Mumps, Rubella Case Report Form

Disease: ☐ Measles ☐ Mumps ☐ Rubella

REPORT CASES OF MEASLES, MUMPS AND/OR RUBELLA TO YCDC OR MOH (AFTER HOURS AND WEEKENDS) THAT MEET SUSPECT, PROBABLE/CLINICAL OR CONFIRMED CASE DEFINITIONS. **FAX THIS FORM TO YCDC AT 867-667-8349**. Information is collected under the authority of the *Health Act* and the *Public Health Act* for purposes of providing health services and public health services. Queries should be directed to the Manager of Yukon Communicable Disease Control, at (867) 667-8323 or toll free, at 1-800-661-0408, ext. 8323.

A. PERSON REPORTING

Location: Health Centre/Clinic/ER _____ Date of report: _____/____/_____ (YYYY MM DD)

Name of HCW reporting: _____ (First name) _____ (Last name) Phone number: (____) _____

E-mail: _____ Fax: (____) _____

B. CASE INFORMATION

Personal Health #: _____ Name: _____ (First name) _____ (Last name) Sex: ☐ Male ☐ Female

Date of birth: _____/_____/_____ (YYYY MM DD) Country of birth: ☐ Canada ☐ Other (Specify) _____

Street address: _____ City: _____ Province: _____

Postal code: _____ Phone numbers (home/office/cell): _____

Attending Physician: _____

☐ Health Care Worker[1] ☐ Attends child care, school, or university; specify where: _____

Is the case pregnant? ☐ Yes ☐ No ☐ Unknown

Is the case Aboriginal?[2] ☐ Yes ☐ No ☐ Unknown

C. CLINICAL INFORMATION

Case status: ☐ Confirmed ☐ Probable/Clinical ☐ Suspect **** For case definitions see attached appendix***

Did the case visit a physician? ☐ Yes ☐ No ☐ Unknown Did the case visit an ER? ☐ Yes ☐ No ☐ Unknown

Was the Case Hospitalized (>24 hours)? ☐ Yes (_____ days) ☐ No ☐ Unknown

Name of Hospital:_____ Reason for hospitalization: _____

If yes, was case admitted to an Intensive Care Unit? : ☐ Yes ☐ No ☐ Unknown

Outcome at the time of reporting: ☐ Recovered ☐ Sick ☐ Died ☐ Unknown If died, date of death: _____/_____/_____ (YYYY MM DD)

SIGNS/SYMPTOMS:

☐ Conjunctivitis	☐ Maculopapular rash	☐ Post-auricular, occipital and posterior cervical lymphadenopathy	☐ Encephalitis
☐ Coryza (runny nose)	☐ Arthralgia (painful joints)	☐ Bilateral parotitis (Sublingual/ submaxillary glands)	☐ Hearing loss
☐ Cough	☐ Fever	☐ Unilateral parotitis (Sublingual/ submaxillary glands)	☐ Koplik spots
☐ Pharyngitis/sore throat	☐ Myalgia	☐ Orchitis/oophoritis	☐ Meningitis
☐ Other(specify): _____			
Date of onset of prodromal symptoms[3]: _____/_____/_____ Did the case visit a diagnostic laboratory? Y / N			

Date of onset of parotid swelling/orchitis/rash: _____/_____/_____ (YYYY MM DD) If yes, name of institution: _____

Duration of parotid swelling/orchitis/rash (days): ____

D. CASE IMMUNIZATION HISTORY

Is case a conscientious objector to vaccination? ☐ Yes ☐ No ☐ Unknown

Record prior vaccination against this disease:

Vaccine Name	Date Received (YYYY/MM/DD)	Age (Yrs)	Province/Territory or Country of receipt (if known)
1.			
2.			
3.			
4.			

If there are no documents of prior vaccination available:

No documented prior immunization but patient recall indicates vaccine history, specify: _____

E. EXPOSURES

INCUBATION PERIOD: time interval from contact with infectious person until first symptoms appear

Measles – average time from exposure to onset is 8-12 days (range: 7-18 days)
Mumps – average time from exposure to onset is 16-18 days (range: 12-25 days)
Rubella – average time from exposure to onset is 14-17 days (range: 14-21 days)

Exposure period: Earliest possible exposure _____/_____/_____ (YYYY MM DD) Latest possible exposure _____/_____/_____ (YYYY MM DD)

Did the exposure occur in a health care setting? ☐ Yes ☐ No ☐ Unknown

During exposure period:

Travel[4]: ☐ Yes ☐ No ☐ Unknown

If yes, travel within Canada: ☐ Yes ☐ No ☐ Unknown If yes, specify where _____when_____

travel outside Canada: ☐ Yes ☐ No ☐ Unknown If yes, specify where _____when_____

Contact with a known case: ☐ Yes ☐ No ☐ Unknown

If yes, specify whom_____ where_____ when _____

Notes: _____

Contact with a visitor from outside of Yukon? ☐ Yes ☐ No ☐ Unknown

If yes, specify when: _____ Visitor's residence: _____

Contact in a known outbreak location: ☐ Yes ☐ No ☐ Unknown

If yes, specify where_____ when _____

F. LABORATORY INFORMATION (Please also complete the 2nd table if tested for more than one disease)

Laboratory Tests: ☐ Yes ☐ No ☐ Unknown Test results for disease diagnosed

Specimen Collected		Collection Date (YYYY/MM/DD)	Results
☐ Throat, nasopharyngeal or buccal swab (circle specimen collected)			☐ Positive ☐ Negative ☐ Indeterminate ☐ Pending
☐ Urine			☐ Positive ☐ Negative ☐ Indeterminate ☐ Pending
☐ Blood	IgM		☐ Positive ☐ Negative ☐ Indeterminate ☐ Pending
	IgG (acute)		☐ Positive ☐ Negative ☐ Indeterminate ☐ Pending
	IgG (convalescent)		☐ Positive ☐ Negative ☐ Indeterminate ☐ Pending

Other relevant test results: _____

[1] Any individual who is regulated by the *Health Professions Act* including doctors, nurses, dentists, physiotherapists, occupational therapists

[2] Any individual who self identifies as Aboriginal

[3] Prodome: early non-specific sign(s) or symptom(s) that indicate the start of the illness before disease-specific symptoms occur
Measles*: three to four days before rash (i.e., fever, cough, coryza, conjunctivitis*
Mumps*: three to five days before parotitis (i.e., myalgia, anorexia, malaise, sore throat, headache, low-grade fever)*
Rubella*: one to five days before rash (i.e., fever, headache, malaise, coryza)*

[4] Any travel outside the city of residence should be included

MEASLES, MUMPS AND RUBELLA CASE-RELATED CONTACT SUMMARY FORM
CONGENITAL RUBELLA SYNDROME (CRS)/CONGENITAL RUBELLA INFECTION (CRI) CASE

Please complete this form once follow-up with contacts is complete. Complete this form for each reported case of Measles, Mumps and/or Rubella that meets the suspect, probable/clinical or confirmed case definitions.
FAX THIS FORM TO YCDC AT 867-667-8349

PERIOD OF COMMUNICABILITY: time interval when the case can transmit the infection to others
Measles: one to two days before onset of prodomal symptoms and up to four days after rash onset
Mumps: maximum infectiousness occurs between two days before to five days following the onset of parotid swelling
Rubella: seven days before to at least seven days after rash onset

Period of communicability: From _____/_____/_____ To _____/_____/_____
YYYY MM DD YYYY MM DD

Manage case contacts based on this date range. Include contact summary in Section E Contact Management.

Note: If travel occurred during the period of communicability notify BCCDC of travel itinerary

G. CONTACT TRACING

Case Health Care #: _____ Case name: _____ _____
First name Last name

Date of birth:_____/_____/_____ Sex: ☐ Male ☐ Female
YYYY MM DD

Total number of contacts: _____

Number of susceptible contacts: _____ Number of immune contacts: _____

Number of contacts that received MMR: _____ _____ within 3 days _____ within 4 to 6 days

Number of contacts that received Ig: _____

Number of contacts by setting type:

_____ Household _____ School, day care

_____ Workplace (not including doctor's office, Emergency Room or hospital)

_____ Health care setting (doctor's office, ER, hospital)

_____ Other, please specify: _____

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12.0 CONTACT INFORMATION

Yukon Communicable Disease Control
Hours: Monday- Friday (08:30 to 16:30)
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone: Local (867) 667-8323
Within Yukon 1-800-661-0408, ext. 8323
Fax: (867) 667-8349

Dr. Brendan E. Hanley MD CCFP (EM) MPH
Chief Medical Officer of Health, Yukon
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone: Office: (867) 456-6136
Cell: (867) 332-1160
Fax: (867) 667-8349

Whitehorse General Hospital
(Ambulatory Care)
#5 Hospital Road, Whitehorse, YT Y1A 3H7
Telephone: (867) 393-8700
Fax: (867)393-8707
WGH Laboratory telephone: (867) 393-8739